

Vulnerability Atlas of India

3rd Edition

2019



Building Materials & Technology Promotion Council
 Ministry of Housing & Urban Affairs
 Government of India

Earthquake, Windstorm, Flood, Landslide, Thunderstorm
 Maps and Damage Risk to Housing

Vulnerability Atlas of India

(Earthquake, Windstorm, Flood, Landslide,
Thunderstorm Maps and Damage Risk to
Housing)

3rd Edition

March, 2019



Building Materials & Technology Promotion Council
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HARDEEP S PURI
 MINISTER OF STATE (I/C) FOR HOUSING & URBAN AFFAIRS
 GOVERNMENT OF INDIA



MESSAGE

The Indian sub-continent, like many other regions in the world, is vulnerable to a number of natural hazards. Earth quakes, wind storms, cyclones, landslides, floods, thunderstorms, based on the prevalent geo-climatic conditions are typical examples of this vulnerability.

India has witnessed several disasters leaving a trail of destruction and irreparable loss of lives. Rapid urbanisation and increased density of population in cities need to be factored into our preparation to anticipate and adequately prepare to meet such threats.

A comprehensive pro-active approach consisting of prevention, reduction and mitigation constitutes an essential component of disaster management. Recognizing the vulnerability of the Indian sub-continent, the Disaster Management Act was enacted in 2005, followed by a National Policy for Disaster Management in 2009 and the National Disaster Management Plan in 2016. Internationally, 1990-2000 was declared as International Decade for Natural Disaster Reduction (IDNDR) by the UN General Assembly, which was subsequently supported by the Yokohama Strategy for Safer World in 1994, Hyogo Framework for Action (2005-2015) and Sendai Framework for Disaster Risk Reduction in 2015-2030. All these policy frameworks brought a paradigm shift in disaster risk management from post-disaster relief centric measures to pro-active pre-disaster preventive measures.

The Building Materials and Technology Promotion Council (BMTPC) is committed to promote the proactive approach towards disaster mitigation and management and has been at the forefront in educating professionals and creating mass awareness amongst various stakeholders including citizens. The Vulnerability Atlas of India brought out by BMTPC in 1997 and 2006 has proved to be a useful tool for a proactive disaster management policy. With changes in the housing scenario, formation of newer States, availability of more information on natural hazards, seismo-tectonic details and meteorological data, the revision of the Atlas has become necessary.

I am happy that BMTPC has now prepared the third edition of the Vulnerability Atlas of India which includes hazard maps of earthquakes, wind/cyclones, floods, landslides, thunderstorms and vulnerability risk tables based on available latest data. I trust this will help in enhancing preparedness of Governments and various other agencies in mitigating natural disasters.

Human lives are precious. Every public functionary tasked with the responsibility of disaster prevention as also all district authorities must, therefore, integrate the salient aspects of the Vulnerability Atlas into their relevant Standard Operating Procedures. This is an imperative we ignore at our own peril.

I congratulate BMTPC in bringing out this document.

New Delhi
 19 February, 2019


 (Hardeep S Puri)

bmpc



DURGA SHANKER MISHRA
 SECRETARY
 MINISTRY OF HOUSING & URBAN AFFAIRS
 GOVERNMENT OF INDIA



MESSAGE

Our country has certain disaster prone areas. High vulnerability of its physical and socio-economic profile characterize the disaster scenario of the subcontinent which has been, traditionally, facing different types of natural calamities that often turn into disasters, causing high loss of life and property.

Considering the vast size, its unique regional features and the need for comprehensive proactive approach to managing disaster, the Government of India, during the International Decade for Natural Disasters Reduction (IDNDR) had taken several initiatives. With the initiative of the erstwhile Ministry of Urban Development and Poverty Alleviation, a Vulnerability Atlas of India on the occurrence of earthquakes, cyclones and floods was brought out by the Building Materials & Technology Promotion Council (BMTPC) in 1997. The second edition of Vulnerability of India was brought out by BMTPC in 2006 based on Census 2001 data using GIS tools and digitized maps were developed for the first-time providing hazard and seismo-tectonic information up to district level. I am happy that the Atlas has since served as one of the valuable tools for developing proactive approaches and strategies as part of the ongoing national and state level efforts for disaster mitigation.

The need for further Revision of the Atlas of 2006 was necessitated due to changes in hazard scenario, creation of new states and districts, availability of new data for housing as per Census of India 2011 etc. Therefore, the Ministry of Housing and Urban Affairs constituted a Peer Group with representation from different concerned agencies. The Peer Group after considering all aspects in detail, through a series of meetings and dialogues, prepared the third revision of Vulnerability Atlas of India giving the Hazard Maps with respect to earthquakes, wind/cyclones, floods, landslides and thunderstorm in digitized form as well as district-wise housing tables giving distribution of houses by predominant materials of roofs & walls and level of damage risk based on Census 2011 data.

The latest information on the possible intensities that may be obtaining in the event of natural hazards and the resulting risk level to housing and buildings will be very useful to the state and national authorities, NITI Aayog, Members of State legislatures and the disaster managers at different levels.

I am happy that the Building Materials & Technology Promotion Council (BMTPC) has brought out third revision of the Vulnerability Atlas of India. I hope, the Atlas would be useful while formulating plans for natural disaster prevention, preparedness and mitigation in different States by bringing in the necessary modifications in the landuse zoning practices, building bye-laws and regulations.

I wish BMTPC success in their endeavor!

(Durga Shanker Mishra)

New Delhi
 08 January, 2019

THE PEER GROUP

Constituted by Ministry of Housing and Urban Affairs (erstwhile MoHUPA), Government of India, for Updation and Revision of Vulnerability Atlas of India with respect to earthquakes, wind/cyclones and floods

(Office Memorandum No. I-21011/1/2015-HFA-IV/FTS-13218 dated June 18, 2015)

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INTRODUCTION

India has a history of disasters leading to irretrievable losses to lives and properties on account to its geological settings and distinct demography. Natural hazards which can be broadly classified into geophysical hazards (earthquakes, landslides & tsunamis), hydrological hazards (floods), meteorological hazards (cyclones, storm surges), and climatological hazards (thunderstorms) are common phenomenon in Indian subcontinent, however the recurrent hazards leaving trail of destruction is the cause of worry. Realizing the need, there have been concerted efforts made by Government of India to bring paradigm shift in its approach towards disaster risk reduction. The traditional 3 Rs (Rescue, Relief & Restoration) are now replaced by 3 Ps (Prevention, Preparedness & Proofing) and pro-active pre-disaster preventive measures are part and parcel for building a New India by 2022 (75th year of Indian independence) as envisioned by Hon'ble Prime Minister. Some of the watershed moments in the annals of disaster management in India are enactment of Disaster Management Act, formulation of Disaster Management Policy and National Disaster Management Plan which are in line with UN resolutions, Hyogo framework (2005-15), Sendai framework (2015-2030) on natural disaster reduction and sustainable development goals. As regards techno-legal regime towards disaster risk reduction, India can boost to have in place the model town & country planning legislation, zonal regulations, development control, building regulation/byelaws for natural hazard zones of India, model building byelaws and comprehensive Indian standards on disaster management.

BMTPC under the Ministry of Housing & Urban Affairs has always played a positive role towards disaster resilience of the country and disseminating hazard resistant construction methodologies through publication of guidelines, damage assessment reports, demonstration construction, retrofitting of life line structures, expositions and capacity building. During its journey, it was realized that there is need to collate the existing hazard scenario w.r.t. earthquake, wind/cyclone and flood for the entire country delineating state/UT and district boundaries and ascertain vulnerability (level of damage risk) of existing housing stock. The then Ministry of Urban Development, constituted an expert group and the first ever Vulnerability Atlas of India was published in 1997. It was first of its kind tool which proved to be an innovative tool for assessing not only district wise hazard but also vulnerability and risk level of housing stock.

The Vulnerability Atlas of India published by BMTPC was commended as “useful tool for policy planning on natural disaster prevention and preparedness, especially for housing and related infrastructures” by the United Nation Centre for Human Settlement, Nairobi, Secretariat for International Decade for Natural Disaster Reduction (IDNDR). The IDNDR also adjudged the project with high demonstrative value.

The Atlas was greatly utilized by State Governments and their agencies as a valuable guide for evolving micro level action plans for reducing the impact of natural disasters, as the highest losses are suffered by damages and destruction caused by, of housing and buildings, causing loss of lives and disruption of socio-economic activities of communities.

The basic premise of development of the Atlas was to use the existing data from Government nodal agencies such as Indian Meteorological Department (IMD), Survey of India (SOI), Geological Survey of India (GSI), Census of India, Bureau of Indian Standards (BIS), Central Water Commission (CWC). Since, Census publishes housing, population and other demographic data every 10 years, it was decided that Atlas needs updation keeping the latest Census data and incorporating the latest data from other resources with regard to earthquake, wind/ cyclone & floods and updated demographic, scientific and engineering information.

Accordingly, the second edition of Vulnerability Atlas of India was brought out by BMTPC in 2006 based on Census 2001 data using GIS tools and digitized maps were developed for the first-time providing hazard and seismo-tectonic information up to district level. Based on Census Housing Stock data, housing risk tables up to districts were also published based on distribution of houses by predominant material of roof and wall. In the second edition of the Atlas, to project earthquake hazard, new earthquake hazard map of India, (IS 1893:2002 -Part 1) brought out by Bureau of Indian Standards by merging Seismic zone I and II and extending zone III in the States of Maharashtra, Karnataka and Tamil Nadu, was used. All the datasets in the various maps including boundaries of the States and Districts in digitized form taken from the Survey of India maps and the boundaries of the various Hazard zones and Seismo tectonic details were digitized to bring more accuracy in the maps. Other important modifications were inclusion of landslide map based on Landslide Atlas (2003) brought out by BMTPC and revision of risk tables on the basis of 2001 Census data, with district names according to 2001 Census. The revised Atlas was published under the auspices of a Peer Group set up by then Ministry of Urban Development and Poverty Alleviation, Department of Urban Employment and Poverty Alleviation (now Ministry of Housing and Urban Affairs), Government of India for revision of the Atlas.

The Atlas thus published provided hazard maps on larger scale in digitized form so that the information is readily available to the planners, administrators and disaster managers in a user-friendly way. The state maps indicating district boundaries and names of the district towns for ease of identification of hazard zone boundaries in each district, information regarding the housing stock and the various house types, and vulnerability of existing house types based on observed performance through district-wise risk tables provided a unique platform for state and district administration to work out their disaster mitigation & management plans. Strengthening of techno legal regimes and structural measures for safer construction and retrofitting of existing houses could be more effectively implemented with the latest information available in this Atlas.

Since the publication of Vulnerability Atlas of India (2006), there has been invaluable feedback from users on the Atlas. Also, Vulnerability Atlas of India was brought out in digitized CD form in 2008 and was also uploaded on National Informatics Centre (NIC) platform. National Institute of Disaster Management (NIDM), Government of India also used the Atlas for training SAARC countries so as to prepare the region towards disaster risk reduction.

There have been subtle changes in the available knowledge and information in the area of disaster mitigation and management. New datasets with respect to earthquake occurrence, cyclones, wind storms, landslides, thunderstorm etc. have been brought out by nodal government agencies. There are demographic changes also on account of formation of new States and new districts. Thunderstorms, urban flooding, flash floods have also caused significant damages to lives and properties.

With the advancement of scientific & technical knowledge, addition of new datasets, experience of disasters caused due to earthquakes, cyclones, damages potential of landslides/mass movements, floods, frequent thunderstorms, failures of roadways and railways during disasters, changes in the political map of the country, new data statistics of walling and roofing data of houses; the revision of the Atlas was initiated by the Peer Group set up by the Ministry of Housing & Urban Affairs vide OM No.I-21011/1/2015-HFA/FTS-13218 dated 18th June 2015. The revised Atlas 2019 contains following new special features:

- State and district boundaries as per Survey of India's digitized data.

- Inclusion of railways, national highways, expressways and water bodies in hazard maps.
- Inclusion of Housing/Population data as per Census 2011 in hazard maps.
- Inclusion of landslide Incidence Maps with detailed note on landslide occurrences and effects.
- Inclusion of Map showing frequencies of Thunderstorms at different stations in the country and corresponding note on causes and effect of thunderstorms.
- Digitisation of all data sets in the various maps including boundaries of the States and Districts according to the Survey of India Maps as well as the boundaries of the various hazard zones, thus improving their accuracy.
- The Vulnerability and Risk Tables of Housing Data in each district is now based on wall types and roof types as per 2011 Census data. The district names and reference numbers are taken according to 2011 Census for ease of cross reference.

It is my proud privilege and honour to present to nation the third edition of Vulnerability Atlas of India 2019 for hazard assessment up to district level and understanding the level of risk to the housing stock in each district of the country. It is a useful tool for urban managers including Mayor/MP/Chairperson/Municipal Commissioners, Additional/Assistant Municipal Commissioners, Town planners, departmental offices and other executives of municipal corporations/councils/municipalities who have role in formulating, approving and implementing various urban renewal scheme in their respective urban local bodies for (a) preventive actions like hazard resistant construction, retrofitting and upgrading of existing buildings, (b) mitigating the intensity and extent of the disaster, (c) warning system installation and drills for its use, (d) instituting a hierarchical structure for preparedness down to the village level, (e) training of manpower in various tasks in the emergency, (f) implementation of land zoning regulations in flood plains and coastal areas, and building byelaws with disaster resistant features in various towns and cities, etc.

Let us prepare ourselves for disasters by expanding our knowledge so as to have zero tolerance towards loss of lives in case of future disaster

Dr. Shailesh Kumar Agrawal
Executive Director, BMTPC

PREFACE

In any programme of disaster prevention, mitigation and preparedness, the first and the foremost task is to identify the vulnerable areas where the impact of natural disasters namely, earthquakes, cyclones, floods and landslides could reach disastrous intensity for the affected communities. Equally important is to identify the man-made buildings and structures and infrastructures which will be exposed to the hazards, to assess the vulnerability of these exposures and determine the disaster risk to the communities. In the preparation of the Vulnerability Atlas of India (2019), the Peer Group attempts to fulfil these requirements. Relevant information regarding the Atlas is given here below:

Hazard Maps - The monitoring of hazards is being carried out by the following most important organizations in the country: Seismic occurrence and cyclone hazard monitoring by India Meteorological Department (IMD) and flood monitoring by the Central Water Commission. In addition, noteworthy contributions are made by Geological Survey of India in mapping of Seismic Hazard & collation of landslide incidences and the Department of Earthquake Engineering, University of Roorkee (now Indian Institute of Technology, Roorkee) on all aspects of engineering concerning seismic risk. It is noted that the Bureau of Indian Standards Committees on Earthquake Engineering and Wind Engineering have already prepared a Seismic Zoning Map and the Wind Velocity Map including cyclonic winds for the country, and the Central Water Commission has prepared a Flood Atlas of India.

The Group has used these hazard maps to prepare 1:2 million scale maps by superposing the above available data on Survey of India map of this scale as the base map. The earthquake, wind storm and flood hazard maps are drawn for each State and Union Territory separately in which the various district boundaries are clearly shown for easy identification of the hazard risk prone areas. The landslide incidence maps and thunderstorm incidence maps are also presented in the Atlas from data provided by the nodal agencies i.e. Geological Survey of India (GSI) and Indian Meteorological Department (IMD), respectively. The seismic zones of India based on intensities of earthquakes on MSK scale and intensity of the wind hazard related with wind speed are shown on the maps clearly identifying the various intensity zones. Flood prone areas were earlier categorized in terms of unprotected and protected areas in 1997 Atlas. However, the division using protected areas were removed since when the protection fails under a large flood, the devastation in the 'so called protected' area becomes even more severe since people have a false sense of protection about the calamity they may face. No information is available on low lying areas in urban centres, which are liable to inundation during heavy rains, hence such areas could not be identified. Landslide Incidence Map besides giving landslide incidences also provide information on Annual State Rainfall Normals. Thunderstorm Incidence Map shows number of thunderstorm at a station during 1981-2010.

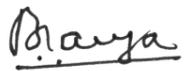
Vulnerability and Risk Assessment - It is noted that preliminary effort towards vulnerability assessment of buildings under seismic and cyclone intensities has been made by the Deptt. of Earthquake Engineering, Indian Institute of Technology, Roorkee and Structural Engineering Research Centre, Chennai, respectively. Taking guidance from that work, the types of housing as existing in each district has been taken from the Census of India, 2011 and categorised from vulnerability consideration. The vulnerability of these types to various intensities of the hazards including floods was estimated by the Peer Group based on knowledge gained in past disaster damage surveys, and the damage risk present in each district is presented accordingly in a separate table for each district wherein the area of the district prone to various hazard intensities has also been shown.

All buildings are likely to suffer severe damage if impacted by landslides, hence separate vulnerability levels to different building types could not be assigned.

The Vulnerability Atlas of India (2019) gives State-wise hazard maps and district wise damage risk tables for the country as a whole. The information and data given in the Atlas can be utilised by the Institutions and Disaster Management organizations for preparing damage scenarios in individual recurrence of hazards and for developing methodologies for mitigation and prevention.

It has been observed since the release of the first Atlas, that the Atlas has helped the planning agencies, the state and district administrations and the communities at panchayat levels in raising the level of awareness about the disaster proneness of the identified areas and the need for disaster preparedness and mitigation on a scientific and realistic basis.

It is hoped that the present Atlas, which is now also available in fully digitized format, will be more conveniently used for various disaster risk management planning, preparedness and mitigation.



Anand S. Arya
Chairman, Peer Group
New Delhi

December 12, 2018

ACKNOWLEDGEMENTS

BMTPC is known for its Vulnerability Atlas of India (VAI) worldwide since it is one of its kind disaster preparedness tool which has endeavored to bring all the scientific & engineering data pertaining to natural hazards on GIS platform and developed state wise hazard maps and district wise risk tables in terms of earthquakes, wind/cyclones and flood. Ever since its first publication in 1997, BMTPC has been perpetually striving to update its database as and when any value-added information percolate from the authentic sources and as a result, BMTPC has been successful in delivering the Vulnerability Atlas of India 2006 and now its third edition in 2019. This humongous task of collating information from different sources, departments would not have been possible only because organizations namely, India Meteorological Department (IMD), Geological Survey of India (GSI), Survey of India (SOI), Census of India (COI), Bureau of Indian Standards (BIS), National Remote Sensing Centre (NRSC), Central Water Commission (CWC), Department of Earthquake Engineering, IIT, Roorkee, Structural Engineering Research Centre (CSIR-SERC), Chennai, extended their full S&T support and cooperation and shared their data. BMTPC wishes to acknowledge profusely their contribution and place on record deep appreciations for respective heads of the organizations and the officers deputed for the task. The maps, datasets of these organizations have been used freely in evolving the Atlas.

The seed of Vulnerability Atlas of India was sown in 1994 and therefore, I would be failing my duties, if I do not acknowledge the contributions made by predecessors for making the Atlas reality. We have just taken the legacy forward with more value-addition.

The Ministry of Housing & Urban Affairs (erstwhile Ministry of Housing & Urban Poverty Alleviation / Ministry of Urban Development) deserves special mention in this effort for reposing faith in BMTPC and providing ministry's support in accomplishing the tedious tasks of bringing various organizations on one platform. I would like to place on record the invaluable contribution made by the Members of the Peer Group and the scientists and engineers for their enthusiastic cooperation extended in completing the various tasks.

The one person who germinated the idea of Vulnerability Atlas of India is Padamshree Prof. A.S. Arya who worked as a chairman for all the three Expert/Peer Groups responsible for bringing out three editions of Vulnerability Atlas of India. It is BMTPC's fortune to have him as Chairman and guide/mentor the entire proceedings and development of Atlas. Prof. Arya is the main force behind this huge task and we all worked under his direction and it can be safely said that Atals would not have been possible without his active support and encouragement. On behalf of BMTPC and Peer group, I wish to thank him for his effort and sincerely hope that he will help us further in developing many such documents. We salute to his vigor, undying approach and unstinted support to the cause of disaster management in India.

I also wish to thank the current Peer Group members, Shri Prabhas Pande, Former Addl. Director General, Geological Survey of India (GSI), Lucknow (in personal capacity); Prof. Y. Singh, Professor, Earthquake Engineering Department, IIT Roorkee; Dr. (Mrs.) S. Selvi Rajan, Chief – Scientist (Wind Engineering), Dr. K. Balaji Rao, Chief – Scientist (S.C.E&T/R.R.S.), Dr. P.Hari Krishna, Sr.Principal Scientist, CSIR-Structural Engineering Research Centre, Chennai; Dr. M. Mohapatra, Scientist G, Shri Charan Singh, Scientist E, National Weather Forecasting Centre, India Meteorological Department, New Delhi; Dr. Saibal Ghosh, Director, Geological Survey of India, New Delhi; Shri O.P. Gupta, Director (FE&SA), Central Water Commission, New Delhi; Dr. V. Bhanumurthy, Group Director, DMS Group & Project Director, NDEM, National Remote Sensing Centre, Hyderabad, for their contributions, guidance and support for the development of the Atlas. I also place on

record my deep appreciation to Shri Sharad Kr. Gupta, Dy.Chief (TDE&IC) & Shri J.K. Prasad, Former Chief (BM) of BMTPC for editing the maps, checking the text and bringing the Atlas to a presentable form.

Last but not the least, Shri Dalip Kumar, Sr.Field Officer (DC&E), BMTPC deserve special applaud and praise for preparing all the maps, vulnerability risk tables, digitization on GIS platform, data collection from agencies along with Mrs. Anita Kumar, Sr.Programmer and Ms. Charchika Shirivastava, GIS Assistant. The three editions of VAI are result of hard work and dedication of BMTPC team. The entire BMTPC family also deserves heartfelt thanks for supporting the work directly and indirectly.

Finally, I would express my deep appreciation and gratitude towards my Hon'ble Minister & President BMTPC Shri Hardeep Singh Puri and our Secretary and Chairman, BMTPC, Shri Durga Shankar Mishra for their guidance, support and unstinted encouragement.

Dr. Shailesh Kr. Agrawal
Executive Director, BMTPC

TO THE READER

It is well known that the collapse or severe damage to buildings during the occurrence of natural disasters such as earthquakes, cyclones and floods is the main cause for loss of lives of people and cattle and misery of the survivors. To minimise damage and disastrous impact therefore, mitigation strategy has to be focussed on the safety of buildings for the safety of their occupants. The first step to prepare a worthwhile strategy towards disaster reduction is to map the hazard prone areas and analyse the risk of damage to the buildings due to the hazards. The Vulnerability Atlas of India presents for each State and Union Territory of India the earthquake hazard map, the wind hazard map, and the flood prone area map. These maps show not only the boundaries of the hazard zones of various intensities but also indicate district-wise areas lying in the different intensities. For each of the districts, the housing stock as per 2011 census, the classification of the houses based on their wall material and roof type, the area of the district lying in a particular hazard intensity zone and the risk to the house types according to the intensity of the hazards is presented in a separate table. Besides, the earthquake, wind and flood prone maps, the landslide incidence maps and thunderstorm incidence map are also presented to provide proper information in this regard. The information so presented can be made use of by the readers as follows:

A householder can use the maps to locate himself in his district boundary and find the intensity of earthquake or wind hazard applicable to his locality. He can also find if his place is prone to floods or storm surge from the sea. From his district table, he can find for himself the level of risk that exists to the type of his own house. He can also find the landslide and thunderstorm incidences in his area. If he finds that the situation is risky, he should take appropriate action to upgrade and strengthen his house to meet the threat of the hazard.

The disaster manager of the district can easily determine the location and percent of area of the district most susceptible to hazard occurrences, the probable maximum hazard intensities, the type and number of housing units existing in the district and the risk to them from the hazards. Knowing the extent of the problems of future disasters, the district authorities can formulate development plans for (a) preventive actions required for hazard resistant construction, retrofitting and upgrading of existing buildings, (b) reducing the impact of different types of hazards, (c) installation of a warning system and required drills for its use, (d) setting up a hierarchical structure for preparedness down to the village level, (e) training of manpower for various tasks in the emergency, (f) implementation of land zoning regulations in flood plains and coastal areas and building byelaws with disaster resistant features in various towns and cities, etc.

Members of State Legislatures and the National Parliament can study the hazard problems in their constituencies and propose disaster mitigation programmes for their districts and the whole State for inclusion in the annual State Plans and the National Five Year Plans.

The State and National authorities and NITI Aayog may identify the districts most prone to severe disaster situations and those with multi-hazard situations requiring priority action in future planning, formulating integrated mitigation policies covering Awareness, Education and Training, Preventive and Preparedness Measures, Improvement in Warning Systems, etc. Development projects will need to include mitigation measures against the disaster impacts at the initial plan formulation as well as execution stages so that whatever is developed should not suffer damage later. The Atlas will be found immensely useful in that regard.

The Vulnerability Atlas has been structured to serve as a tool towards natural disaster prevention, preparedness and mitigation for housing and related infrastructure at local as well as national levels.

The Peer Group

CONTENTS

Introduction	v
Preface	vi
To The Reader	viii
List of Damage Risk Tables and Maps	ix
1. Introduction	1
2. Description of the Vulnerability Atlas	4
3. The Geologic Hazards	4
3.1. Earthquake and Seismic Zones	4
3.2. Landslides	5
3.3. Indian Volcanoes	7
4. Wind Hazard Maps	7
4.1. Basic Wind Speed Zones	7
4.2. Design Wind Speed and Pressures	7
4.3. Coastal Areas	8
4.4. Storm Surge	8
4.5. Tsunami	8
4.6. Thunderstorm	9
5. Flood Hazard Maps	9
5.1. Areas Liable to Flooding and Protected Areas	9
5.2. Probable Maximum Precipitation	10
5.3. Flooding In Coastal Areas	10
6. Housing Vulnerability Tables	10
6.1. House Types	10
6.2. Risk of Damage to House Types	10
6.3. Damage Risk Levels for Earthquakes	11
6.4. Damage Risk Levels for Wind Storms	11
6.5. Damage Risk Levels for Flood	11
6.6. The Housing Vulnerability Tables	11
7. Use of Vulnerability Atlas	12
8. Definitions of Some Disaster Related Terms	12
9. References	13
Annexures	
1. The Expert Group	17
2. The Peer Group	17
3. Constitution of Peer Group for Updation and Revision of Vulnerability Atlas of India by Ministry of Urban Poverty Alleviation, Government of India	18
4. Modified Mercalli Intensity Scale (ABRIDGED)	19
5. MSK 1964 Intensity Scale	19

LIST OF DAMAGE RISK TABLES AND HAZARD MAPS

S.NO.STATE/DISTRICT (TABLE NO.)	PAGE NO.
INDIA	21
EARTHQUAKE HAZARD MAP	22
WIND HAZARD MAP	23
FLOOD HAZARD MAP	24
LANDSLIDE INCIDENCE MAP	25
THUNDERSTORM INCIDENCE MAP	26
CYCLONE OCCURRENCE MAP	27
ANDHRA PRADESH (AP)	31
01 SRIKAKULAM (AP 01)	31
02 VIZIANAGARAM (AP 02)	32
03 VISAKHAPATNAM (AP 03)	32
04 EAST GODAVARI (AP 04)	33
05 WEST GODAVARI (AP 05)	33
06 KRISHNA (AP 06)	34
07 GUNTUR (AP 07)	34
08 PRAKASAM (AP 08)	35
09 S.P.S.NELLORE (AP 09)	35
10 Y.S.R (AP 10)	36
11 KURNOOL (AP 11)	36
12 ANANTAPUR (AP 12)	37
13 CHITTOOR (AP 13)	37
EARTHQUAKE HAZARD MAP	38
WIND HAZARD MAP	39
FLOOD HAZARD MAP	40
ARUNACHAL PRADESH (AR)	41
01 TAWANG (AR 01)	41
02 WEST KAMENG (AR 02)	42
03 EAST KAMENG (AR 03)	42
04 PAPUM PARE (AR 04)	43
05 UPPER SUBANSIRI (AR 05)	43
06 WEST SIANG (AR 06)	44
07 EAST SIANG (AR 07)	44
08 UPPER SIANG (AR 08)	45
09 CHANGLANG (AR 09)	45
10 TIRAP (AR 10)	46
11 LOWER SUBANSIRI (AR 11)	46
12 KURUNG KUMEY (AR 12)	47
13 DIBANG VALLEY (AR 13)	47
14 LOWER DIBANG VALLEY (AR 14)	48
15 LOHIT (AR 15)	48
16 ANJAW (AR 16)	49
EARTHQUAKE HAZARD MAP	50
WIND HAZARD MAP	51
LANDSLIDE INCIDENCE MAP	52

	ASSAM (AS)	53	19	SAMASTIPUR (BH 19)	80
01	KOKRAJHAR (AS 01)	53	20	BEGUSARAI (BH 20)	81
02	DHUBRI (AS 02)	54	21	KHAGARIA (BH 21)	81
03	GOALPARA (AS 03)	54	22	BHAGALPUR (BH 22)	82
04	BARPETA (AS 04)	55	23	BANKA (BH 23)	82
05	MORIGAON (AS 05)	55	24	MUNGER (BH 24)	83
06	NAGAON (AS 06)	56	25	LAKHISARAI (BH 25)	83
07	SONITPUR (AS 07)	56	26	SHEIKHPURA (BH 26)	84
08	LAKHIMPUR(AS 08)	57	27	NALANDA (BH 27)	84
09	DHEMAJI (AS 09)	57	28	PATNA (BH 28)	85
10	TINSUKIA (AS 10)	58	29	BHOJPUR (BH 29)	85
11	DIBRUGARH (AS 11)	58	30	BUXAR (BH 30)	86
12	SIVASAGAR (AS 12)	59	31	KAIMUR (BHABUA) (BH 31)	86
13	JORHAT (AS 13)	59	32	ROHTAS (BH 32)	87
14	GOLAGHAT (AS 14)	60	33	AURANGABAD (BH 33)	87
15	KARBI ANGLONG (AS 15)	60	34	GAYA (BH 34)	88
16	DIMA HASAO (AS 16)	61	35	NAWADA (BH 35)	88
17	CACHAR (AS 17)	61	36	JAMUI (BH 36)	89
18	KARIMGANJ (AS 18)	62	37	JEHANABAD (BH 37)	89
19	HAILAKANDI (AS 19)	62	38	ARWAL (BH 38)	90
20	BONGAIGAON (AS 20)	63		EARTHQUAKE HAZARD MAP	91
21	CHIRANG (AS 21)	63		WIND HAZARD MAP	92
22	KAMRUP (AS 22)	64		FLOOD HAZARD MAP	93
23	KAMPUR METROPOLITAN (AS 23)	64			
24	NALBARI (AS 24)	65		CHHATTISGARH (CT)	94
25	BAKSA (AS 25)	65	01	KORIYA (CT 01)	94
26	DARRANG (AS 26)	66	02	SURGUJA (CT 02)	95
27	UDALGURI (AS 27)	66	03	JASHPUR (CT 03)	95
	EARTHQUAKE HAZARD MAP	67	04	RAIGARH (CT 04)	96
	WIND HAZARD MAP	68	05	KORBA (CT 05)	96
	FLOOD HAZARD MAP	69	06	JANJGIR - CHAMPA (CT 06)	97
	LANDSLIDE INCIDENCE MAP	70	07	BILASPUR (CT 07)	97
			08	KABEERDHAM (CT 08)	98
	BIHAR (BH 00)	71	09	RAJNANDGAON (CT 09)	98
01	PASHCHIM CHAMPARAN (BH 01)	71	10	DURG (CT 10)	99
02	PURBA CHAMPARAN (BH 02)	72	11	RAIPUR (CT 11)	99
03	SHEOHAR (BH 03)	72	12	MAHASAMUND (CT 12)	100
04	SITAMARHI (BH 04)	73	13	DHAMTARI (CT 13)	100
05	MADHUBANI (BH 05)	73	14	UTTAR BASTAR KANKER (CT 14)	101
06	SUPAUL (BH 06)	74	15	BASTAR (CT 15)	101
07	ARARIA (BH 07)	74	16	NARAYANPUR (CT 16)	102
08	KISHANGANJ (BH 08)	75	17	DAKSHIN BASTAR DANTEWADA (CT 17)	102
09	PURNIA (BH 09)	75	18	BIJAPUR (CT 18)	103
10	KATIHAR (BH 10)	76		EARTHQUAKE HAZARD MAP	104
11	MADHEPURA (BH 11)	76		WIND HAZARD MAP	105
12	SAHARSA (BH 12)	77			
13	DARBHANGA (BH 13)	77		GOA (GO)	106
14	MUZAFFARPUR (BH 14)	78	01	NORTH GOA (GO 01)	106
15	GOPALGANJ (BH 15)	78	02	SOUTH GOA (GO 02)	107
16	SIWAN (BH 16)	79		EARTHQUAKE HAZARD MAP	107
17	SARAN (BH 17)	79		WIND HAZARD MAP	108
18	VAISHALI (BH 18)	80		LANDSLIDE INCIDENCE MAP	108

GUJARAT (GJ)	109	21	PALWAL (HR 21)	136
01 KACHCHH (GJ 01).....	109		EARTHQUAKE HAZARD MAP.....	137
02 BANAS KANTHA (GJ 02).....	110		WIND HAZARD MAP.....	137
03 PATAN (GJ 03).....	110		FLOOD HAZARD MAP.....	138
04 MAHESANA (GJ 04).....	111		HIMACHAL PRADESH (HP)	139
05 SABAR KANTHA (GJ 05).....	111	01	CHAMBA (HP 01).....	139
06 GANDHINAGAR (GJ 06).....	112	02	KANGRA (HP 02).....	140
07 AHMADABAD (GJ 07).....	112	03	LAHUL & SPITI (HP 03).....	140
08 SURENDRANAGAR (GJ 08).....	113	04	KULLU (HP 04).....	141
09 RAJKOT (GJ 09).....	113	05	MANDI (HP 05).....	141
10 JAMNAGAR (GJ 10).....	114	06	HAMIRPUR (HP 06).....	142
11 PORBANDAR (GJ 11).....	114	07	UNA (HP 07).....	142
12 JUNAGADH (GJ 12).....	115	08	BILASPUR (HP 08).....	143
13 AMRELI (GJ 13).....	115	09	SOLAN (HP 09).....	143
14 BHAVNAGAR (GJ 14).....	116	10	SIRMAUR (HP 10).....	144
15 ANAND (GJ 15).....	116	11	SHIMLA (HP 11).....	144
16 KHEDA (GJ 16).....	117	12	KINNAUR (HP 12).....	145
17 PANCH MAHALS (GJ 17).....	117		EARTHQUAKE HAZARD MAP.....	145
18 DOHAD (GJ 18).....	118		WIND HAZARD MAP.....	146
19 VADODARA (GJ 19).....	118		LANDSLIDE INCIDENCE MAP.....	146
20 NARMADA (GJ 20).....	119		JAMMU & KASHMIR (JK)	147
21 BHARUCH (GJ 21).....	119	01	KUPWARA (JK 01).....	147
22 THE DANGS (GJ 22).....	120	02	BADGAM (JK 02).....	148
23 NAVSARI (GJ 23).....	120	03	LEH (LADAKH) (JK 03).....	148
24 VALSAD (GJ 24).....	121	04	KARGIL (JK 04).....	149
25 SURAT (GJ 25).....	121	05	PUNCH (JK 05).....	149
26 TAPI (GJ 26).....	122	06	RAJOURI (JK 06).....	150
EARTHQUAKE HAZARD MAP.....	123	07	KATHUA (JK 07).....	150
WIND HAZARD MAP.....	124	08	BARAMULA (JK 08).....	151
FLOOD HAZARD MAP.....	125	09	BANDIPORE (JK 09).....	151
HARYANA (HR)	126	10	SRINAGAR (JK 10).....	152
01 PANCHKULA (HR 01).....	126	11	GANDERBAL (JK 11).....	152
02 AMBALA (HR 02).....	127	12	PULWAMA (JK 12).....	153
03 YAMUNANAGAR (HR 03).....	127	13	SHUPIYAN (JK 13).....	153
04 KURUKSHETRA (HR 04).....	128	14	ANANTNAG (JK 14).....	154
05 KAITHAL (HR 05).....	128	15	KULGAM (JK 15).....	154
06 KARNAL (HR 06).....	129	16	DODA (JK 16).....	155
07 PANIPAT (HR 07).....	129	17	RAMBAN (JK 17).....	155
08 SONIPAT (HR 08).....	130	18	KISHTWAR (JK 18).....	156
09 JIND (HR 09).....	130	19	UDHAMPUR (JK 19).....	156
10 FATEHABAD (HR 10).....	131	20	REASI (JK 20).....	157
11 SIRSA (HR 11).....	131	21	JAMMU (JK 21).....	157
12 HISAR (HR 12).....	132	22	SAMBA (JK 22).....	158
13 BHIWANI (HR 13).....	132		EARTHQUAKE HAZARD MAP.....	159
14 ROHTAK (HR 14).....	133		WIND HAZARD MAP.....	160
15 JHAJJAR (HR 15).....	133		LANDSLIDE INCIDENCE MAP.....	161
16 MAHENDRAGARH (HR 16).....	134		JHARKHAND (JD)	162
17 REWARI (HR 17).....	134	01	GARHWA (JD 01).....	162
18 GURUGRAM (HR 18).....	135	02	CHATRA (JD 02).....	163
19 MEWAT (HR 19).....	135			
20 FARIDABAD (HR 20).....	136			

03	KODARMA (JD 03).....	163	27	KOLAR (KN 27).....	190
04	GIRIDIH (JD 04).....	164	28	CHIKKABALLAPURA (KN 28).....	191
05	DEOGHAR (JD 05).....	164	29	BANGALORE RURAL (KN 29).....	191
06	GODDA (JD 06).....	165	30	RAMANAGARA (KN 30).....	192
07	SAHIBGANJ (JD 07).....	165		EARTHQUAKE HAZARD MAP.....	193
08	PAKUR (JD 08).....	166		WIND HAZARD MAP.....	194
09	DHANBAD (JD 09).....	166		LANDSLIDE INCIDENCE MAP.....	195
10	BOKARO (JD 10).....	167			
11	LOHARDAGA (JD 11).....	167		KERALA (KL).....	196
12	PURBI SINGHBHUM (JD 12).....	168	01	KASARAGOD (KL 01).....	196
13	PALAMU (JD 13).....	168	02	KANNUR (KL 02).....	197
14	LATEHAR (JD 14).....	169	03	WAYANAD (KL 03).....	197
15	HAZARIBAGH (JD 15).....	169	04	KOZHIKODE (KL 04).....	198
16	RAMGARH (JD 16).....	170	05	MALAPPURAM (KL 05).....	198
17	DUMKA (JD 17).....	170	06	PALAKKAD (KL 06).....	199
18	JAMTARA (JD 18).....	171	07	THRISSUR (KL 07).....	199
19	RANCHI (JD 19).....	171	08	ERNAKULAM (KL 08).....	200
20	KHUNTI (JD 20).....	172	09	IDUKKI (KL 09).....	200
21	GUMLA (JD 21).....	172	10	KOTTAYAM (KL 10).....	201
22	SIMDEGA (JD 22).....	173	11	ALAPPUZHA (KL 11).....	201
23	PASHCHIMI SINGHBHUM (JD 23).....	173	12	PATHANAMTHITTA (KL 12).....	202
24	SARAIKELA-KHARSAWAN (JD 24).....	174	13	KOLLAM (KL 13).....	202
	EARTHQUAKE HAZARD MAP.....	175	14	THIRUVANANTHAPURAM (KL 14).....	203
	WIND HAZARD MAP.....	176		EARTHQUAKE HAZARD MAP.....	203
				WIND HAZARD MAP.....	204
				FLOOD HAZARD MAP.....	204
				LANDSLIDE INCIDENCE MAP.....	205
	KARNATAKA (KN).....	177			
01	BELGAUM (KN 01).....	177		MADHYA PRADESH (MP).....	206
02	BAGALKOT (KN 02).....	178	01	SHEOPUR (MP 01).....	206
03	BIJAPUR (KN 03).....	178	02	MORENA (MP 02).....	207
04	BIDAR (KN 04).....	179	03	BHIND (MP 03).....	207
05	RAICHUR (KN 05).....	179	04	GWALIOR (MP 04).....	208
06	KOPPAL (KN 06).....	180	05	DATIA (MP 05).....	208
07	GADAG (KN 07).....	180	06	SHIVPURI (MP 06).....	209
08	DHARWAD (KN 08).....	181	07	TIKAMGARH (MP 07).....	209
09	UTTARA KANNADA (KN 09).....	181	08	CHHATARPUR (MP 08).....	210
10	HAVERI (KN 10).....	182	09	PANNA (MP 09).....	210
11	BELLARY (KN 11).....	182	10	SAGAR(MP 10).....	211
12	CHITRADURGA (KN 12).....	183	11	DAMOH (MP 11).....	211
13	DAVANAGERE (KN 13).....	183	12	SATNA (MP 12).....	212
14	SHIMOGA (KN 14).....	184	13	REWA (MP 13).....	212
15	UDUPI (KN 15).....	184	14	UMARIA (MP 14).....	213
16	CHIKMAGALUR (KN 16).....	185	15	NEEMUCH (MP 15).....	213
17	TUMKUR (KN 17).....	185	16	MANDSAUR (MP 16).....	214
18	BANGALORE (KN 18).....	186	17	RATLAM (MP 17).....	214
19	MANDYA (KN 19).....	186	18	UJJAIN (MP 18).....	215
20	HASSAN (KN 20).....	187	19	SHAJAPUR (MP 19).....	215
21	DAKSHINA KANNADA (KN 21).....	187	20	DEWAS (MP 20).....	216
22	KODAGU (KN 22).....	188	21	DHAR (MP 21).....	216
23	MYSORE (KN 23).....	188	22	INDORE (MP 22).....	217
24	CHAMARAJANAGAR (KN 24).....	189	23	WEST NIMAR (MP 23).....	217
25	GULBARGA (KN 25).....	189			
26	YADGIR (KN 26).....	190			

24	BARWANI (MP 24).....	218	22	MUMBAI SUBURBAN (MH 22).....	245
25	RAJGARH (MP 25).....	218	23	MUMBAI (MH 23).....	245
26	VIDISHA (MP 26).....	219	24	RAIGARH (MH 24).....	246
27	BHOPAL (MP 27).....	219	25	PUNE (MH 25).....	246
28	SEHORE (MP 28).....	220	26	AHMADNAGAR (MH 26).....	247
29	RAISEN (MP 29).....	220	27	BID (MH 27).....	247
30	BETUL (MP 30).....	221	28	LATUR (MH 28).....	248
31	HARDA (MP 31).....	221	29	OSMANABAD (MH 29).....	248
32	HOSHANGABAD (MP 32).....	222	30	SOLAPUR (MH 30).....	249
33	KATNI (MP 33).....	222	31	SATARA (MH 31).....	249
34	JABALPUR (MP 34).....	223	32	RATNAGIRI (MH 32).....	250
35	NARSIMHAPUR (MP 35).....	223	33	SINDHUDURG (MH 33).....	250
36	DINDORI (MP 36).....	224	34	KOLHAPUR (MH 34).....	251
37	MANDLA (MP 37).....	224	35	SANGLI (MH 35).....	251
38	CHHINDWARA (MP 38).....	225		EARTHQUAKE HAZARD MAP.....	252
39	SEONI (MP 39).....	225		WIND HAZARD MAP.....	253
40	BALAGHAT (MP 40).....	226		LANDSLIDE INCIDENCE MAP.....	254
41	GUNA (MP 41).....	226		MANIPUR (MN)	255
42	ASHOKNAGAR (MP 42).....	227	01	SENAPATI (MN 01).....	255
43	SHAHDOL (MP 43).....	227	02	TAMENGLONG (MN 02).....	256
44	ANUPPUR (MP 44).....	228	03	CHURACHANDPUR (MN 03).....	256
45	SIDHI (MP 45).....	228	04	BISHNUPUR (MN 04).....	257
46	SINGRAULI (MP 46).....	229	05	THOUBAL (MN 05).....	257
47	JHABUA (MP 47).....	229	06	IMPHAL WEST (MN 06).....	258
48	ALIRAJPUR (MP 48).....	230	07	IMPHAL EAST (MN 07).....	258
49	EAST NIMAR (MP 49).....	230	08	UKHRUL (MN 08).....	259
50	BURHANPUR (MP 50).....	231	09	CHANDEL (MN 09).....	259
	EARTHQUAKE HAZARD MAP.....	232		EARTHQUAKE HAZARD MAP.....	260
	WIND HAZARD MAP.....	233		WIND HAZARD MAP.....	260
	MAHARASHTRA (MH)	234		FLOOD HAZARD MAP.....	261
01	NANDURBAR (MH 01).....	234		LANDSLIDE INCIDENCE MAP.....	261
02	DHULE (MH 02).....	235		MEGHALAYA (MG)	262
03	JALGAON (MH 03).....	235	01	WEST GARO HILLS (MG 01).....	262
04	BULDANA (MH 04).....	236	02	EAST GARO HILLS (MG 02).....	263
05	AKOLA (MH 05).....	236	03	SOUTH GARO HILL (MG 03).....	263
06	WASHIM (MH 06).....	237	04	WEST KHASI HILLS (MG 04).....	264
07	AMRAVATI (MH 07).....	237	05	RIBHOI (MG 05).....	264
08	WARDHA (MH 08).....	238	06	EAST KHASI HILLS (MG 06).....	265
09	NAGPUR (MH 09).....	238	07	JAINTIA HILLS (MG 07).....	265
10	BHANDARA (MH 10).....	239		EARTHQUAKE HAZARD MAP.....	266
11	GONDIYA (MH 11).....	239		WIND HAZARD MAP.....	266
12	GADCHIROLI (MH 12).....	240		LANDSLIDE INCIDENCE MAP.....	267
13	CHANDRAPUR (MH 13).....	240		MIZORAM (MZ)	268
14	YAVATMAL (MH 14).....	241	01	MAMI (MZ 01).....	268
15	NANDED (MH 15).....	241	02	KOLASIB (MZ 02).....	269
16	HINGOLI (MH 16).....	242	03	AIZAWL (MZ 03).....	269
17	PARBHANI (MH 17).....	242	04	CHAMPHAI (MZ 04).....	270
18	JALNA (MH 18).....	243	05	SERCHHIP (MZ 05).....	270
19	AURANGABAD (MH 19).....	243	06	LUNGLEI (MZ 06).....	271
20	NASHIK (MH 20).....	244			
21	THANE (MH 21).....	244			

07	LAWNGTLAI (MZ 07).....	271	30	MALKANGIRI (OR 30).....	297
08	SAIHA (MZ 08).....	272		EARTHQUAKE HAZARD MAP.....	298
	EARTHQUAKE HAZARD MAP.....	272		WIND HAZARD MAP.....	299
	WIND HAZARD MAP.....	273		FLOOD HAZARD MAP.....	300
	LANDSLIDE INCIDENCE MAP.....	273			
	NAGALAND (NG).....	274		PUNJAB (PN).....	301
01	MON (NG 01).....	274	01	GURDASPUR (PN 01).....	301
02	MOKOKCHUNG (NG 02).....	275	02	KAPURTHALA (PN 02).....	302
03	ZUNHEBOTO (NG 03).....	275	03	JALANDHAR (PN 03).....	302
04	WOKHA (NG 04).....	276	04	HOSHIARPUR (PN 04).....	303
05	DIMAPUR (NG 05).....	276	05	SHAHID BHAGAT SINGH NAGAR (PN 05).....	303
06	PHEK (NG 06).....	277	06	FATEHGARH SAHIB (PN 06).....	304
07	TUENSANG (NG 07).....	277	07	LUDHIANA (PN 07).....	304
08	LONGLENG (NG 08).....	278	08	MOGA (PN 08).....	305
09	KIPHIRE(NG 09).....	278	09	FIROZPUR (PN 09).....	305
10	KOHIMA (NG 10).....	279	10	MUKTSAR (PN 10).....	306
11	PEREN (NG 11).....	279	11	FARIDKOT (PN 11).....	306
	EARTHQUAKE HAZARD MAP.....	280	12	BATHINDA (PN 12).....	307
	WIND HAZARD MAP.....	280	13	MANSA (PN 13).....	307
	LANDSLIDE INCIDENCE MAP.....	281	14	PATIALA (PN 14).....	308
			15	AMRITSAR (PN 15).....	308
	ODISHA (OR).....	282	16	TARN TARAN (PN 16).....	309
01	BARGARH (OR 01).....	282	17	RUPNAGAR (PN 17).....	309
02	JHARSUGUDA (OR 02).....	283	18	SAHIBZADA AJIT SINGH NAGAR (PN 18).....	310
03	SAMBALPUR (OR 03).....	283	19	SANGRUR (PN 19).....	310
04	DEBAGARH (OR 04).....	284	20	BARNALA (PN 20).....	311
05	SUNDARGARH (OR 05).....	284		EARTHQUAKE HAZARD MAP.....	311
06	KENDUJHAR (OR 06).....	285		WIND HAZARD MAP.....	312
07	MAYURBHANJ (OR 07).....	285		FLOOD HAZARD MAP.....	312
08	BALESHWAR (OR 08).....	286			
09	BHADRAK (OR 09).....	286		RAJASTHAN (RJ).....	313
10	KENDRAPARA (OR 10).....	287	01	GANGANAGAR (RJ 01).....	313
11	JAGATSINGHAPUR (OR 11).....	287	02	HANUMANGARH (RJ 02).....	314
12	CUTTACK (OR 12).....	288	03	BIKANER (RJ 03).....	314
13	JAJAPUR (OR 13).....	288	04	CHURU (RJ 04).....	315
14	DHENKANAL (OR 14).....	289	05	JHUNJHUNUN (RJ 05).....	315
15	ANUGUL (OR 15).....	289	06	ALWAR (RJ 06).....	316
16	NAYAGARH (OR 16).....	290	07	BHARATPUR (RJ 07).....	316
17	KHORDHA (OR 17).....	290	08	DHAULPUR (RJ 08).....	317
18	PURI (OR 18).....	291	09	KARALI (RJ 09).....	317
19	GANJAM (OR 19).....	291	10	SAWAI MADHOPUR (RJ 10).....	318
20	GAJAPATI (OR 20).....	292	11	DAUSA (RJ 11).....	318
21	KANDHAMAL (OR 21).....	292	12	JAIPUR (RJ 12).....	319
22	BAUDH (OR 22).....	293	13	SIKAR (RJ 13).....	319
23	SUBARNAPUR (OR 23).....	293	14	NAGPUR (RJ 14).....	320
24	BALANGIR (OR 24).....	294	15	JODHPUR (RJ 15).....	320
25	NUAPADA (OR 25).....	294	16	JAISALMER (RJ 16).....	321
26	KALAHANDI (OR 26).....	295	17	BARMER (RJ 17).....	321
27	RAYAGADA (OR 27).....	295	18	JALOR (RJ 18).....	322
28	NABARANGAPUR (OR 28).....	296	19	SIROHI (RJ 19).....	322
29	KORAPUT(OR 29).....	296	20	PALI (RJ 20).....	323
			21	AJMER (RJ 21).....	323

22	TONK (RJ 22).....	324	27	TIRUNELVELI (TN 27).....	349
23	BUNDI (RJ 23).....	324	28	KANNIYAKUMARI (TN 28).....	350
24	BHILWARA (RJ 24).....	325	29	DHARMAPURI (TN 29).....	350
25	RAJSAMAND (RJ 25).....	325	30	KRISHNAGIRI (TN 30).....	351
26	DUNGARPUR (RJ 26).....	326	31	COIMBATORE (TN 31).....	351
27	BANSWARA (RJ 27).....	326	32	TIRUPPUR (TN 32).....	352
28	CHITTAURGARH (RJ 28).....	327		EARTHQUAKE HAZARD MAP.....	353
29	KOTA (RJ 29).....	327		WIND HAZARD MAP.....	354
30	BARAN (RJ 30).....	328		LANDSLIDE INCIDENCE MAP.....	355
31	JHALAWAR (RJ 31).....	328		TELANGANA (TL).....	356
32	UDAIPUR (RJ 32).....	329	01	ADILABAD (TL 01).....	356
33	PRATAPGARH (RJ 33).....	329	02	NIZAMABAD (TL 02).....	357
	EARTHQUAKE HAZARD MAP.....	330	03	KARIMNAGAR (TL 03).....	357
	WIND HAZARD MAP.....	331	04	MEDAK (TL 04).....	358
	SIKKIM (SK).....	332	05	HYDERABAD (TL 05).....	358
01	NORTH DISTRICT(SK 01).....	332	06	RANGAREDDY (TL 06).....	359
02	WEST DISTRICT(SK 02).....	333	07	MAHBUBNAGAR (TL 07).....	359
03	SOUTH DISTRICT(SK 03).....	333	08	NALGONDA (TL 08).....	360
04	EAST DISTRICT(SK 04).....	334	09	WARANGAL (TL 09).....	360
	EARTHQUAKE HAZARD MAP.....	334	10	KHAMMAM (TL 10).....	361
	WIND HAZARD MAP.....	335		EARTHQUAKE HAZARD MAP.....	362
	LANDSLIDE INCIDENCE MAP.....	335		WIND HAZARD MAP.....	363
	TAMIL NADU (TN).....	336		FLOOD HAZARD MAP.....	364
01	THIRUVALLUR (TN 01).....	336		TRIPURA (TR).....	365
02	CHENNAI (TN 02).....	337	01	WEST TRIPURA (TR 01).....	365
03	KANCHEEPURAM (TN 03).....	337	02	SOUTH TRIPURA (TR 02).....	366
04	VELLORE (TN 04).....	338	03	DHALAI (TR 03).....	366
05	TIRUVANNAMALAI (TN 05).....	338	04	NORTH TRIPURA (TR 04).....	367
06	VILUPPURAM (TN 06).....	339		EARTHQUAKE HAZARD MAP.....	367
07	SALEM (TN 07).....	339		WIND HAZARD MAP.....	368
08	NAMAKKAL (TN 08).....	340		LANDSLIDE INCIDENCE MAP.....	368
09	ERODE (TN 09).....	340		UTTAR PRADESH (UP).....	369
10	THE NILGIRIS (TN 10).....	341	01	SAHARANPUR (UP 01).....	369
11	DINDIGUL (TN 11).....	341	02	MUZAFFARNAGAR (UP 02).....	370
12	KARUR (TN 12).....	342	03	BIJNOR (UP 03).....	370
13	TIRUCHIRAPPALLI (TN 13).....	342	04	MORADABAD (UP 04).....	371
14	PERAMBALUR (TN 14).....	343	05	RAMPUR (UP 05).....	371
15	ARIYALUR (TN 15).....	343	06	JYOTIBA PHULE NAGAR (UP 06).....	372
16	CUDDALORE (TN 16).....	344	07	MEERUT (UP 07).....	372
17	NAGAPATTINAM (TN 17).....	344	08	BAGHPAT(UP 08).....	373
18	THIRUVARUR (TN 18).....	345	09	GHAZIABAD (UP 09).....	373
19	THANJAVUR (TN 19).....	345	10	GAUTAM BUDDHA NAGAR (UP 10).....	374
20	PUDUKKOTTAI (TN 20).....	346	11	BULANDSHAHR (UP 11).....	374
21	SIVAGANGA (TN 21).....	346	12	ALIGARH (UP 12).....	375
22	MADURAI (TN 22).....	347	13	MAHAMAYA NAGAR (UP 13).....	375
23	THENI (TN 23).....	347	14	MATHURA (UP 14).....	376
24	VIRUDHUNAGAR (TN 24).....	347	15	AGRA (UP 15).....	376
25	RAMANATHAPURAM (TN 25).....	348	16	FIROZABAD (UP 16).....	377
26	THOOTHUKKUDI (TN 26).....	349	17	MAINPURI (UP 17).....	377

18	BUDAUN (UP 18).....	378	70	ETAH (UP 70).....	404
19	BAREILLY (UP 19).....	378	71	KANSHIRAM NAGAR (UP 71).....	404
20	PILIBHIT (UP 20).....	379		EARTHQUAKE HAZARD MAP.....	405
21	SHAHJAHANPUR (UP 21).....	379		WIND HAZARD MAP.....	406
22	KHERI (UP 22).....	380		FLOOD HAZARD MAP.....	407
23	SITAPUR (UP 23).....	380			
24	HARDOI (UP 24).....	381		UTTARAKHAND (UK)	408
25	UNNAO (UP 25).....	381	01	UTTARKASHI (UK 01).....	408
26	LUCKNOW (UP 26).....	382	02	CHAMOLI (UK 02).....	409
27	RAE BARELI (UP 27).....	382	03	RUDRAPRAYAG (UK 03).....	409
28	FARRUKHABAD (UP 28).....	383	04	TEHRI GARHWAL (UK 04).....	410
29	KANNAUJ (UP 29).....	383	05	DEHRADUN (UK 05).....	410
30	ETAWAH (UP 30).....	384	06	GARHWAL (UK 06).....	411
31	AURAIYA (UP 31).....	384	07	PITHORAGARH (UK 07).....	411
32	KANPUR DEHAT (UP 32).....	385	08	BAGESHWAR (UK 08).....	412
33	KANPUR NAGAR (UP 33).....	385	09	ALMORA (UK 09).....	412
34	JALAUN (UP 34).....	386	10	CHAMPAWAT (UK 10).....	413
35	JHANSI (UP 35).....	386	11	NAINITAL (UK 11).....	413
36	LALITPUR (UP 36).....	387	12	UDHAM SINGH NAGAR (UK 12).....	414
37	HAMIRPUR (UP 37).....	387	13	HARDWAR (UK13).....	414
38	MAHOBA (UP 38).....	388		EARTHQUAKE HAZARD MAP.....	415
39	BANDA (UP 39).....	388		WIND HAZARD MAP.....	415
40	CHITRAKOOT (UP 40).....	389		FLOOD HAZARD MAP.....	416
41	FATEHPUR (UP 41).....	389		LANDSLIDE INCIDENCE MAP.....	416
42	PRATAPGARH (UP 42).....	390			
43	KAUSHAMBI (UP 43).....	390		WEST BENGAL (WB)	417
44	ALLAHABAD (UP 44).....	391	01	DARJILING (WB 01).....	417
45	BARA BANKI (UP 45).....	391	02	JALPAIGURI (WB 02).....	418
46	FAIZABAD (UP 46).....	392	03	KOCH BIHAR (WB 03).....	418
47	AMBEDKAR NAGAR (UP 47).....	392	04	UTTAR DINAJPUR (WB 04).....	419
48	SULTANPUR (UP 48).....	393	05	DAKSHIN DINAJPUR (WB 05).....	419
49	BAHRAICH (UP 49).....	393	06	MALDAH (WB 06).....	420
50	SHRAWASTI (UP 50).....	394	07	MURSHIDABAD (WB 07).....	420
51	BALRAMPUR (UP 51).....	394	08	BIRBHUM (WB 08).....	421
52	GONDA (UP 52).....	395	09	BARDDHAMAN (WB 09).....	421
53	SIDDHARTHANAGAR (UP 53).....	395	10	NADIA (WB 10).....	422
54	BASTI (UP 54).....	396	11	NORTH TWENTY FOUR PARGANAS (WB 11).....	422
55	SANT KABIR NAGAR (UP 55).....	396	12	HUGLI (WB 12).....	423
56	MAHARAJGANJ (UP 56).....	397	13	BANKURA (WB 13).....	423
57	GORAKHPUR (UP 57).....	397	14	PURULIYA (WB 14).....	424
58	KUSHINAGAR (UP 58).....	398	15	HAORA (WB 15).....	424
59	DEORIA (UP 59).....	398	16	KOLKATA (WB 16).....	425
60	AZAMGARH (UP 60).....	399	17	SOUTH TWENTY FOUR PARGANAS (WB 17).....	425
61	MAU (UP 61).....	399	18	PASCHIM MEDINIPUR (WB 18).....	426
62	BALLIA (UP 62).....	400	19	PURBA MEDINIPUR (WB 19).....	426
63	JAUNPUR (UP 63).....	400		EARTHQUAKE HAZARD MAP.....	427
64	GHAZIPUR (UP 64).....	401		WIND HAZARD MAP.....	428
65	CHANDAULI (UP 65).....	401		FLOOD HAZARD MAP.....	429
66	VARANASI (UP 66).....	402		LANDSLIDE INCIDENCE MAP.....	430
67	SANT RAVIDAS NAGAR (BHADOHI) (UP 67).....	402			
68	MIRZAPUR (UP 68).....	403			
69	SONBHADRA (UP 69).....	403			

UNION TERRITORIES

	ANDAMAN & NICOBAR ISLANDS (AN)	433
01	NICOBARS (AN 01)	433
02	NORTH & MIDDLE ANDAMAN (AN 02)	434
03	SOUTH ANDAMAN (AN 03)	434
	EARTHQUAKE HAZARD MAP	435
	WIND HAZARD MAP	436
	CHANDIGARH (CH)	437
	EARTHQUAKE HAZARD MAP	437
	WIND HAZARD MAP	438
	DADRA & NAGAR HAVELI (DN)	439
	EARTHQUAKE HAZARD MAP	439
	WIND HAZARD MAP	440
	DAMAN & DIU (DD)	441
01	DIU (DD 01)	441
02	DAMAN (DD 02)	442
	EARTHQUAKE HAZARD MAP	442
	WIND HAZARD MAP	443
	NCT OF DELHI (DL)	444
01	NORTH WEST (DL 01)	444
02	NORTH (DL 02)	445
03	NORTH EAST (DL 03)	445
04	EAST (DL 04)	446
05	NEW DELHI (DL 05)	446
06	CENTRAL (DL 06)	447
07	WEST (DL 07)	447
08	SOUTH WEST (DL 08)	448
09	SOUTH (DL 09)	448
	EARTHQUAKE HAZARD MAP	449
	WIND HAZARD MAP	449
	FLOOD HAZARD MAP	450
	LAKSHADWEEP (LK)	451
	EARTHQUAKE HAZARD MAP	451
	WIND HAZARD MAP	452
	PUDUCHERRY (PY)	453
01	YANAM (PY 01)	453
02	PUDUCHERRY (PY 02)	454
03	MAHE (PY 03)	454
04	KARAIKAL (PY 04)	455
	EARTHQUAKE HAZARD MAP	455
	WIND HAZARD MAP	456
	FLOOD HAZARD MAP	456

VULNERABILITY ATLAS OF INDIA

NATURAL HAZARD MAPS AND DAMAGE RISK TO HOUSING

1. BACKGROUND

As per prevalent geo-climatic conditions, Indian sub-continent is prone to natural hazards such as earthquakes, wind storms & cyclones, landslides, floods, thunderstorms. India has witnessed several disasters leading trail of destruction, irreparable loss of lives and properties. Recognizing the vulnerability of Indian sub-continent, Disaster Management Act was enacted in 2005 followed up by National Policy for Disaster Management in 2009 and National Disaster Management Plan in 2016. Internationally also, 1990-2000 was declared as International Decade for Natural Disaster Reduction (IDNDR) by UN General Assembly, which was subsequently supported by Yokohama Strategy for Safer World in 1994, Hygo Framework for Action (2005-2015) and Sendai Framework for Disaster Risk Reduction in 2015-2030. All these policy frameworks brought paradigm shift in disaster risk management from post disaster relief centric measures to pro-active pre-disaster preventive measures.

Vulnerability Atlas of India, 1997

BMTPC since its inception in 1990 was committed towards promoting disaster mitigation measures through preparedness and brought out its first Vulnerability Atlas of India in 1997 under the auspices of Expert Group set up by the Ministry of Housing & Urban Affairs (erstwhile Ministry of Urban Development) (*Annex-1*). It was first of its kind tool for the Disaster Management authorities, agencies, related stake holders and citizens of India for identifying the level of damage risk (degree of vulnerability) of housing stock with respect to earthquakes, floods and cyclones, in any part of the country. The data from Government nodal agencies such as Indian Meteorological Department (IMD), Survey of India (SOI), Geological Survey of India (GSI), Census of India, Bureau of Indian Standards (BIS), Central Water Commission (CWC) was assimilated and natural hazards maps were prepared upto district level in each State of India.

The expected loss from a given hazard and related depends upon the hazard intensity, population exposed and vulnerability of housing stocks. A simplified way of projecting the inter-dependencies of these factors and risk at a place is :

Risk at any place = [(Hazard x Vulnerability) x exposure] / Capacity,

where various terms are defined as

Risk is combination of probability of an event and its negative consequences

Hazard is a threatening event i.e. Earthquakes/Wind storm/ Cyclones/Floods/Landslides

Vulnerability is Characteristics and circumstances of a community, system or asset that make it susceptible to the damaging effects of a hazard

Exposure is in terms of People, buildings, businesses, infrastructure

Capacity is combination of all the strengths, attributes and resources available within a community, society or organization

Accordingly, the housing risk tables enumerating level of damage risk with reference to earthquakes, cyclones and floods having potential of damaging the housing stocks were also incorporated in the Vulnerability Atlas of India. The Atlas with the help of State and Union Territory wise hazard maps as well as housing risk tables for each districts, indicate overall vulnerability of different regions. The macro level information on hazard risk of housing stock has proved to be an innovative tool for assessing district wise vulnerability and risk level of housing stock. It is being utilized by state governments and their agencies.

The Vulnerability Atlas of India published by BMTPC was commended as “*useful tool for policy planning*

on natural disaster prevention and preparedness, specially for housing and related infrastructures” by the United Nation Centre for Human Settlement, Nairobi, Secretariat for International Decade for Natural Disaster Reduction (IDNDR). The IDNDR also adjudged the project with high demonstrative value.

Vulnerability Atlas of India, 2006

Ever since its first publication in 1997, it was felt that the publication of the Atlas ought to be periodically revised based on the new data and information collated by various nodal agencies. One of the most important data is on housing statistics which is released by Census of India after every 10 years and therefore, it was prudent to upgrade the Atlas after every Census data with the incorporation of newer data, demographic changes and supplementary scientific and engineering information observed during the period.

Accordingly, the second edition Vulnerability of India was brought out by BMTPC in 2006 based on Census 2001 data using GIS tools and digitized maps were developed for the first time providing hazard and seismo-tectonic information upto district level. Based on Census Housing Stock data, housing risk tables upto districts were also published based on distribution of houses by predominant material of roof and wall. The Vulnerability Atlas of India 2006 was brought out under the guidance of Peer Group set up by the then Ministry of Housing & Urban Poverty Alleviation (*Annex-2*).

In the second edition (first revision) of the Atlas, to project earthquake hazard, new earthquake hazard map of India, (IS 1893:2002 -Part 1) brought out by Bureau of Indian Standards by merging Seismic zoning I and II and extending zone III in the States of Maharashtra, Karnataka and Tamil Nadu, was used. All the datasets in the various maps including boundaries of the States and Districts in digitized form taken from the Survey of India maps and the boundaries of the various Hazard zones and Seismo tectonic details were digitized to bring more accuracy in the maps. Other important modifications were inclusion of landslide map based on Landslide Atlas (2003) brought out by BMTPC and revision of risk tables on the basis of 2001 Census data, with district names according to 2001 Census.

Vulnerability Atlas of India, 2019

While the second edition was being finalized, Disaster Management Act 2005 was enacted by the Government on 26 December 2005, making Disaster Risk Reduction a continuous and integrated process involving individuals, communities, government, non government bodies, civil societies and other stakeholders in the entire cycle of Disaster Risk Management. This also led the creation of National Disaster Management Authority (NDMA) headed by Prime Minister and initiation of formation of State Disaster Management Authorities headed by Chief Ministers and Districts Disaster Management Authorities headed by District Collector/District Magistrate/Deputy Commissioner, as the case may be, to spearhead and adopt a holistic and integrated approach towards Disaster Management and create the needed techno-legal framework for paradigm shift from post-disaster relief-centric response to a pro-active preventions, mitigation and preparedness.

Subsequently, National Policy for Disaster Management was brought out by NDMA in 2009. The hazard maps prepared for the Vulnerability Atlas of India (2006) was referred in National Policy for describing the extent of earthquakes, flood and cyclone hazards in the country. The objectives of the policy, inter alia, include promoting a culture of prevention, preparedness and resilience at all levels through knowledge, innovation and education, besides mainstreaming disaster management into development planning process.

Given the increasing concern about the impact of disasters, the broader global awareness of the social and economic consequences of disasters caused by natural hazards developed as the decades progressed. The Hygo Framework for Action (2005-2015) Building the Resilience of Nations and Communities to Disasters was

an outcome of the 2005 Conference. The present Sendai Framework for Disaster Risk Reduction 2015-2030, which was adopted at the Third UN World Conference on Disaster Risk Reduction (WCDRR) is built on the basis of the experience matured in the implementation of the Hygo Framework for Action and other relevant international frameworks.

India is also committed to make all efforts to contribute to realization of the global targets by improving the entire disaster management cycle in India by following the recommendations in the Sendai Framework and by adopting globally accepted best practices. The four priorities of Sendai Framework are (i) Understanding disaster Risk, (ii) Strengthening disaster risk governance to manage disaster risk, (iii) Investing in disaster risk reduction for resilience, and (iv) Enhancing disaster preparedness for effective response and to *Build Back Better* in recovery, rehabilitation and reconstruction.

A mile stone in the history of disaster management in India is the National Disaster Management Plan which has been drawn by NDMA in 2016, with the vision “*Make India disaster resilient, achieve substantial disaster risk reduction, and significantly decrease the losses of life, livelihoods and assts-economic, physical, social, cultural, and environmental – by maximizing the ability to cope with disasters at all levels of administration as well as among communities*”.

Since the publication of Vulnerability Atlas of India (2006), there has been invaluable feedback from users on the Atlas. Also, Vulnerability Atlas of India was brought out in digitized CD form in 2008 and was also uploaded on National Informatics Centre (NIC) platform. National Institute of Disaster Management (NIDM), Government of India also used the Atlas for training SAARC countries so as to prepare the region towards disaster risk reduction.

There have been subtle changes in the available knowledge and information in the area of disaster mitigation and management. New datasets with respect to earthquake occurrence, cyclones, wind storms, landslides, thunderstorm etc. have been brought out by nodal government agencies. There are demographic changes also on account of formation of new States and new districts. During this period, the country has also experienced some damaging earthquakes, cyclones, floods and landslides. Thunderstorms, urban flooding, flash floods have also caused significant damages to lives and properties. The major changes are given below:

i) Major earthquakes affecting the country

Year	Place of Occurrence	Magnitude	Maximum Intensity	Other features
2006	Sikkim	5.7	VII	Structural damage was observed in and around state capital of Sikkim
2009	Andaman Islands	6.9	-	Minor damage to buildings
2011	Sikkim	6.9	Vii	Significant building collapse and mud slides
2015	Nepal	7.9	IX	States of Bihar, West Bengal, Sikkim, Assam, Rajasthan and Uttar Pradesh experienced damage,79 deaths and 627 injured,477 houses collapsed fully and 9673 got partially damaged.
2016	Manipur	6.7	VII	Loss of damage to life and property,08 deaths and 78 injured in Manipur and Assam. 1825 buildings damaged in Manipur

Source : NDMA

ii) Major Flood, Cyclone, Landslides and Flashflood Disasters in India

S. No.	Name of Event	Year	State & Area	Fatalities
1.	Floods	October 2014	Jammu & Kashmir	---
2.	Cyclone Hud Hud	September 2014	Andhra Pradesh & Odisha	---
3.	Odisha Floods	October 2013	Odisha	21
4.	Andhra Floods	October 2013	Andhra Pradesh	53
5.	Cyclone Phailin	October 2013	Odisha and Andhra Pradesh	23
6.	Floods/Landslides	June 2013	Uttarakhand and Himachal Pradesh	4,094
7.	Cyclone Mahasen	May 2013	Tamil Nadu	08
8.	Cyclone Nilam	October 2012	Tamil Nadu	65
9.	Uttarakhand Floods	Aug – Sep 2012	Uttarkashi, Rudraprayag and Bageshwar	52
10.	Assam Floods	July – Aug 2012	Assam	---
11.	Cyclone Thane	December 2011	Tamil Nadu, Puducherry	47
13.	Odisha Floods	September 2011	19 Districts of Odisha	45
14.	Sikkim Earthquake	2011	North Eastern India with epicenter near Nepal Border and Sikkim	97 people died (75 in Sikkim)
15.	Cloudburst	2010	Leh, Ladakh in J&K	257 people died
16.	Drought	2009	252 Districts in 10 States	-----
17.	Krishna Floods	2009	Andhra Pradesh, Karnataka	300 people died
18.	Kosi Floods	2008	North Bihar	527 deaths, 19,323 livestock perished, 2,23,000 houses damaged, 3.3 million persons affected
19.	Cyclone Nisha	2008	Tamil Nadu	204 deaths

Source : NDMA

iii) Revision of Indian Standards Codes and National Building Code

- a) IS 875 : PART 3 : 2015 Design Loads (Other than Earthquake) for Buildings and Structures - Code of Practice - Part 3 Wind Loads
- b) IS 1893 : PART 1 : 2016 Criteria for Earthquake Resistant Design of Structures - Part 1 : General Provisions and Buildings
- c) IS 1893 : PART 2 : 2014 Criteria for Earthquake Resistant Design of Structures Part 2 Liquid Retaining Tanks
- d) IS 1893 : PART 3 : 2014 Criteria for Earthquake Resistant Design of Structures Part 3 Bridges and Retaining Walls
- e) IS 1893 : PART 4 : 2015 Criteria for Earthquake Resistant Design of Structures Part 4 Industrial Structures Including Stack - Like Structures (First Revision)
- f) IS 4326 : 2013 Earthquake resistant design and construction of buildings - Code of practice
- g) IS 13920 : 2016 Ductile Detailing of Reinforced Concrete Structures subjected to Seismic Forces - Code Of Practice
- h) IS 13935 : 2009 Seismic Evaluation, Repair and Strengthening of Masonry Buildings – Guidelines

- (Reaffirmed 2014)
- i) IS 15988 : 2013 Seismic Evaluation and Strengthening of Existing Reinforced Concrete Building – Guidelines
 - j) National Building Code 2016.
- iv) Development of basin wise Atlases for Probable Maximum Precipitation (PMP) by Central Water Commission and India Metrological Department i.e. (a) Ganga river basin, (b) Brahmaputra river basin, (c) Godavari river basin, (d) Mahanadi and other adjoining river basins, (e) Cauvery and other east flowing river basins; (f) Narmada Tapi, Sabarmati and Luni river basins, rivers of Saurashtra & Kutch regions including Mahi, West flowing rivers of western ghats and (g) Krishna river basins.
 - v) Availability of more than 9000 field verified landslide incidence data from Geological Survey of India – the nodal agency of Government of India for study of landslides in the country.
 - vi) Availability of climatological data for thunderstorms from IMD in terms of number of thunderstorms at a station from 1981 to 2010.
 - vii) The political map of the country has undergone change in terms of bifurcation of Andhra Pradesh into two States, namely Andhra Pradesh and Telangana and creation of 47 new districts across different states.
 - viii) The housing data of Census 2011 are made available on various relevant factors relating the population growth and the changed building typologies (roof-wall types). The number of houses have increased from 249,095,869 to 330,835,767. The percentage of mud/un-burnt bricks walls in rural areas has reduced from Census 2001 i.e. 26.4% to 19.1% and in urban areas from 3.2% to 2.7%. In so far as houses with burnt brick walls & stone packed with mortar walls are concerned, there is increase in both urban area and rural areas. In urban areas from 19.7%, it has gone to 24.6% while in rural areas it has increased from 25.2% to 34.3%. Percentage of heavy weight sloping roofs in both rural and urban combined has decreased from 31.4% to 30.7%. There is increase in flat roof also, which has gone from 33.7% to 36.2%.
 - ix) Availability of digitized Earthquake Hazard Zoning Atlas of India, States and Union territories and Districts with Subdistrict boundaries for NDMA prepared by BMTPC in 2016.
 - x) As regards latest data on flood prone areas is concerned, the nodal agency, Central Water Commission, has informed that the work of scientific assessment of flood prone area in India is under progress and it would take time to come out with the final report of scientific assessment of flood prone area in India. Therefore, the existing flood maps of 2006 Atlas are used for presenting Flood Hazard Maps and flood prone areas. Once the final report is made available by CWC, the flood maps will be updated accordingly as a supplementary to new Atlas.

With the advancement of scientific & technical knowledge, addition of new datasets, experience of disasters caused due to earthquakes, cyclones, damages potential of landslides/mass movements, floods, frequent thunderstorms, failures of roadways and railways during disasters, changes in the political map of the country, new data statistics of walling and roofing data of houses; the revision of the Atlas was initiated by the Peer Group set up by the Ministry vide OM No.I-21011/1/2015-HFA/FTS-13218 dated 18th June 2015 (Annex-3). A number of meetings of the Peer Group and interaction with nodal agencies were held to arrive at consensus for various modifications and additions. The revised Atlas contains following new special features :

- ❖ State and district boundaries as per Survey of India's digitized data.
- ❖ Inclusion of railways, national highways, expressways and water bodies in hazard maps.
- ❖ Inclusion of Housing/Population data as per Census 2011 in hazard maps.

- ❖ Inclusion of landslide Incidence Maps with detailed note on landslide occurrences and effects.
- ❖ Inclusion of Map showing frequencies of Thunderstorms at different stations in the country and corresponding note on causes and effect of thunderstorms.
- ❖ Digitisation of all data sets in the various maps including boundaries of the States and Districts according to the Survey of India Maps as well as the boundaries of the various hazard zones, thus improving their accuracy.
- ❖ The Vulnerability and Risk Tables of Housing Data in each district is now based on wall types and roof types as per 2011 Census data. The district names and reference numbers are taken according to 2011 Census for ease of cross reference.

In order to incorporate the special features, the following methodology has been adopted in the revised Atlas:

- i) **Earthquake Hazard Maps** : Modifications of Earthquake Hazard maps both India and State/UT levels based on latest Seismic hazard zoning map of India as per IS 1893 (Part 1) 2002. Addition of railway lines, national and state highways, rivers and water bodies, housing/population data as per Census 2011, faults, thrust & other seismo-tectonic details as per GSI. Earthquake epicenter data of magnitude ≥ 5 up to 2016 from IMD. Earthquake epicenter of magnitude 7.1 shown earlier in Rajasthan was deleted with the confirmation from IMD that it occurred in Baluchistan and not in Rajasthan.

While developing the Earthquake Hazard Maps, the base maps were initially developed by taking Seismic Zoning Map from IS 1893 (Part-1): 2016 and National Building Code 2016. While digitizing, it was found that there is variation in seismic zones boundaries in the Seismic Zones of India Map given in IS 1893(Part-1):2016 / NBC 2016 while comparing with Seismic Zones of India Map as given in the IS 1893 (Part-1):2002. The issue was discussed with various members of the relevant Sectional Committee and BIS. It was responded by the Members that there are no changes in the seismic zoning and the base map used by BMTPC in its earlier map as presented in 2006 Atlas is in order. Therefore, Earthquake Hazard Maps of India and States/UTs for the revision of the Atlas has been prepared based on Seismic Zones of India Map as given in the IS 1893 (Part-1): 2002.

- ii) **Wind Hazard Maps** : Revision of Wind Hazard map both India and State/UT levels based on the latest wind speed map given in National Building Code 2016 with updated cyclone and super cyclone data in terms of number of cyclonic storms (C.S.) and number of severe cyclonic storms (S.C.S.) passing 1° latitude for a period 1891 to 2017, as provided by IMD.

While developing the Wind Hazard Map, it has been noted that the revised Basic Wind Speed map has been included in the National Building Code of India 2016 whereas the same has not been included in the IS 875 (Part-3): 2015 which is still using the old wind map. The Chairman, Peer Group desired that this anomaly in the Basic Wind Map in the IS 875 (Part-3): 2015 may be brought to the notice of BIS and related Sectional Committee. However, it was noted from the SERC representative (part of Peer Group) who is responsible for bringing changes in the Basic Wind Speed map that the Basic Wind Map given in NBC 2016 is being included in IS 875 shortly through amendment.

- iii) **Cyclone Occurrence Map** : On the suggestions of the Director General, IMD, two maps, namely, (a) Wind Hazard Maps both India and State/UT levels, and (b) Cyclone Occurrence Map for Coastal India have been developed. The Cyclone Occurrence Map of India has been developed based on maximum/estimated 3-minute average Maximum Sustained Wind (MSW) in knots (1 knot = 0.5144 m/s) that affected coastal districts of India during 1891-2008, as per data provided by IMD.

It was earlier decided to include Cyclone track maps showing depression, severe and very severe cyclones from sea to land and land to sea. However, since these are available on the website of the IMD

(Cyclone Track E-Atlas – <http://www.rmchennaieatlas.tn.nic.in>), the same is not part of this Atlas.

- iv) **Flood Hazard Maps** : Flood hazard maps, both India and State/UT levels, are based on the existing flood hazard map given in 2006 version of the Atlas. The Peer Group also considered using Flood hazard maps of Assam and Bihar brought out by National Remote Sensing Centre (NRSC), Hyderabad. However, considering the fact that NRSC Atlases are based on limited satellite imagery data of 13 years only and also that the data itself has got lots of limitation, the same has not been included.
- v) **Landslide Incidence Maps** : New Landslide Incidence Maps both India and State/UT levels based on the field verified data (about 9000) given by GSI has been included. The Landslide Incidence Maps also provides Annual State Rainfall Normals (mm) in the base layer, as provided by IMD.
- vi) **Thunderstorm Incidence Map** : A new Thunderstorm Incidence Map of India showing frequency of thunderstorms at different locations has been included.
- vii) **Vulnerability and Risk Tables** : The Vulnerability and Risk Tables of Housing Data in each district is now based on wall types and roof types as per 2011 Census data. The district names and reference numbers are taken according to 2011 Census for ease of cross reference. As per 2011 Census housing data, the houses with stone walls not packed with mortar and houses stone walls packed with mortar are categorized in two different categories.

Probable Maximum Precipitation : Probable Maximum Precipitation (PMP) for each districts are now based on the PMP Atlases of Probable Maximum Precipitation developed by Central Water Commission and India Meteorological Department. The values have been derived from the 1 day areal PMP (mm) for 1000 sq km given at 1 degree grid point of different river basins. For the values in the districts tables, nearest grid point value or average have been taken depending upon the location of the district HQ. Users of the Atlas are suggested that for more accurate values, PMP Atlas of Central Water Commission and India Meteorological Department may be referred. A number of States/Districts have not been covered in PMP Atlases of different basins. Therefore, for these States/Districts, PMP values in District tables have not been changed and they continue as given in earlier Atlas as “*Probable Maximum Precipitation at a Station of the district in 24 h.*”

2. DESCRIPTION OF THE VULNERABILITY ATLAS

The Vulnerability Atlas contains the following maps and tables for each State and Union Territory of India:

- a) Earthquake hazard maps both India and State/UT levels
- b) Wind hazard maps both India and State/UT levels
- c) Flood hazard maps both India and 14 States/UTs
- d) The Landslide Hazard Incidence Maps for India and States/UTs of Jammu and Kashmir, Uttarakhand, Himachal Pradesh, Maharashtra, Kerala, Karnataka, Tamil Nadu, Tripura, West Bengal, Goa and North Eastern States including Sikkim
- e) Cyclone Occurrence Map of Coastal India based on maximum/estimated 3-minute average Maximum Sustained Wind (MSW)
- f) India Map showing frequency of thunderstorms at different stations of the country
- g) Housing stock vulnerability table for each State and districts, indicating for each house by wall and roof type, the level of damage risk with regard to earthquake, wind and floods.

All hazard maps of the States and UTs, in digitized form have been reproduced on larger scale of 1:2 million based on Survey of India map. The State maps show the state & district boundaries and names of districts for ease of identifying the hazard zone boundaries in the districts. While printing, some maps of the larger States have been reduced so as to accommodate them in A3 size. Maps of the Union Territories are drawn to different scales to suit A3 or A4 size. The accuracy of the enlarged maps is limited to the accuracy of the small-scale map.

The various parameters involved, the sources of information used and the limitations of the present maps and tables are described in the following paras:

3. THE GEOLOGIC HAZARDS

The predominant geologic hazards in India consist of earthquake and landslides. An isolated case of active volcano occurs at the Barren Island in the Andaman and Nicobar Islands. These are briefly described below:

3.1 Earthquake and Seismic Zones

The entire Indian landmass, susceptible to different levels of earthquake hazard, has broadly been classified into four distinct seismic Zones, referred to as Zones II to IV as per the Seismic Zoning Map of India contained in IS 1893:2002 (Part-1). As per the Foreword to the Seismic Code IS 1893:2002, the general basis of the zones is as follows:

- Zone V: Covers the areas liable to seismic intensity IX *and above* on MSK (1964) Intensity Scale. This is the most severe seismic zone and is referred here as Very High Damage Risk Zone.
- Zone IV: Gives the area liable to MSK VIII. This zone is second in severity to zone V. This is referred here as High Damage Risk Zone.
- Zone III: The associated intensity is MSK VII. This is termed here as Moderate Damage Risk Zone.
- Zone II: The probable intensity is MSK VI *or less*. This zone is referred to as Low Damage Risk Zone.

Note 1: In reproducing the map from IS 1893:2016 and National Building Code 2016, it was observed that there are variations in boundaries of zones. Noting that BIS Technical Committee CED 39 has not changed the seismic zoning, the map used in this Atlas has utilized seismic zoning map of IS 1893 (Part-1): 2002.

Note 2: In reproducing the map from IS 1893:2002, it was observed that some important differences have crept in the map given in IS 1893:1984. Noting that BIS Technical Committee had not changed the seismic zoning in the North of Peninsular India, the map used in this Atlas has utilized seismic zoning map of 1984 for North India and 2002 map for Peninsular India, where revision of the map was introduced by the BIS Committee CED 39.

Note 3: In the Seismic Zone Map of 2002, the seismic zone I as given in 1984 has been merged into Seismic Zone II and renamed as Zone II. Zone III has been extended to cover more areas in Maharashtra, Andhra Pradesh, Telangana and Tamil Nadu. Zones IV and V have remained unchanged.

It may be mentioned here that the new Intensity scale, called as MSK Intensity Scale 1964, is much more detailed and quantitative in nature as compared to the Modified Mercalli (MM) though almost similar in intensity.

Hence MSK could be used in place of MM in the classification of the seismic zones given above. The two intensity scales are reproduced in Annex-4 and 5.

The following important comments, from the Foreword to the IS 1893:2002, are very relevant for clearer understanding of the seismic zoning:

- (a) "The Sectional Committee responsible for the formulation of this standard (IS 1893:2002 Part I) has attempted to include a seismic zoning map. The object of this map is to classify the area of the country into a number of zones in which one may reasonably expect earthquake shaking of more or less same maximum intensity in future. The Intensity as per Comprehensive Intensity Scale (MSK 64) broadly associated with the various zones is VI (or less), VII, VIII and IX (and above) for Zones II, III, IV and V, respectively. The maximum seismic ground acceleration in each zone cannot be presently predicted with accuracy either on a deterministic or on a probabilistic basis. The basic zone factors included herein are reasonable estimates of effective peak ground accelerations for the design of various structures covered in this standard."
- (b) "The Sectional Committee has appreciated that there cannot be an entirely scientific basis for zoning in view of the scanty data available. Though the magnitudes of different earthquakes which have occurred in the past are known to reasonable degree of accuracy, the intensities of the shocks caused by these earthquakes have so far been mostly estimated by damage surveys and there is little instrumental evidence to corroborate the conclusions arrived at. Maximum intensity at different places can be fixed on a scale only on the basis of the observations made and recorded after the earthquake and thus a zoning map which is based on the maximum intensities arrived at, is likely to lead in some cases to an incorrect conclusion in view of (a) incorrectness in the assessment of intensities, (b) human error in judgment during the damage survey, and (c) variation in quality and design of structures causing variation in type and extent of damage to the structures for the same intensity of shock. The Sectional Committee has therefore, considered that a rational approach to the problem would be to arrive at a zoning map based on known magnitudes and the known epicenters assuming all other conditions as being average and to modify such an idealized iso-seismal map in the light of tectonics, lithology and the maximum intensities as recorded from damage surveys. The Committee has also reviewed such a map in the light of the past history and future possibilities and also attempted to draw the lines demarcating the different zones so as to be clear of important towns, cities and industrial areas, after making special examination of such cases, as a little modification in the zonal demarcations may mean considerable difference to the economics of a project in the area."
- (c) "In the seismic zoning map, Zones I and II of the contemporary map have been merged and assigned the level of Zone II. The Killari area has been included in Zone III and necessary modifications made, keeping in view the probabilistic hazard evaluation. The Bellary isolated zone has been removed. The parts of eastern coast areas have shown similar hazard to that of the Killari area, the level of Zone II has been enhanced to Zone III and connected with Zone III of Godawari Graben area."

Epicentres of Earthquakes of $M \geq 5.0$

All earthquakes of $M \geq 5.0$ on Richter open ended logarithmic scale have been plotted along with the seismic-intensity zones. The catalogue of earthquakes prepared by India Meteorological Department (IMD), Government of India has been utilized for the purpose. The Magnitude of the earthquake as well as the year of occurrence are shown along with the location on the maps. With regard to earthquakes of lower magnitudes, it is known that their frequency of occurrence is much higher than the larger earthquakes. Also lower the magnitude, the closer must be the installations of seismological instruments and better should be their installation to permit higher gain, so as to be able to record the shocks and find their location. The present seismological network in India is not so capable and is non-uniform in its capability as well. No doubt, small

magnitude earthquakes have been recorded in several parts of the country through local, small aperture networks of high gain instruments by some organizations and institutions, but the non-uniformity of the data and time gaps as well, may convey an unrealistic picture of relative seismic activity in different areas, that is, areas having dense local instrument network showing more activity than those where such networks do not exist. No attempt was therefore made to present this available information on the general purpose hazard maps which are meant here specifically for prevention, mitigation and preparedness concerning housing and related infrastructure. As recommended in the Code itself, in the case of special structures, detailed investigations (site related geologic, seismotectonic, geotechnical) should be undertaken. Such special structures will include very tall buildings, say more than 90 m in height; very long span, special type and important bridges, major dams, major power plants, hazardous/risky structures, etc. The seismic risk to such structures can not be worked out from the data presented in this Atlas.

Earthquake Magnitude and Intensity

The magnitude M of an earthquake is denoted by a number which is a measure of energy released during the earthquake occurrence. It is now measured in different ways, the most commonly used is the Richter Scale according to which "the magnitude of an earthquake is the logarithm to the base 10 of the maximum trace amplitude, expressed in microns, with which the standard short period torsion seismometer (with a period of 0.8 second, magnification of 2800 and damping nearly critical) would register the earthquake at an epicentral distance of 100 km". The scale being logarithmic, the energy of earthquake magnitude ' $m+1$ ' is about 31 times the energy released in earthquake of magnitude ' m '. Magnitude scale is open ended, denoted numerically to one place of decimal (5.6, 8.3, etc.).

"The intensity of an earthquake at a place is a measure of the effects of the earthquake". A number of intensity scales have been in vogue in different times, namely Rossi-Forel (RF), Modified Mercalli (MM), MSK 1964 and Japan Meteorological Agency (JMA) scales. All the scales are close-ended stepped scales, RF having 10 points (I to X), MM and MSK with 12 points (I to XII) and JMA with 7 points (I to VII). Presently MSK 12 point scale is the most used, JMA being used in Japan. In historical earthquakes in India such as 1905 Kangra earthquake and 1934 Bihar- Nepal earthquake, RF intensity scale was used for drawing the isoseismal.

While for a given earthquake, the magnitude has one unique value and epicentral location, the intensity varies from the maximum in the epicentral area to smaller values at increasing distances from the epicentre. Isoseismals derived from the observed damages in an earthquake as per the intensity scale show the intensity distribution caused in the earthquake.

The relationship between the earthquake magnitude and the maximum intensity caused is not precise. Approximate relationship between them is shown in Table-1 as a general guide.

MSK Intensity Scale

The MSK intensity scale (Annex-5) describes the generally observed grades of damage to buildings and structures in various intensity levels. For convenience of reference, the damage vulnerability of the various building types in MSK seismic intensities VI, VII, VIII and IX is presented in Table-2.

3.2 Landslides

In India, landslides are perennial hazards in the hilly/mountainous terrains that directly inflicts irreparable losses of precious human lives and properties, including un-ending indirect miseries to the society at large.

Landslides are caused mainly by two factors – pre-disposing causal geofactors and the triggering factors (e.g., rainfall, earthquake, sudden slope cutting etc.). The pre-disposing causal geo factors such as variation in topographic gradient, topographic shape, aspect (direction of slope), geomorphology and its prevalent processes, geology, structure, lithology of the overburden material, changes in land use, and land cover are the main controlling geofactors which are instrumental in causing the landslides, including its varying types of movements, material and magnitudes. In India, the landslide prone areas represent a wide spectrum of topography, geology and geomorphic set up and thus cause landslides of varying types, magnitudes and failure mechanisms. All sorts of landslide failure mechanisms – deep-seated, shallow translational slides, flows involving varying material, movement type and magnitudes are observed in India (Fig. 1) which are strongly influenced by prevalent topography, geology and geomorphology of the terrain.

The landslides can be rapid or slow and occur in a wide variety of geological environs including under water. The secondary or domino/ cascading effects of landslides can also be very disastrous. Waves generated by landslides entering rivers, lakes, reservoirs and other water bodies have caused substantial damage to engineering and civil infrastructures in many parts of the world. The artificial landslide debris-dammed lakes can flood upstream areas and also on breaching can generate Landslide Lake Outburst Flow (LLOF) having enormous amount of discharge and energy that can suddenly trigger flash flood or inundation in downstream, low-lying areas and can also trigger many new landslides due to toe cutting and excessive rate of erosion by the flowing debris-laden flood discharge downstream along the narrow mountainous rivers. The examples of such type of cascading hazards are plenty in Indian Himalayas (e.g. the deluge of 2013 in Uttarakhand).



Fig. 1: Different types of landslides and failure mechanism that are prevalent in India

In India excepting the permafrost terrain in the Himalayas, 12.6 percent of landmass (~0.42 million km²) in the mountainous/ hill regions are landslide prone spreading mainly over 18 States. The main landslide prone areas belong to the Himalayan States in the north occupying about 53% of landslide prone areas of India. In the Northeast, the Meghalaya plateau, the Tertiary hills of Assam, Mizoram, Manipur, Tripura and Nagaland occupies about 25% of the landslide prone landmass, and the rest 22% are occupied by the Western Ghats and Konkan Regions in States of Maharashtra, Tamil Nadu, Karnataka, Kerala, Goa respectively. In all the above 18 States, landslides with varying frequencies are reported. These landslides of varying magnitudes are mostly triggered by the high/ extreme rainfall events during monsoon (June-October in Northern and Northeastern States; July-August and November-March in the Western Ghats and Konkan Regions). However, many of the above landslide-prone areas in India, especially the Himalayas and Northeast India also belong to the maximum earthquake-prone areas (Zone-IV and V of Seismic Zoning Map given in IS 1893 (Part1):2002), where earthquakes of MSK VIII to IX or more can occur, and thus are also prone to earthquake-induced/ triggered landslides. Amongst these 18 landslide prone States, landslides are quite frequent in the Himalayan States like Uttarakhand, Jammu & Kashmir, Himachal Pradesh, Sikkim, West Bengal, and Arunachal Pradesh, followed by fragile Tertiary Hills in the Northeastern States and The Nilgiris in the southwest within the Western Ghats.

In this revised version of Vulnerability Atlas of India, 9883 nos. historic landslide data, that have been mapped and field validated till 2016 by the Geological Survey of India (GSI) – the nodal department of landslide studies in India, are incorporated to depict the landslide vulnerability of the above mentioned States of India. The distribution of such historic landslide incidences indirectly shows the relative densities of landslides in different such landslide prone States in the map as well as also in the associated textural database, indicating their types of movement, material type and dimensions, and in some cases their initiation years and damage details, wherever such information are available. However, landslide incidences demonstrated in this Vulnerability Atlas are time-dependent and dynamic features, therefore, its signatures in cases of many smaller landslides cannot always be recognized on ground on present day because of rapid land use and vegetation changes in time. In addition, the dimensions shown in the textural databases are mostly based on field-based eye-estimation, where actual landslide sizes could not always be measured at site because of local inaccessibility and time constraints. Damage details available so far in the historic record are based on the reports that are made available to the visiting field geoscientists by the local authorities and the local residents and could not always been validated with the actual government records, because of its non-availability and lack of real witnesses of the events. The densities revealed by this historic data, collected so far by GSI are only based on the landslides that are field validated on ground only at the accessible locations, but there could be many more landslides which are available on remotely and inaccessibly-distributed natural slopes and also are not proximal to habitated areas. The latter group of landslides or the landslides that are mainly mapped using only the remote sensing data are not incorporated in the landslide database of this present Atlas, because the same could not be validated through fieldwork.

The available historic landslide data (9883 nos.) presented in this Atlas indicate that about 60 percent of the incidences are smaller having lengths 50 m or lesser and about 14 percent of landslides are bigger having lengths 100 m or larger. According to the prevalent movement types, maximum (~85%) are primarily slides, followed by complex and other movement types (~6%), flows (~5%) and falls (~4%) respectively. According to the material involved or moved, about 60 percent are debris and/ or earth, followed by about 30 percent rock and the rest 10 percent are of mixed type involving both debris/ earth and rock material. As per the density of the field-validated landslides of this Atlas is concerned, the Himalayan and Northeastern States surpass all other landslide-prone terrains in India. Within the Himalayan States, Uttarakhand represents about 34 percent of the incidences, followed by Darjeeling-Sikkim Himalayas (~24%), Northeastern States including Arunachal Pradesh (~16%), Himachal Pradesh and J&K (~14%), and States in the Western Ghats and Konkan areas (~12%) respectively. However, the above region-wise statistics may slightly vary if all the field-validated and

non-field-validated landslides present in inaccessible natural slopes are considered together. According to GSI, the non-field validated landslides which are not presented in this atlas also primarily favour the fact that within the 12.6percent of landslide prone landmass of India, the Himalayan and Northeastern States contain maximum amount of landslides (about 80-90%) in India.

Since the growth of population and infrastructure in such Himalayan, Northeastern States and Western Ghats/ Konkan areas are enormous in post-independence era, risks to landslide hazards also increase manifold and the losses incurred so far due to landslide hazards are huge. Thus sustainable infrastructure development and practicing the relevant land use zoning regulations strictly by following the prevalent landslide hazard scenarios of these areas are essential to reduce the landslide risks and its cascading effects. Moreover, due to climate change, behaviour, role and frequencies of the main landslide triggering factor i.e. the monsoon and extreme rainfall events are becoming more erratic and unpredictable nowadays, and thus sustainable developmental planning and its execution on ground must honour strict implementation of land use zoning practices for safer construction of buildings, and infrastructure. The same will not only ensure reduction of landslide risk in the mountainous terrains but also will ameliorate the resilience of people living in such fragile landmass to cope up the ever increasing risks of landslide hazards in India.

Disclaimer - While GSI endeavors to keep the landslide information up to date and correct, however, GSI make no representations or warranties of any kind, express or implied, about the completeness, accuracy, reliability, suitability or availability with respect to landslides for any purpose. The landslide inventories including its dimensions presented are based on field data and visual estimation and are often limited to the accessibility and approachability in the mountainous terrain

3.3 Indian Volcanoes

The lone active volcano in India is the “Barren Island Volcano” falling in the Southeast Asia volcanic belt. It lies about 135 km ENE of Port Blair, the capital of Andaman and Nicobar Group of Islands (12.29°N: 93.85°E) and occupies only 10 sq km area. The Barren Island rises from a depth of about 2250 m from the sea floor and stands out 355 m above the sea level. From west side it looks like a truncated cone girdled by precipitous cliffs all around. Except in its central part, Barren Island is covered with thick vegetation similar to other parts of Andaman and Nicobar Group of islands and closely related to Myanmar, Indonesia and Malayan Flora. No human habitation is ever reported from this Island.

4. WIND HAZARD MAPS

The statewide wind hazard maps contain the following information:

4.1 Basic Wind Speed Zones

The macro-level wind speed zones of India have been formulated and published in IS 875 (Part 3):2015 - “Indian Standard Code of Practice for Design Loads (other than earthquakes) for Buildings and Structures, Part 3 Wind Loads”. There are six basic wind speeds ‘ V_b ’ considered for zoning, namely 55, 50, 47, 44, 39 and 33 m/s. From wind damage view point, these could be described as follows:

55 m/s (198 km/h)	-	Very High Damage Risk Zone -A
50 m/s (180 km/h)	-	Very High Damage Risk Zone – B
47 m/s (169.2 km/h)	-	High Damage Risk Zone
44 m/s (158.4 km/h)	-	Moderate Damage Risk Zone –A
39 m/s (140.4 km/h)	-	Moderate Damage Risk Zone – B
33 m/s (118.8 km/h)	-	Low Damage Risk Zone

In fact, the cyclone affected coastal areas of the country are classified in 50 and 55 m/s zones. Wind speeds are applicable to 10 m height above mean ground level in an open terrain. Recently, Bureau of Indian Standards has brought out two guidelines IS 15498:2004 (Reaffirmed 2015) and IS 15499:2004 (Reaffirmed 2015) on improving cyclonic resistance of low rise houses and other buildings/structures, and survey of housing and building typology in cyclone prone areas, respectively. IS 15498:2004 gives guidelines for increased wind speeds based on importance of structures in cyclone prone areas.

The above basic maximum wind speeds in m/s represent the peak gust velocity averaged over a short time interval of about 3 seconds duration. The wind speeds have been worked out for 50 years return period with probability of exceedance of 63%, based on the upto-date wind data of 43 Dines Pressure Tube (DPT) anemograph stations and study of other related works available on the subject since 1964. The map and related recommendations have been provided in the Code with the active cooperation of India Meteorological Department (IMD).

In general, wind speed in the atmospheric boundary layer increases with height from zero at ground level to a maximum value at a height, called gradient height. The variation with height depends primarily on the terrain conditions. However, the wind speed at any height never remains constant and it has been found convenient to resolve its instantaneous magnitude into an average or mean value and a fluctuating component around this average value. The average value depends on the averaging time employed in analysing the meteorological data and this averaging time varies from a few seconds to several minutes. The magnitude of fluctuating component of the wind speed which is called gust, depends on the averaging time. In general, smaller the averaging interval, greater is the magnitude of the gust speed.

The basic wind-speed zones are plotted here in statewise maps which show the district boundaries as well as the district towns for their easy identification.

4.2 Design Wind Speed and Pressures

The basic wind speed is reduced or enhanced for design of buildings and structures due to factors like (i) the risk level of the structure measured in terms of adopted return period and life of structures (5, 25, 50 or 100 years), (ii) terrain roughness determined by the surrounding buildings or trees and, height and size of the structure, (iii) local topography like hills, valleys, cliffs, or ridges, etc., and (iv) Importance factor for the cyclonic region. This basic wind speed shall be modified to include the above effects to get design wind speed, V_z as follows:

$$V_z = V_b k_1 k_2 k_3 k_4$$

where

V_z = design wind speed at height z, in m/s;

k_1 = probability factor (risk coefficient);

k_2 = terrain roughness and height factor;

k_3 = topography factor; and

k_4 = importance factor for the cyclonic region.

Thus basic wind speed being the same in a given zone, structures in different site conditions could have appreciable modification and must be considered in determining design wind velocity as per IS 875 (Part 3):2015.

The design wind pressure at height z above ground level on a surface normal to the wind stream is given by

$$P_z = 0.0006 V_z^2$$

where

V_z = design wind velocity, m/s

P_z = design wind pressure, kN/m²

This value of wind pressure gets very much modified when applied to a given house: the windward vertical faces being subjected to pressure, the leeward and lateral faces getting suction effects, and the inclined roofs getting pressures or suction effects depending on their inclination. The projecting window shades, roof projections at eave levels are subjected to uplift pressures several times the intensity of P_z . These factors play an important role in determining the vulnerability of given building types in given wind speed zones.

Over the Indian continent, the average wind speed is reported on the basis of 3 minutes average. Wind speed increases manifold in of a squall or low pressure systems over the region. The highest wind speed recoded at the station during the past due to any weather system may be considered as the maximum probable wind for that region or a station.

High wind speed over the Agartala and Leh area is due to the following reasons:

Agartala

- Tropical cyclones after re-curving move across northeast India, hence Agartala region lies in the affected zone of cyclonic winds.
- Severe thunderstorm causes high wind speed over Agartala region.
- Agartala is located in such orographic region therefore experiences katabatic and anabatic wind affects.

Leh

- The height of Leh from mean sea level is about 5,753 M at this height generally, strong wind prevails. This is the general phenomena of the atmosphere over these latitudes as per climatology.
- When the upper air jet core passes over the region, the region experiences strong wind.
- When divergence area falls over the region in association with active western disturbance passing over western Himalayan region, the area experiences strong wind.

4.3 Coastal Areas

The coastal areas are subjected to severe wind storms, cyclonic storms and tsunamis. It is known that in certain events, the wind gusts could appreciably exceed the given basic wind speeds (by as much as 40 to 55%)¹. But for design of normal structures and classification of vulnerability and risk to buildings, the above macro-level zoning is considered as sufficient. Higher wind velocity may be adopted for the 50-60 km wide cyclonic belt on the east and west coasts as per the provisions in IS 15498:2004.

The frequency of occurrence of cyclones on the different portions of the coast has been different. Even for the same design wind speed in some areas, the risk of damage per year will be higher in areas subjected to more frequent cyclones. Therefore, for the States having coastal areas, the number of cyclones having crossed

the coastline from the year 1891 to 2017 has also been shown as cyclonic storm (C.S.) with wind speed between 34 and 47 knots. Under the S.C.S. Category all cyclones with wind speeds greater than or equal to 48 knots have been included. It is to be noted that the cyclones crossing West Bengal coast shown on the map include those upto Longitude 90°E that is a part of Bangladesh coast.

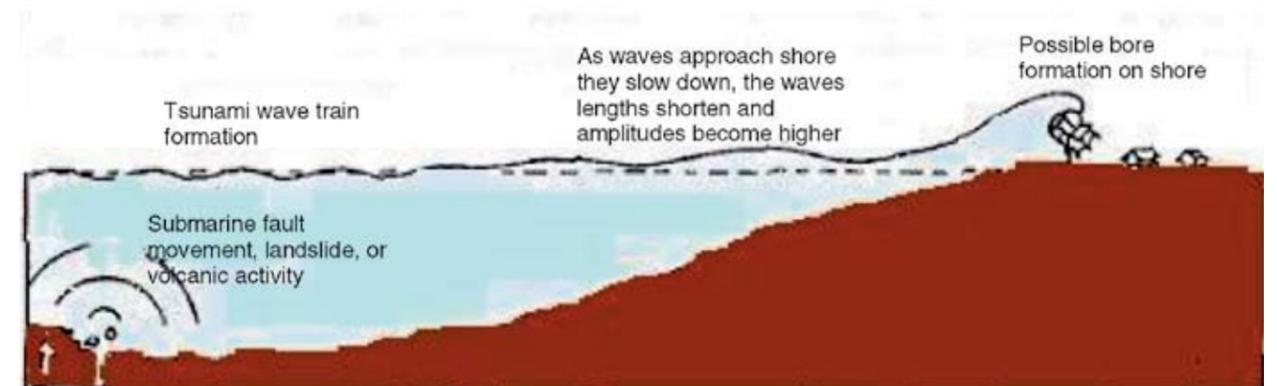
4.4 Storm Surge

Besides the very high velocity winds, the coastal areas suffer from the onslaught of sea water over the coast due to storm surge generated by cyclones. A storm surge is the sudden abnormal rise in sea level caused by cyclone. The surge is generated due to interaction of air, sea and land. The cyclone provides the driving force in the form of very high horizontal atmospheric pressure gradient that leads to very strong surface winds. The sea water flows across the coast as well as inland and then recedes back to the sea. Great loss of life and property takes place in the process. Scientists from India Meteorological Department have estimated the probable maximum heights of storm surge in various sections of the sea coast. These are shown in the relevant States' wind hazard maps. While calculating Probable Maximum Storm Surge (PMSS) the presumption has been made that there is a possibility of highest intensity storm generated in the adjacent sea/area during past 100 years may strike any part of the coast touching that sea. The height of the storm surge is over and above the concurrent sea level, hence added to the normal astronomical tide level existing at the time of the cyclonic storm for calculating the maximum level to which the surge could strike under the storm.

4.5 Tsunami

A tsunami is a series of waves with a long wavelength and period (time between crests). Time between crests of the wave can vary from a few minutes to over an hour. They are often incorrectly called tidal waves; they have no relation to the daily ocean tides. Tsunami (soo-NAH-mee) is a Japanese word meaning harbour wave. They can occur at any time of day or night.

Tsunamis are generated by any large, impulsive displacement of the sea bed level (Fig.2). Earthquakes generate tsunamis by vertical movement of the sea floor. If the sea floor movement is horizontal, a tsunami is not generated. Earthquakes of Magnitude larger than M 6.5 are critical for tsunami generation. Tsunamis are also triggered by landslides into or under the water surface, and can be generated by volcanic activity and meteorite impacts.



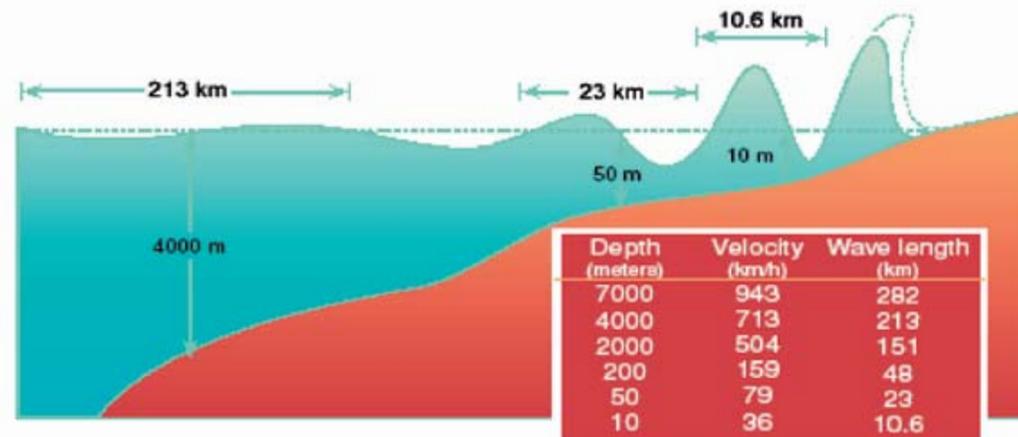
Source: International Tsunami Information Centre - Geologic Hazard

Fig.2 Wave train of Tsunami

¹ Probable Maximum wind speed in coastal districts is shown on the Wind Hazard Maps for East Coast. Similar data for West Coast need to be computed.

On the average, there are two tsunamis per year in the Pacific Ocean somewhere, which cause damage near the source. Approximately every 15 years a destructive tsunami occurs in the Pacific. The destructive tsunami of Dec 26th, 2004 on the Indian Coast, in terms of its impact, seems to have occurred for the first time in the known history.

Tsunami velocity is dependent on the depth of water through which it travels (velocity equals the square root of water depth h times the gravitational acceleration g , that is $V = \sqrt{gh}$). The tsunami will travel approximately at a velocity of 700 kmph in 4000 m depth of sea water. In 10 m, of water depth the velocity drops to about 36 kmph. See Fig.3. Even on shore tsunami speed is 35 to 40 km/h, hence much faster than a person can run.



Source: http://www.prh.noaa.gov/pr/itc/library/pubs/great_waves/tsunami_great_waves_4.html

Fig.3 Tsunami Velocities

Tsunamis range in size from centimeters to over 30 m height. Most tsunamis are *less than 3 m* in height. In deep water (greater than 200 m), tsunamis are rarely over 1m high and will not be noticed by ships due to their long period (time between crests). As tsunamis propagate into shallow water, the wave height can increase by over 10 times. Tsunami heights can vary greatly along a coast. The waves are amplified by certain shoreline and bathymetric (sea floor) features. A large tsunami can flood land up to 1.5 km from the coast.

The force of some tsunamis is enormous. Large rocks weighing several tons along with boats and other debris can be moved inland tens of metres by tsunami wave activity. Houses and other buildings are destroyed. All this material and water move with great force and can kill or injure people.

Wind-generated waves usually have periods (time between crests) of 5 to 20 seconds. Tsunami periods are usually between 5 minutes and an hour. Wind-generated waves break as they shoal and lose energy offshore. Tsunamis act more like a flooding wave. A 6 m tsunami is a 6 m rise in sea level. This rise is of course temporary. Receding waters are also very destructive and take away to the sea whatever comes in the way.

There are two well recognized earthquake sources which are known to have generated tsunamis on the Indian coast. On the east, the west coast of Sumatra Islands and on the west, the Mekaran coast have generated tsunamis in the past. The entire coast line of India can be subjected to tsunamis and there is a need to take precautionary measures in about 1.5 km distance from the coast line particularly in the areas which are below 5 m elevation above the high tide line.

4.6 Thunderstorm

Thunderstorm is a severe weather phenomenon, the impact of which is felt by all the sectors of society including aviation service; it occurs all over the world. In general, the orographically dominant regions as well as the coastal areas are more prone to thunderstorm activities. In Indian scenario, most thunderstorm prone area is northeastern states and adjoining east India. Thunderstorm is popularly known as 'Nor'westers' over these regions because most of them move from northwest to southeast over these regions. Frequency of thunderstorms is the maximum during pre-monsoon season (April-May). It is accompanied with lightning, squalls and sometimes heavy rain and hailstorms.

Squalls in association with thunderstorm occurs when wind speed significantly increases and last for short duration of time (at least one minute) with wind speed reach 22 kts or more. As per IMD criteria, squalls with surface wind (in gusts) upto 80 kmph are known as "moderate squall", greater than 80 kmph as "severe squall" and greater than 100 kmph as "very severe squall" due to their appreciably more damaging effects.

5. FLOOD HAZARD MAPS

The statewise flood hazard maps cover the following information:

5.1 Areas Liable to Flooding

The "Flood Atlas of India" brought out by Central Water Commission (CWC), shows pictorially the areas liable to floods, expenditure made and the achievement of flood protection measures. The Atlas was first published in 1962 and again published in 1977 and updated upto March 1985. A further revision is in process now. As per the information collected from CWC, a total area of 14.37 million hectares are reported to have been protected in various states out of the total flood prone area of the country of about 40 million hectares as assessed by Rashtriya Barh Ayog (RBA) 1980. The protectable area has been considered to be of the order of 32 million hectares. The area liable to floods is the aggregate of different areas flooded in any year during the period of record. This, therefore, include the unprotected and protected areas. The protected area is also vulnerable to floods as the flood control structures, mainly embankments, may breach during a severe flood and the so called protected areas may also get flooded due to wrong alignment or breach of embankments. However, because of the protective measures adopted, vulnerability of houses, etc., in such areas, are considered to be comparatively less in usual circumstances.

The areas outside the flood prone areas are generally not vulnerable to flood. But experience shows that heavy rains in some of these areas can result in flood condition and at times flooding in such areas may be very severe and create more acute problem than in the identified flood prone areas. The economic loss and disruption to normal life in urban areas could be very high as seen in recent floods of Mumbai and Chennai (2006) which were unprecedented. These aspects may be kept in mind while using the vulnerability tables as mentioned in the note below the Risk Tables.

The State-wise flood hazard maps in this Vulnerability Atlas are based on the Flood Atlas of India (1987), and updated flood prone areas of Assam and other neighboring States including Bihar, West Bengal and Eastern Uttar Pradesh included in the Task Force Report (2004). These maps mark the areas which are liable to flooding. Since these maps given herein also show the district boundaries and the location of the district towns along with the rivers, districtwise identification of the vulnerable areas will be easy.

As regards latest data on flood prone areas is concerned, the scientific assessment of flood prone area in India is under progress by CWC. The existing flood maps presented here are of 2006 Atlas and will be updated as and when the data is made available by CWC.

5.2 Probable Maximum Precipitation

Besides the problem of flooding in the river plains, heavy intensity rains could cause local flooding in certain areas where the drainage is either naturally poor or the drains are choked due to various reasons such as careless dumping of refuse in the drains and lack of maintenance. Much of the flooding problems in towns and cities occur due to such causes. The Central Water Commission and India Meteorological Department have compiled statistics on Probable Maximum Precipitation (PMP) over the country considering one day rainfall data. The design of drainage should consider such PMP values, the catchment areas of the drain and the characteristics of the catchment area to avoid flooding.

5.3 Flooding in Coastal Areas

As stated earlier under cyclonic winds in coastal areas, the sea coast of India can be flooded due to heavy downpour on the one hand and the storm surge on the other. Whereas the PMP values give the probable intensity of raining, the probable maximum storm surge heights worked out by IMD and shown on the statewise maps will give an idea of height of water which could flow from the sea towards the coastal plains in extreme cases and the levels to which protection will be required. The depth of inland inundation could be worked out by taking the storm surge heights, where high resolution coastal maps with half metre contours are available.

6. HOUSING VULNERABILITY TABLES

6.1 House Types

The Census of Housing, 2011 Census of India, gives the following details of houses based on materials of construction for walls and roofs:

- a) *Type of Roof:*
 - i) Pitched or sloping including tiles, stone/slate; corrugated iron, zinc or other metal sheets; asbestos cement sheets; plastic polythene, thatch, grass, leaves, bamboo, etc.
 - ii) Flat including brick, stone and lime; reinforced brick concrete/reinforced cement concrete.
- b) *Type of Wall:*
 - i) Mud, unburnt bricks, stone packed and not packed with mortar
 - ii) Burnt bricks laid in cement, lime or mud mortar
 - iii) Cement concrete
 - iv) Wood or Ekra walling
 - v) Corrugated iron, zinc or other metal sheets
 - vi) Grass, leaves, reeds or bamboo or thatch, plastic polythene and others
- c) *Type of Flooring:*
Various types like mud, stone, concrete, wood or bamboo, mosaic floor tiles, etc.

The distribution of houses based on Predominant materials of roof and wall over whole of India according to 2011 Census is shown in Table-3. From the point of view of vulnerability to the earthquake, wind or flood hazards, it was seen that the type of flooring had hardly any significance, hence omitted from consideration,

and that the roof types and wall types could not be grouped together. The appropriate grouping for the whole of India is shown in Table-4, wherein the wall and roofing groups are categorized as follows:

Wall Types

- Category - A: Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B: Ordinary brick building; buildings of the large block and prefabricated type, half- timbered structures, building in natural hewn stone
- Category - C: Reinforced building, well built wooden structures
- Category - X: Other materials not covered in A, B and C. These are generally light structures.

Roof Types

- Category - R1: Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2: Heavy Weight (Tiles, Stone/Slate)
- Category - R3: Flat Roof (Brick, Concrete)

With these groupings, the vulnerability of each subgroup could be defined separately for any given intensity of earthquake, wind or flood hazard. The risk levels of the various categories of houses for the three hazards are shown in Table-5, and explained in the following sections.

In the 1991 Census of Housing, roof and wall combinations were available for each house type. Therefore, the combined vulnerability of the complete house was indicated which is not possible for the data available in Census of Housing 2001 and 2011. For convenience of reference to those who may be studying existing houses taking wall and roof together Table 5A is reproduced from Vulnerability Atlas of India 1997.

6.2 Risk of Damage to House Types

The damage risk to various house types is based on their average performance observed during past occurrences of damaging events. In view of numerous variations in the architectural planning, structural detailing, quality of construction and care taken in maintenance, the performance of each category of houses in a given event could vary substantially from the average observed. The intensity scales as given in Annex -4 and 5 or Table-2 represent average observations. For example, under seismic occurrence, the following observations have been made in many cases:

- (a) *All Masonry Houses (Categories A and B)*
 - Quality of construction comes out as a major factor in the seismic performance particularly under intensities MSK VII to IX. Good quality constructions perform much better than poor quality constructions in any category. Appropriate maintenance increases durability and maintains original strength.
 - Number of storeys in the house and the storey height are other factors. Higher the storey and more the number of storeys, greater is the observed damage.
 - Size, location and number of door and window openings in the walls also determine seismic performance, since the openings have weakening effect on the walls. Smaller and fewer openings and located more centrally in the walls are better from seismic performance viewpoint.
 - Architectural layout, particularly in large buildings, that is, shape of building in plan and elevation, presence of offsets and extended wings, also play important role in initiation of damage at certain points and its propagation as well. More symmetrical plans and elevations reduce damage and unsymmetrical ones lead to greater damage.

- Where clay/mud mortar is used in wall construction, its wetness at the time of earthquake is very important factor in the seismic performance since the strength of fully saturated mortar can become as low as 15% of its dry strength.

(b) *Wooden Houses*

- Quality of construction, that is, seasoning of wood and the joinery are important in seismic and cyclonic wind performance. Better the quality better the performance.
- Wood decays with time due to dry rot, insect and rodent attack, etc., therefore, the joints tend to become loose and weak. The state of maintenance of the wooden building will determine its performance during earthquake, high wind, as well as flooding.
- In houses with sloped roofs, a shallow angle for the roof, extended eaves projection, and reentrant corners lead to higher damage.
- In light roofs, pressures often exceed the dead weight leading to blowing-off of roofs.

(c) *Reinforced Concrete Houses*

- Multistorey RC frame buildings resting on soft soils and having soft first storey unconnected wall panels and floating columns in the superstructure collapsed even in Seismic Zone III.
- Besides bad quality of configuration planning and structural design, poor quality of construction lead to total collapses of 5 to 10 storeyed RC frame buildings.
- In reinforced concrete construction, good structural design and detailing and good quality construction only would ensure excellent performance. Carelessness in any of these can lead to poor behaviour both under earthquakes and cyclones.

Now the average risk levels to various categories of houses for various hazards and their intensities are defined here below for use in the house vulnerability tables.

6.3 Damage Risk Levels for Earthquakes

The damage risk to various house types is defined under various seismic intensities on MSK scale (see Annex-5). The following damage risks are defined based on this Intensity Scale.

Very High Damage Risk (VH)

Total collapse of buildings

High Damage Risk (H)

Gaps in walls; parts of buildings may collapse; separate parts of the building lose their cohesion; and inner walls collapse.

Moderate Damage Risk (M)

Large and deep cracks in walls fall of chimneys on roofs.

Low Damage Risk (L)

Small cracks in walls; fall of fairly large pieces of plaster, pantiles slip off; cracks in chimneys, part may fall down.

Very Low Damage Risk (VL)

Fine cracks in plaster; fall of small pieces of plaster.

6.4 Damage Risk Levels for Wind Storms

For damage risk to buildings from wind storms, there appears no universally accepted scale like the seismic intensity scale. The following damage risk scale has been adopted as per 2006 Atlas, for developing the house vulnerability tables.

Very High Damage Risk (VH)

Generally similar to "High Risk" but damage is expected to be more widespread as in the case of cyclonic storms.

High Damage Risk (H)

Boundary walls overturn, walls in houses and industrial structures fail; roofing sheets, and tiles or whole roofs fly; large scale destruction of life-line structures such as lighting and telephone poles, a few transmission line towers/communication towers may suffer damage; and non engineered/semi constructions suffer heavy damage.

Moderate Damage Risk (M)

Loose tiles of clay fly, roofs sheets fixed to battens fly; moderate damage to telephone and lighting poles; moderate damage to non-engineered/semi-engineered buildings.

Low Damage Risk (L)

Loose metal or fibre cement sheets fly; a few lighting and telephone poles go out of alignment; sign boards and hoardings partially damaged; well detailed non-engineered/ semi-engineered buildings suffer very little damage.

Very Low Damage Risk (VL)

Generally similar to "Low Risk" but expected to be very limited in extent.

6.5 Damage Risk Levels for Flood

No detailed building damage reports under flooding appear to have been worked out as yet. Also flood intensities in terms of depth of water, velocity of flow or time duration of inundation are not yet defined. In the absence of such data, no definite recommendation about damage risk levels could be made.

The following damage risks have been adopted from the 2006 which is based on understanding of material behaviour under submergence.

Very High Damage Risk (VH)

Total collapse of buildings; roof and some walls collapse; floating away of sheets, thatch, etc; erosion of foundation; severe damage to life line structures and systems.

High Damage Risk (H)

Gaps in walls; punching of holes through wall by flowing water; parts of buildings may collapse; light roofs float away; erosion of foundation, sinking or tilting; undercutting of floors, partial roof collapse.

Moderate Damage Risk (M)

Large and deep cracks in walls; bulging of walls; loss of belongings; damage to electric fittings.

Low Damage Risk (L)

Small cracks in walls; fall of fairly large pieces of plaster.

Very Low Damage Risk (VL)

Fine cracks in plaster; fall of small pieces of plaster.

6.6 The Housing Vulnerability Tables

Now correlating the house types, the hazard intensities on the maps and the damage risk levels, the housing damage risk tables have been generated. For the country as a whole, for each State and Union Territory also, an overall risk table has been developed. Such tables are then prepared for each of the districts and collected statewise.

Each table also gives at the top of each column of hazard intensities, the percent of total area of the country, State or District covered by the Table, lying under the various hazard intensities. Thus the concerned administrative

or professional authority can visualize the extent of damage risk existing to any hazard at one time or the other in the future.

As an example, let us refer to a District Kendrapara (OR 10) of the State of Odisha. It is seen that 87% area of the district lies in seismic intensity MSK VII zone (Zone III) and 100% area in the 50 & 55 m/s wind velocity zone. Also 48.4% of its area is flood prone. The probable maximum precipitation is 716 mm, that is, quite a high figure. According to 2011 census, there are 421,530 housing units in the district, 58.1% of which are of category A (very weak type), 36.5% of category B (moderate strength) and only 1.40% of category C (the strong types). Also 4% houses are of other materials such as bamboo, thatch, grass, leaves. The risk of damage from earthquakes to Category A houses is 'medium', and to Category B (36.5% of total) it is 'low'. The example district lies in the cyclone prone area of the Odisha coastal area and have very high risk to 62.9% [57.9%(Cat.A1) + 1.0%(Cat.C2) + 4.0%(Cat.X)] housing units, hence the life and property of this population living in the district is at great cyclone risk. The district has also great risk of flooding, storm surges & tsunami. Hence serious attention has to be paid to the district from cyclone, tsunami & storm surge disaster prevention, mitigation and preparedness points of view. Other hazards can similarly be analyzed with the help of the table.

It is pertinent to mention here that there are perceptible changes in the area calculation (percent) for earthquake, wind and flood hazards as areas are now calculated based on the administrative boundary data provided by Survey of India including state and district boundaries. Also 47 new districts have been added since 2006 Vulnerability Atlas of India and one more State is added. Further, Basic Wind Speed Map given in National Building Code 2016 have been updated on account of availability of more scientific data. The difference in area is shown in the Table-7 for better comprehension:

TABLE-7

INDIA	Level of Risk under								
	EQ Zone				Wind Velocity m/s				Flood Prone Area in %
	V	IV	III	II	55 & 50	47	44 & 39	33	
	Area in %				Area in %				
Vulnerability Atlas of India - 2018	11.3	14.4	31.1	43.2	18.0	30.3	45.1	6.6	7.3
Vulnerability Atlas of India - 2006	10.9	17.3	30.4	41.4	5.0	40.2	48.0	6.7	7.9

7. USE OF VULNERABILITY ATLAS

In preparing the Vulnerability Atlas, it has been realized that the State Governments have the basic mandate for management of disasters and the executive actions are taken at the district levels with the District Collector playing the pivotal role. The Atlas provides some ready information, though at macro-level, for use of the authorities involved in the tasks of disaster mitigation, preparedness and preventive actions. A glance at the hazard maps will bring to the notice of the district authorities, the location and percent areas of the districts most susceptible to hazard occurrence, the probable maximum hazard intensities, the type of housing and its vulnerability and risk to the hazards. It must be realised that most of the human problems arise due to loss of the houses; deaths mostly occur in collapsed houses; and rescue, evacuation, relief and rehabilitation become more acute when houses get lost. Houses are threatened more due to earthquakes and floods, except loss due to wind in coastal areas subjected to cyclones. Landslides and mud flows can totally erase villages and bury them under debris. Rock falls can destroy a building very badly. **Knowing the extent of the problem of future disasters, the district authorities can formulate development plans for (a)**

preventive actions like hazard resistant construction, retrofitting and upgrading of existing buildings, (b) mitigating the intensity and extent of the disaster, (c) warning system installation and drills for its use, (d) instituting a hierarchical structure for preparedness down to the village level, (e) training of manpower in various tasks in the emergency (f) implementation of land zoning regulations in flood plains and coastal areas, and building byelaws with disaster resistant features in various towns and cities, etc.

The District authorities with the help of the people's representatives can create the necessary awareness leading to self help. Also the hazard zoning can be improved at local levels by specific studies carried out in the district particularly for minimising the flood havoc by measures such as suitable vulnerability analysis, hazard reduction measures, and risk mapping, and improved resistance of buildings wherein the local technical institutions and professionals could also be involved.

The Atlas can be used to identify areas in each district of the country which are prone to high risk from more than one hazard. This information will be useful in establishing the need of developing housing designs to resist the combination of such hazards.

8. DEFINITIONS OF SOME DISASTER RELATED TERMS

For the sake of easy understanding, a few of the terms commonly used in dealing with natural disasters are defined here below:

Hazard¹: a threatening event, or the probability of occurrence of a potentially damaging phenomenon (e.g. an earthquake, a cyclonic storm or a large flood) within a given time period and area.

Disaster¹: a serious disruption of the functioning of a society, causing widespread human, material, or environmental losses which exceed the ability of the affected society to cope using only its own resources. Disasters are often classified according to their speed of onset (sudden or slow) or according to their cause (natural or man-made).

Disaster²: means a catastrophe, mishap, calamity or grave occurrence in any area, arising from natural or man-made causes, or by accident or negligence which results in substantial loss of life or human suffering or damage to, and destruction of, property, or damage to, or degradation of, environment, and is of such a nature or magnitude as to be beyond the coping capacity of the community of the affected areas.

Disaster Management²: means a continuous and integrated process of planning, organizing, coordinating and implementing measures which are necessary or expedient for :

- i) prevention of danger or threat of any disaster;
- ii) mitigation or reduction of risk of any disaster or its severity or consequences;
- iii) capacity building;
- iv) preparedness to deal with any disaster;
- v) prompt response to any threatening disaster situation or disaster;
- vi) assessing the severity or magnitude of effects of any disaster;
- vii) evacuation, rescue and relief;
- viii) rehabilitation and reconstruction.

Risk¹: the expected number of lives lost, persons injured, damage to property and disruption of economic activity due to a particular natural phenomenon, and consequently the product of specific risk and elements at risk.

Vulnerability¹: the degree of loss to a given element at risk or set of such elements resulting from the occurrence of a natural phenomenon (or man-made event) of a given magnitude and expressed on a scale from 0.0 (no damage or loss) to 1.0 (total loss).

Mitigation¹: measures taken in advance of a disaster aimed at decreasing or eliminating its impact on society and on environment.

Mitigation²: means measures aimed at reducing the risk, impact or effects of a disaster or threatening disaster situation.

Preparedness¹: activities designed to minimise loss of life and damage, to organise the temporary removal of people and property from a threatened location and facilitate timely and effective rescue, relief and rehabilitation.

Preparedness²: means the state of readiness to deal with a threatening disaster situation or disaster and the effects thereof.

Prevention¹: encompasses activities designed to provide permanent protection from disasters. It includes engineering and other physical protective measures, and also legislative measures controlling land-use and urban planning.

¹ A list of disaster management related terms with their definitions to be included in an internationally agreed multilingual glossary” English Version. Third Draft. UNDRO Sectt., Geneva, Dec. 1981.

² The Disaster Management Act 2005 (No.53 of 2005), 23rd December, 2005, the Gazette of India Extraordinary, December 26, 2005.

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TABLE - 4

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

INDIA

Wall / Roof		Census Houses		Level of Risk under									
		No. of Houses	%	EQ Zone				Wind Velocity m/s				Flood Prone Area in %	
				V	IV	III	II	55 & 50	47	44 & 39	33		
				Area in %				Area in %					
INDIA				11.3	14.4	31.1	43.2	18.0	30.3	45.1	6.6	7.3	
WALL													
A1 - Mud & Unburnt Brick Wall	Rural	58,330,614	19.1										
	Urban	8,119,213	2.7										
	Total	66,449,827	21.8	VH	H	M	L	VH	H	M	L	VH	
A2 - Stone Wall not packed with mortar	Rural	7,751,666	2.5										
	Urban	2,689,476	0.9										
	Total	10,441,142	3.4	VH	H	M	L	H	M	L	VL	VH	
Total - Category - A		76,890,969	25.2										
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	104,552,560	34.3										
	Urban	75,035,035	24.6										
	Total	179,587,595	58.9	H	M	L	VL	H	M	L	VL	H/M	
Total - Category - B		179,587,595	58.9										
C1 - Concrete Wall	Rural	3,699,096	1.2										
	Urban	7,284,583	2.4										
	Total	10,983,679	3.6	M	L	VL	VL	L	VL	VL	VL	L/VL	
C2 - Wood wall	Rural	2,132,342	0.7										
	Urban	648,929	0.2										
	Total	2,781,271	0.9	M	L	VL	VL	VH	H	M	L	H	
Total - Category - C		13,764,950	4.5										
X - Other Materials	Rural	30,097,412	9.9										
	Urban	4,541,522	1.5										
	Total	34,638,934	11.4	M	VL	VL	VL	VH	H	M	L	VH	
Total - Category - X		34,638,934	11.4										
TOTAL HOUSES*		304,882,448											
ROOF													
R1 - Light Weight Sloping Roof	Rural	79,430,355	26.1										
	Urban	21,269,826	7.0										
	Total	100,700,181	33.1	M	M	L	VL	VH	VH	H	M	VH	
R2 - Heavy Weight Sloping Roof	Rural	74,034,404	24.3										
	Urban	19,649,099	6.4										
	Total	93,683,503	30.7	H	M	L	VL	H	M	L	VL	H	
R3 - Flat Roof	Rural	53,098,931	17.4										
	Urban	57,399,833	18.8										
	Total	110,498,764	36.2	<i>Damage Risk as per that for the Wall supporting it</i>									
TOTAL HOUSES*		304,882,448											

Housing Category : Wall Types

- Category - A :** Buildings in field-stone, rural structures, unburnt brick houses, clay houses
 - Category - B :** Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
 - Category - C :** Reinforced building, well built wooden structures
 - Category - X :** Other materials not covered in A,B,C. These are generally light.
- Notes :**
1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1 -** Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
 - Category - R2 -** Heavy Weight (Tiles, Stone/Slate)
 - Category - R3 -** Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

TABLE - 5

Damage Risk to Housing under Various Hazard Intensities

Category	Type of Wall	Level of Risk								Flood Prone
		Seismic Zone				Wind Velocity m/s				
		V	IV	III	II	55 & 50	47	44 & 39	33	
A1	Mud and Unburnt Brick	VH	H	M	L	VH	H	M	L	VH
A2	Stone Wall	VH	H	M	L	H	M	L	VL	VH
B	Burnt Bricks Wall	H	M	L	VL	H	M	L	VL	H/M
C1	Concrete Wall	M	L	VL	VL	L	VL	VL	VL	L/VL
C2	Wood wall	M	L	VL	VL	VH	H	M	L	H
X	Other Materials	M	VL	VL	VL	VH	H	M	L	VH
Category Type of Roof										
R1	Light Weight Sloping Roof	M	M	L	VL	VH	VH	H	M	VH
R2	Heavy Weight Sloping Roof	H	M	L	VL	H	M	L	VL	H
R3	Flat Roof	Damage Risk as per that for the Wall supporting it								

Building Category : (By Wall Material)

- Category - A :** Buildings in field-stone, rural structures, unburnt brick houses, clay houses
 - Category - B :** Ordinary brick building; buildings of the large block and prefabricated type, half-timbered structures, building in natural hewn stone
 - Category - C :** Reinforced concrete building, well built wooden structures
 - Category - X :** Other materials not covered in A,B,C. like light sheets and biomass materials
- Note : Damage Risk is indicated assuming heavy flat roof in cases A, B and C (Reinforced Concrete) building

Building Category : (By Roof Material)

- Category - R1 :** Light Weight Sloping Roof (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, etc)
- Category - R2 :** Heavy Weight Sloping Roof (Tiles, Stone/Slate)
- Category - R3 :** Flat Roof (Brick, Concrete)

- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)

Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low

Notes:

1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
2. Source of Housing Data : Census of Housing, GOI, 2011

TABLE - 5A

Damage Risk to Housing under various Hazard Intensities

Category (Type of Wall and Roof)	EQ Intensity MSK				Wind Velocity m/s				Flood Prone
	≥IX	VIII	VII	≤VI	55 & 50	47	44 & 39	33	
A1. Mud wall (All roofs)	VH	H	M	L	VH	H	M	L	VH
A2.a. Unburned Brick Wall (Sloping roofs)	VH	H	M	L	VH	H	M	L	VH
A2.b. Unburned Brick Wall (Flat roofs)	VH	H	M	L	VH	H	M	L	VH
A3.a. Stone Wall (Sloping roofs)	VH	H	M	L	VH	H	M	L	VH
A3.b. Stone Wall (Flat roofs)	VH	H	M	L	H	M	L	L	VH
B.a. Burned Brick Wall (Sloping roofs)	H	M	L	VL	H	M	M	L	H
B.b. Burned Brick Wall (Flat roofs)	H	M	L	VL	M	L	L	VL	H
C1.a. Concrete Wall (Sloping roofs)	M	L	VL	NIL	H	M	M	L	L
C1.b. Concrete Wall (Flat roofs)	M	L	VL	NIL	L	VL	VL	VL	L
C2. Wood Wall (All roofs)	M	L	VL	NIL	VH	H	M	L	H
C3. Ekra wall (All roofs)	M	L	VL	NIL	VH	H	M	L	H
X1 GI and other metal sheets (All roofs)	M	VL	NIL	NIL	VH	H	M	L	H
X2 Bamboo, Thatch, Grass, Leaves, etc. (All roofs)	M	VL	NIL	NIL	VH	VH	H	L	VH

Building Category

- Category - A : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B : Ordinary brick buildings, building of the large block and prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C : Reinforced building, well built wooden structures
- Category - X : Other types not covered in A, B, C. These are generally light.

TABLE - 6

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : OR 10 State : ODISHA KENDRAPARA

Wall / Roof	Census Houses	No. of Houses	%	Level of Risk under								Flood Prone Area in %
				EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
				87.0	13.0	100					48.4	
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	237,793	56.4									
	Urban	6,136	1.5									
	Total	243,929	57.9		M	L	VH				VH	
A2 - Stone Wall not packed with mortar	Rural	976	0.2									
	Urban	38	-									
	Total	1,014	0.2		M	L	H				VH	
Total - Category - A		244,943	58.1									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	139,540	33.1									
	Urban	14,240	3.4									
	Total	153,780	36.5		L	VL	H				H/M	
Total - Category - B		153,780	36.5									
C1 - Concrete Wall	Rural	1,451	0.3									
	Urban	286	0.1									
	Total	1,737	0.4		VL	VL	L				L/VL	
C2 - Wood wall	Rural	3,866	0.9									
	Urban	434	0.1									
	Total	4,300	1.0		VL	VL	VH				H	
Total - Category - C		6,037	1.4									
X - Other Materials	Rural	16,090	3.8									
	Urban	680	0.2									
	Total	16,770	4.0		VL	VL	VH				VH	
Total - Category - X		16,770	4.0									
TOTAL HOUSES*		421,530										
ROOF												
R1 - Light Weight Sloping Roof	Rural	289,583	68.7									
	Urban	10,984	2.6									
	Total	300,567	71.3		L	VL	VH				VH	
R2 - Heavy Weight Sloping Roof	Rural	4,484	1.1									
	Urban	456	0.1									
	Total	4,940	1.2		L	VL	H				H	
R3 - Flat Roof	Rural	105,649	25.1									
	Urban	10,374	2.5									
	Total	116,023	27.6									
TOTAL HOUSES*		421,530										

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 716 mm

Housing Category : Wall Types

- Category - A :** Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B :** Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C :** Reinforced building, well built wooden structures
- Category - X :** Other materials not covered in A,B,C. These are generally light.

- Notes :** 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
- 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
- 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1 -** Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2 -** Heavy Weight (Tiles, Stone/Slate)
- Category - R3 -** Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
- M = Moderate; L = Low; VL = Very Low

* Total No.of Houses excluding Vacant/Locked Houses

Annex-1**THE EXPERT GROUP**

Constituted by the Ministry of Urban Development, Government of India, on Natural Disaster Prevention, Preparedness and Mitigation having bearing on Housing and Related Infrastructure

(Office Memorandum No. O-17024/23/94-HI dated July 13, 1994)

Dr. Anand S. Arya (Chairman)

Professor Emeritus, University of Roorkee, Roorkee

Dr. G.S.Mandal (Member)

Addl. Director General (Retd), India Meteorological Department, New Delhi

Dr. V.C . Thakur (Member)

Director, Wadia Institute of Himalayan Geology, Dehradun

Dr. Prem Krishna (Member)

Professor of Civil Engineering, University of Roorkee, Roorkee

Dr. N. Lakshmanan (Member)

Head, Wind Engineering Laboratory, SERC, Madras

Shri S.K Chaudhuri (Member)

Director, Central Water Commission, New Delhi

Shri T.N Gupta (Member Convenor)

Executive Director, BMTPC & Advisor (Housing Technology), Ministry of Urban Development, New Delhi

Annex-2**THE PEER GROUP**

Constituted by Ministry of Housing and Urban Poverty Alleviation, Government of India, for Updation and Revision of Vulnerability Atlas of India with respect to earthquakes, wind/cyclones and floods

(Office Memorandum No. C-17024/23/94-H.I dated March 5, 2004)

Dr.A.S.Arya (Chairman)

National Seismic Advisor, Ministry of Home Affairs, Government of India

Dr. N. Lakshmanan (Member)

Director, Structural Engineering Research Centre, Chennai

Shri Prabhas Pande (Member)

Director, Earthquake Geology Division, Northern Region, Geological Survey of India (GSI), Lucknow

Shri S.R.Kalsi (Member)

Addl. Director General (Services), India Meteorological Department (IMD), New Delhi

Shri Mukesh Kumar Sinha (Member)

Director (FE&SA), Central Water Commission, New Delhi

Shri M.Mohanty (Member)

Scientist D, Seismology Division, Department of Science and Technology, New Delhi

Dr.S.K.Thakkar (Member)

Professor, Railway Chair, Department of Civil Engineering, Indian Institute of Technology Roorkee

Shri T.N.Gupta (Member)

Former Executive Director, BMTPC, New Delhi

Dr.Prem Krishna (Member)

Former Professor, Deptt. of Civil Engineering and Ex-President of World Association of Wind Engineering, Currently working as AICTE Professor at IIT, Roorkee

Shri R.K.Celly (Member Convenor)

Executive Director, BMTPC

Shri J.K.Prasad (Co-Convenor)

Chief - Building Materials, BMTPC

Annex-3

F. No. I-21011/1/2015-HFA-IV/FTS-13218
 Government of India
 Ministry of Housing & Urban Poverty Alleviation
 (HFA-IV)

Nirman Bhawan, New Delhi
 Dated ..18/6/2015 June, 2015

OFFICE ORDER

Subject: Constitution of a Peer Group for Updation and Revision of Vulnerability Atlas of India with respect of earthquakes, wind / cyclones and floods.

In keeping with the objectives of Mid Term Yokohama Strategy, focusing on pro-active action rather than post disaster response and recognizing the paradigm shift in the policy of the Government in dealing with natural disasters, the Vulnerability Atlas of India was brought out by BMTPC in 1997 as formulated by Expert Group constituted by the Ministry of Urban Development. The Atlas was subsequently revised in 2006 with digitization of the hazard maps and district wise vulnerability status of the housing stock based on the Census 2001 data. Since the publication of the 2nd version of the Atlas, there has been significant change in demographic and typology of housing data, as brought out by Census 2011. In addition new districts have been formed in many states. Updating of the Vulnerability Atlas, therefore, has become necessary.

2. Ministry of Housing and Urban Poverty Alleviation, Govt. of India, being the nodal agency for housing and human settlements, it has been decided that Vulnerability Atlas 2006 is updated by incorporating the latest information with reference to Earthquake, Cyclone & Flood Hazard Maps, new districts formed since 2006 and changes in housing data as per Census 2011.

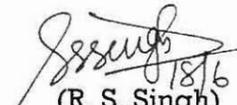
3. To examine and study the changes mentioned in Para 2 and update the Vulnerability Atlas of India with respect to these, the Ministry has decided to constitute a Peer Group comprising following experts:-

SI. No.	Name & Designation	Capacity
i)	Prof. A.S. Arya, Professor – Emeritus, IIT Roorkee and Member, Bihar State Disaster Management Authority, Govt. of Bihar	Chairman
ii)	Prof. Y. Singh, Professor, Earthquake Engineering Department, IIT Roorkee.	Member
iii)	Director or his representative dealing with Cyclone Resistant Structures, Structural Engineering Research Institute, Chennai.	Member

iv)	Representative (not below the rank of Director) of Geological Survey of India, Kolkata dealing with Seismo-tectonic Map Maps.	Member
v)	Director (FE& SA), Central Water Commission, New Delhi.	Member
vi)	Dr. Prabash Pande, Former ADG, Geological Survey of India, in personal capacity.	Member
vii)	Dr. Bhanu Murty, National Remote Sensing Centre, Hyderabad	Member
viii)	Representatives of India Meteorological Department, Ministry of Earth Science, GOI, dealing with seismic data and cyclone data.	Member
ix)	Dr. Shailesh Kr. Agrawal, ED, BMTPC	Convener
x)	Shri J.K. Prasad, Chief (Building Materials), BMTPC.	Co – Convener

4. The Group will meet from time to time in New Delhi and in such other places as may be decided by the Chairman. The expenditure of the Working Group will be met from the grants sanctioned to the Building Materials & Technology Promotion Council (BMTPC) by the Ministry. The BMTPC will also provide technical input and necessary secretarial assistance to the Peer Group in its working.

5. The Group will submit its report by January, 2016.

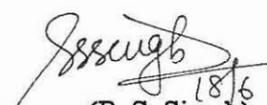

 (R. S. Singh)
 Director (HFA-I)
 Tele fax No.: 23062279

To,

The Chairman, Members &
 Member Convener of the Peer Group

Copy to;

PS to Hon'ble Minister(HUPA)
 PS to Secretary (HUPA)
 PS to all Joint Secretaries ,M/o HUPA
 PS to all Directors/DS, M/o HUPA


 (R. S. Singh)
 Director (HFA-I)
 Tele fax No.: 23062279

Annex-4

MODIFIED MERCALLI INTENSITY SCALE (ABRIDGED)

(Source: IS:1893-1984)

Intensity	Description
I	Not felt except by a very few under specially favourable circumstances.
II	Felt only by a few persons at rest, specially on upper floors of buildings; and delicately suspended objects may swing.
III	Felt quite noticeably indoors, specially on upper floors of buildings but many people do not recognize it as an earthquake; standing motor cars may rock slightly; and vibration may be felt like the passing of a truck.
IV	During the day felt indoors by many, outdoors by a few, at night some awakened; dishes, windows, doors disturbed; walls make creaking sound, sensation like heavy truck striking the building; and standing motor cars rocked noticeably.
V	Felt by nearly everyone; many awakened; some dishes, windows, etc., broken; a few instances of cracked plaster; unstable objects overturned; disturbance of trees, poles and other tall objects noticed sometimes; and pendulum clocks may stop.
VI	Felt by all, many frightened and run outdoors; some heavy furniture moved; a few instances of fallen plaster or damaged chimneys; and damage slight.
VII	Everybody runs outdoors, damage negligible in buildings of good design and construction; slight to moderate in well built ordinary structures; considerable in poorly built or badly designed structures; and some chimneys broken, noticed by persons driving motor cars.
VIII	Damage slight in specially designed structures; considerable in ordinary but substantial buildings with partial collapse; very heavy in poorly built structures; panel walls thrown out of framed structures; falling of chimney, factory stacks, columns, monuments, and walls heavy furniture overturned, sand and mud ejected in small amounts; changes in well water; and disturbs persons driving motor cars.
IX	Damage considerable in specially designed structures; well designed framed structures thrown out of plumb; very heavy in substantial buildings with partial collapse; buildings shifted off foundations; ground cracked conspicuously; and underground pipes broken.
X	Some well built wooden structures destroyed; most masonry and framed structures with foundations destroyed; ground badly cracked; rails bent; landslides considerable from river banks and steep slopes; shifted sand and mud; and water splashed over banks.
XI	Few, if any, masonry structures remain standing; bridges destroyed; broad fissures in ground, underground pipelines completely out of service; earth slumps and landslips in soft ground; and rails bent greatly.
XII	Total damage; waves seen on ground surfaces; lines of sight and levels distorted; and objects thrown upward into the air.

Annex-5

MSK 1964 INTENSITY SCALE

(Source: IS 1893: 2002)

The scale was discussed generally in the inter-governmental meeting convened by UNESCO in April 1964. Though not finally approved, the scale is more comprehensive and describes the intensity of earthquake more precisely. The main definitions used are as follows:

a) Type of structures (Buildings):

Structure A	Buildings in field-stone, rural structures, unburnt-brick houses clay houses.
Structure B	Ordinary brick buildings, buildings of the large block and prefabricated type, half timbered structures, building in natural hewn stone.
Structure C	Reinforced buildings, well built wooden structures.

b) Definition of Quantity:

Single, few	About 5 percent
Many	About 50 percent
Most	About 75 percent

c) Classification of Damage to Buildings:

Grade 1	<i>Slight damage</i> - Fine cracks in plaster; fall of small pieces of plaster
Grade 2	<i>Moderate damage</i> - Small cracks in walls; fall of fairly large pieces of plaster, pantiles slip off; cracks in chimneys; parts of chimney fall down.
Grade 3	<i>Heavy damage</i> - Large and deep cracks in walls; fall of chimneys.
Grade 4	<i>Destruction</i> - Gaps in walls; parts of buildings may collapse; separate parts of the building lose their cohesion; and inner walls collapse.
Grade 5	<i>Total damage</i> - Total collapse of buildings.

d) Intensity Scale:

I	<i>Not noticeable.</i> The intensity of the vibration is below the limit of sensibility; the tremor is detected and recorded by seismographs only.
II	<i>Scarcely noticeable (very slight)</i> Vibration is felt only by individual people at rest in houses, especially on upper floors of buildings.
III	<i>Weak, partially observed only</i> The earthquake is felt indoors by a few people, outdoors only in favourable circumstances. The vibration is like that due to the passing of a light truck. Attentive observers notice a slight swinging of hanging objects, somewhat more heavily on upper floors.

IV *Largely observed*

The earthquake is felt indoors by many people, outdoors by few. Here and there people awake, but no one is frightened. The vibration is like that due to the passing of a heavily loaded truck. Windows, doors and dishes rattle. Floors and walls crack. Furniture begins to shake. Hanging objects swing slightly. Liquids in open vessels are slightly disturbed. In standing motor cars the shock is noticeable.

V *Awakening*

- a) The earthquake is felt indoors by all, outdoors by many. Many sleeping people awake. A few run outdoors. Animals become uneasy. Buildings tremble throughout. Hanging objects swing considerably. Pictures knock against walls or swing out of place. Occasionally pendulum clocks stop. Unstable objects may be overturned or shifted. Open doors and windows are thrust open and slam back again. Liquids spill in small amounts from well-filled open containers. The sensation of vibration is like that due to heavy object falling inside of buildings.
- b) Slight damages in buildings of Type A are possible.
- c) Sometimes change in flow of springs.

VI *Frightening*

- a) Felt by most indoors and outdoors. Many people in buildings are frightened and run outdoors. A few persons lose their balance. Domestic animals run out of their stalls. In few instances dishes and glassware may break, books fall down. Heavy furniture may possibly move and small steeple bells may ring.
- b) Damage of Grade 1 is sustained in single buildings of Type B in many of Type A. Damage in few buildings of Type A is of Grade 2.
- c) In few cases cracks upto widths of 1 cm possible in wet ground; in mountains occasional landslips; change in flow of springs and in level of well water are observed.

VII *Damage of buildings*

- a) Most people are frightened and run outdoors. Many find it difficult to stand. The vibration is noticed by persons driving motor cars. Large bells ring.
- b) In many buildings of Type C damage of Grade 1 is caused; in many buildings of Type B damage is of Grade 2. Most buildings of Type A suffer damage of Grade 3, few of Grade 4. In single instances landslips of roadway on steep slopes; cracks in roads; seams of pipelines damaged; cracks in stone walls.

VIII *Destruction of buildings*

- a) Fright and panic; also persons driving motor cars are disturbed. Here and there branches of trees break off. Even heavy furniture moves and partly overturns. Hanging lamps are damaged in part.
- b) Most buildings of Type C suffer damage of Grade 2, and few of Grade 3. Most buildings of Type B suffer damage of Grade 3, and most building of Type A suffer damage of Grade 4. Occasional breaking of pipe seams. Memorials and monuments move and twist. Tombstones overturn. Stone walls collapse.
- c) Small landslips in hollows and on banked roads on steep slopes; cracks in ground upto widths of several centimetres. Water in lakes becomes turbid. New reservoirs come into

existence. Dry wells refill and existing wells become dry. In many cases change in flow and level of water is observed.

IX *General damage to buildings*

- a) General panic; considerable damage to furniture, animals run to and fro in confusion and cry.
- b) Many buildings of Type C suffer damage of Grade 3, and a few of Grade 4. Many buildings of Type B show damage of Grade 4, and a few of Grade 5. Many buildings of Type A suffer damage of Grade 5. Monuments and columns fall. Considerable damage to reservoirs; underground pipes partly broken. In individual cases railway lines are bent and roadway damaged.
- c) On flat land overflow of water, sand and mud is often observed. Ground cracks to widths of upto 10 cm, on slopes and river banks more than 10 cm; furthermore a large number of slight cracks in ground; falls of rock, many landslides and earth flows; large waves in water. Dry wells renew their flow and existing wells dry up.

X *General destruction of buildings*

- a) Many buildings of Type C suffer damage of Grade 4, and a few of Grade 5. Many buildings of Type B show damage of Grade 5; most Of Type A have destruction of Grade 5; critical damage to dams and dykes and severe damage to bridges. Railway lines are bent slightly. Underground pipes are broken or bent. Road paving and asphalt show waves.
- b) In ground, cracks up to widths of several centimetres, sometimes upto 1 metre. Parallel to water courses occur broad fissures. Loose ground slides from steep slopes. From river banks and steep coasts, considerable landslides are possible. In coastal areas, displacement of sand and mud; change of water level in wells; water from canals, lakes, rivers, etc, thrown on land. New lakes occur.

XI *Destruction*

- a) Severe damage even to well built buildings, bridges, water dams and railway lines; highways become useless; underground pipes destroyed.
- b) Ground considerably distorted by broad cracks and fissures, as well as by movement in horizontal and vertical directions; numerous landslips and falls of rock. The intensity of the earthquake requires to be investigated specially.

XII *Landscape changes*

- a) Practically all structures above and below ground are greatly damaged or destroyed.
- b) The surface of the ground is radically changed. Considerable ground cracks with extensive vertical and horizontal movements are observed. Falls of rock and slumping of river banks over wide areas, lakes are dammed; waterfalls appear, and rivers are deflected. The intensity of the earthquake requires to be investigated specially.

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

INDIA

Wall / Roof		Census Houses		Level of Risk under									
		No. of Houses	%	EQ Zone				Wind Velocity m/s				Flood Prone Area in %	
				V	IV	III	II	55 & 50	47	44 & 39	33		
				Area in %				Area in %					
INDIA		11.3	14.4	31.1	43.2	18.0	30.3	45.1	6.6	7.3			
WALL													
A1 - Mud & Unburnt Brick Wall	Rural	58,330,614	19.1										
	Urban	8,119,213	2.7										
	Total	66,449,827	21.8	VH	H	M	L	VH	H	M	L	VH	
A2 - Stone Wall not packed with mortar	Rural	7,751,666	2.5										
	Urban	2,689,476	0.9										
	Total	10,441,142	3.4	VH	H	M	L	H	M	L	VL	VH	
Total - Category - A		76,890,969	25.2										
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	104,552,560	34.3										
	Urban	75,035,035	24.6										
	Total	179,587,595	58.9	H	M	L	VL	H	M	L	VL	H/M	
Total - Category - B		179,587,595	58.9										
C1 - Concrete Wall	Rural	3,699,096	1.2										
	Urban	7,284,583	2.4										
	Total	10,983,679	3.6	M	L	VL	VL	L	VL	VL	VL	L/VL	
C2 - Wood wall	Rural	2,132,342	0.7										
	Urban	648,929	0.2										
	Total	2,781,271	0.9	M	L	VL	VL	VH	H	M	L	H	
Total - Category - C		13,764,950	4.5										
X - Other Materials	Rural	30,097,412	9.9										
	Urban	4,541,522	1.5										
	Total	34,638,934	11.4	M	VL	VL	VL	VH	H	M	L	VH	
Total - Category - X		34,638,934	11.4										
TOTAL HOUSES*		304,882,448											
ROOF													
R1 - Light Weight Sloping Roof	Rural	79,430,355	26.1										
	Urban	21,269,826	7.0										
	Total	100,700,181	33.1	M	M	L	VL	VH	VH	H	M	VH	
R2 - Heavy Weight Sloping Roof	Rural	74,034,404	24.3										
	Urban	19,649,099	6.4										
	Total	93,683,503	30.7	H	M	L	VL	H	M	L	VL	H	
R3 - Flat Roof	Rural	53,098,931	17.4										
	Urban	57,399,833	18.8										
	Total	110,498,764	36.2	<i>Damage Risk as per that for the Wall supporting it</i>									
TOTAL HOUSES*		304,882,448											

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

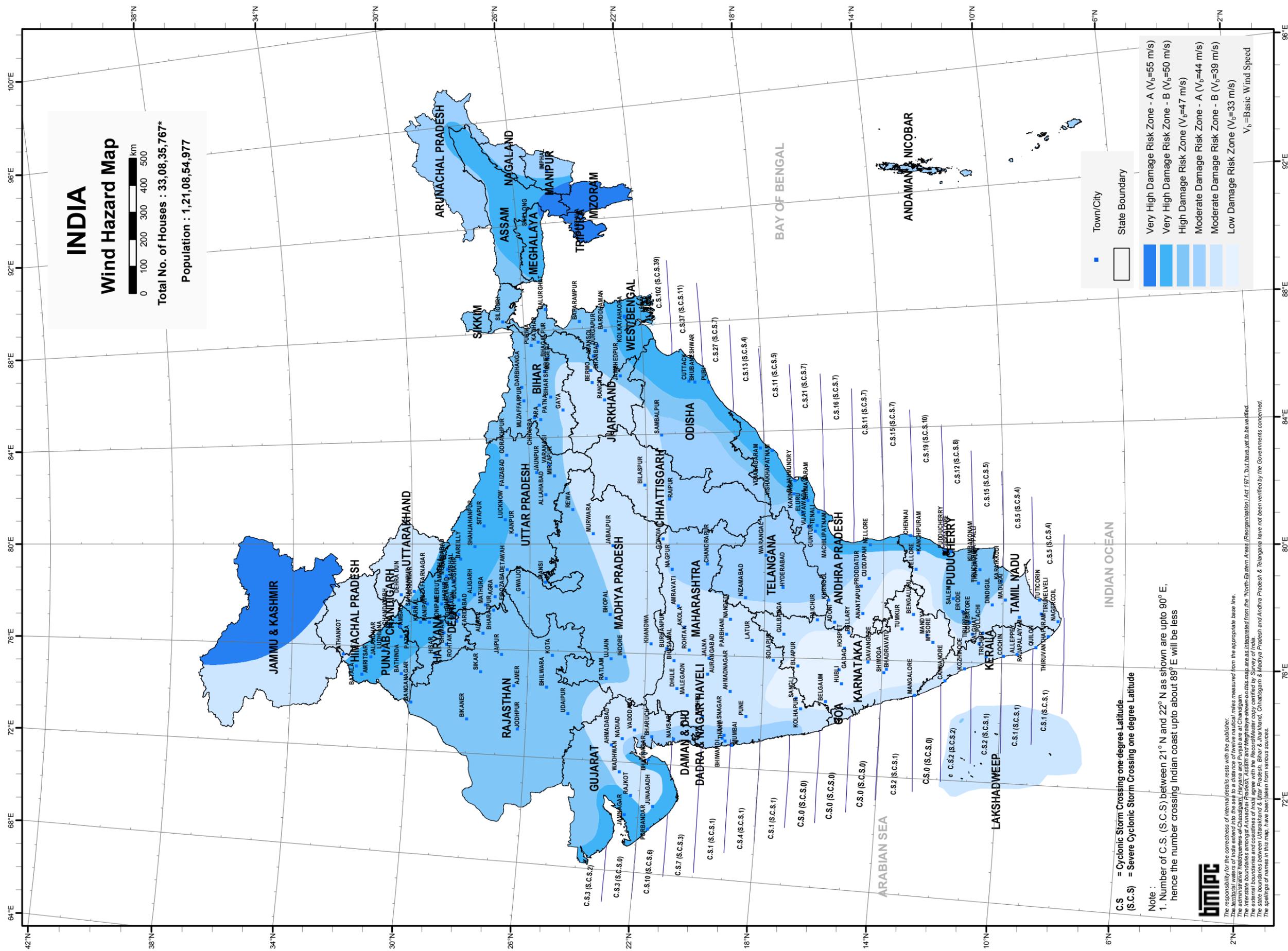
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)

- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
 Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low

* Total No. of Houses excluding Vacant/Locked Houses



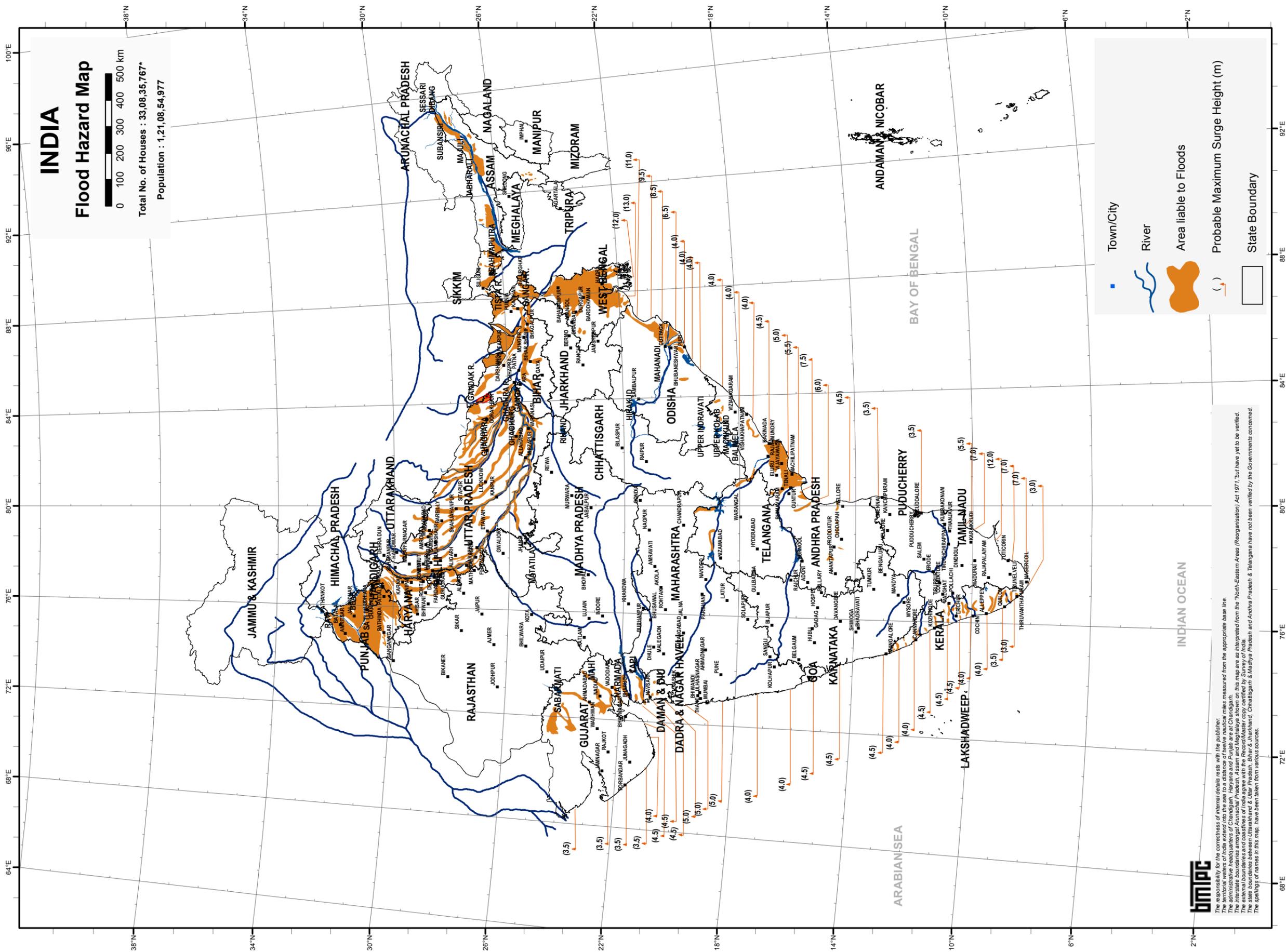
C.S. = Cyclonic Storm Crossing one degree Latitude.
(S.C.S.) = Severe Cyclonic Storm Crossing one degree Latitude

Note :
1. Number of C.S. (S.C.S.) between 21° N and 22° N as shown are upto 90° E, hence the number crossing Indian coast upto about 89° E will be less



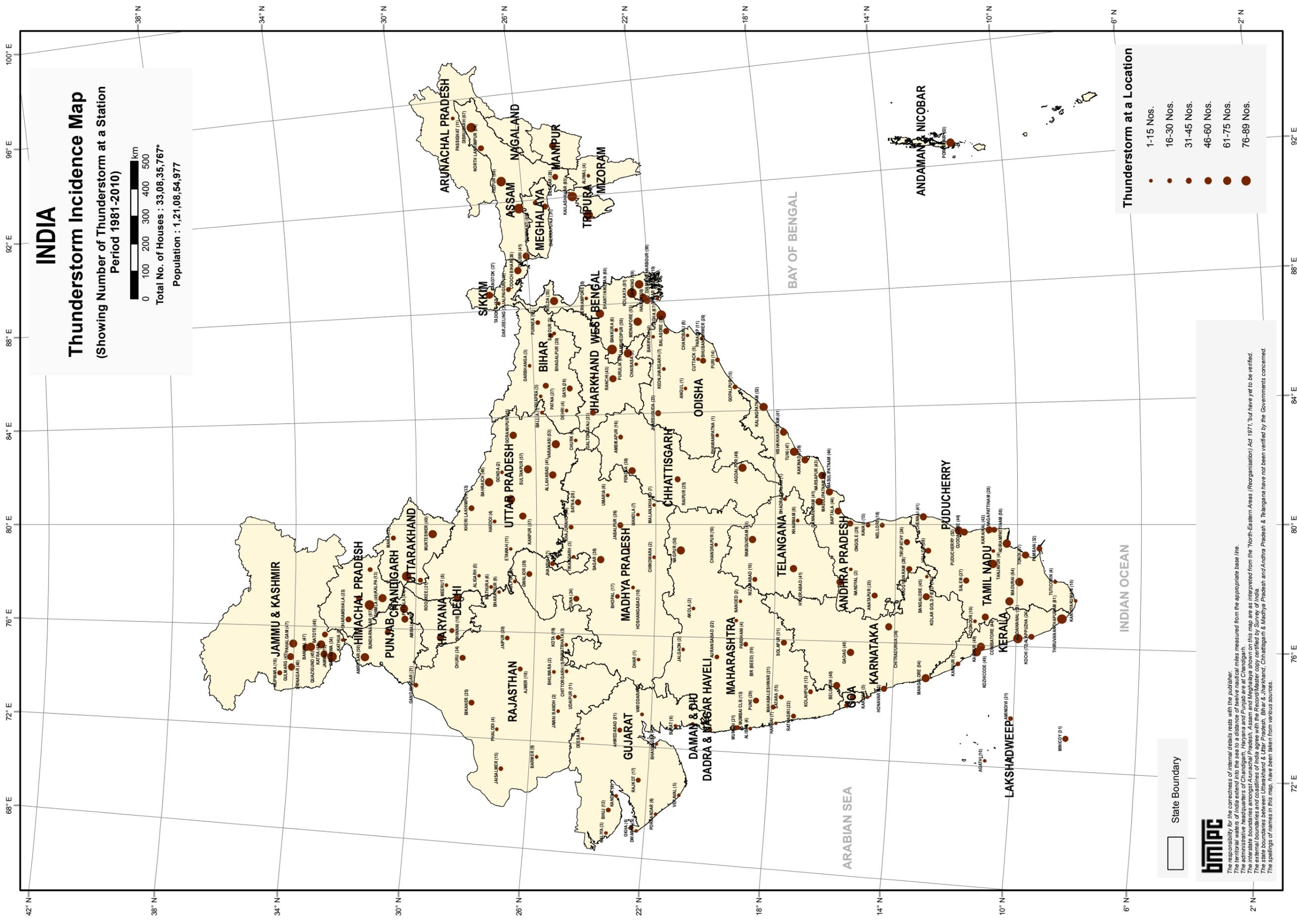
The responsibility for the correctness of internal details rests with the publisher. The territorial waters of India extend into the sea to a distance of twelve nautical miles measured from the appropriate base line. The administrative headquarters of Chandigarh, Hyderabad and Punjab are at Chandigarh, Hyderabad and Chandigarh respectively. The external boundaries and coastlines of India are those shown with the Record Master copy certified by Survey of India. The state boundaries between Uttar Pradesh & Bihar, Bihar & Jharkhand, Chhattisgarh & Madhya Pradesh and Andhra Pradesh & Telangana have not been verified by the Governments concerned. The spellings of names in this map have been taken from various sources.

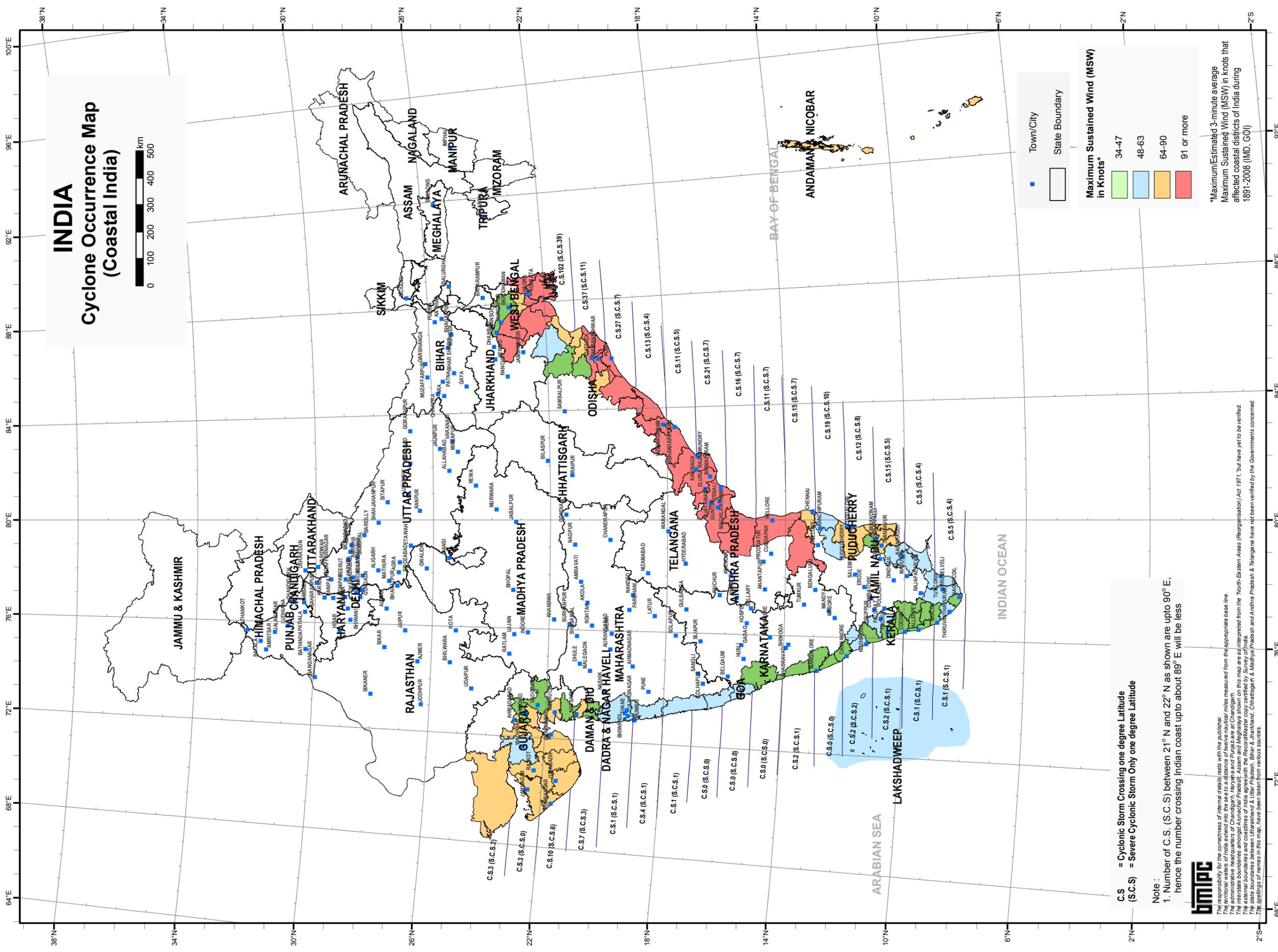
BMPIC : Vulnerability Atlas- 3rd Edition; Peer Group, MoHUA; Map is Based on digitised data of SOI, GOI; Basic Wind Speed Map National Building Code: 2016; Cyclone Data, 1891-2015, IMD, GOI; Houses/Population as per Census 2011; *Houses including vacant & locked houses. Disclaimer: The maps are solely for thematic presentation.



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The territorial waters of India extend into the sea to a distance of twelve nautical miles measured from the appropriate base line.
The international boundaries shown on this map are as interpreted from the "North-Eastern Areas (Recognition) Act 1971, but have yet to be verified.
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The spellings of names in this map, have been taken from various sources.

BMPFC : Vulnerability Atlas - 3rd Edition; Peer Group, MoHA; Map is Based on digitised data of SOI, GOI; Census of India 2011; Flood Atlas (1987), Task Force Report (2004), C.W.C., G.O.I. Houses/Population as per Census 2011; * Houses including vacant & locked houses. Disclaimer: The maps are solely for thematic presentation.





BMTPC : Vulnerability Atlas - 3rd Edition; Peer Group, MoHUA; Map is Based on digitised data of SOI, GOI; Maximum Sustained Wind (MSW) Data from IMD, GOI. Disclaimer: The maps are solely for thematic presentation.

DAMAGE RISK TABLES AND HAZARD MAPS

STATES

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

ANDHRA PRADESH

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
						35.3	64.7	30.1	8.2	46.9	14.9	9.9
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	1,420,062	10.0									
	Urban	227,015	1.6									
	Total	1,647,077	11.6			M	L	VH	H	M	L	VH
A2 - Stone Wall not packed with mortar	Rural	473,780	3.3									
	Urban	151,495	1.1									
	Total	625,275	4.4			M	L	H	M	L	VL	VH
Total - Category - A		2,272,352	16.0									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	6,973,104	49.0									
	Urban	3,478,467	24.5									
	Total	10,451,571	73.5			L	VL	H	M	L	VL	H/M
Total - Category - B		10,451,571	73.5									
C1 - Concrete Wall	Rural	114,705	0.8									
	Urban	126,292	0.9									
	Total	240,997	1.7			VL	VL	L	VL	VL	VL	L/VL
C2 - Wood Wall	Rural	108,667	0.8									
	Urban	14,975	0.1									
	Total	123,642	0.9			VL	VL	VH	H	M	L	H
Total - Category - C		364,639	2.6									
X - Other Materials	Rural	992,759	7.0									
	Urban	139,931	1.0									
	Total	1,132,690	8.0			VL	VL	VH	H	M	L	VH
Total - Category - X		1,132,690	8.0									
TOTAL HOUSES*		14,221,252										
ROOF												
R1 - Light Weight Sloping Roof	Rural	3,481,149	24.5									
	Urban	953,728	6.7									
	Total	4,434,877	31.2			L	VL	VH	VH	H	M	VH
R2 - Heavy Weight Sloping Roof	Rural	2,034,889	14.3									
	Urban	407,105	2.9									
	Total	2,441,994	17.2			L	VL	H	M	L	VL	H
R3 - Flat Roof	Rural	4,567,039	32.1									
	Urban	2,777,342	19.5									
	Total	7,344,381	51.6									
TOTAL HOUSES*		14,221,252										

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
 - Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
 - Category - C** : Reinforced building, well built wooden structures
 - Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
 - Category - R2** - Heavy Weight (Tiles, Stone/Slate)
 - Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
 Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
 * Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : AP 01

ANDHRA PRADESH

SRIKAKULAM

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
				Area in %				Area in %					
WALL													
A1 - Mud & Unburnt Brick Wall	Rural	136,736	17.4										
	Urban	10,281	1.3										
	Total	147,017	18.7					L	VH	H			VH
A2 - Stone Wall not packed with mortar	Rural	3,796	0.5										
	Urban	983	0.1										
	Total	4,779	0.6					L	H	M			VH
Total - Category - A		151,796	19.3										
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	450,447	57.4										
	Urban	112,749	14.4										
	Total	563,196	71.8					VL	H	M			H/M
Total - Category - B		563,196	71.7										
C1 - Concrete Wall	Rural	6,796	0.9										
	Urban	1,310	0.2										
	Total	8,106	1.1					VL	L	VL			L/VL
C2 - Wood wall	Rural	10,759	1.4										
	Urban	1,383	0.2										
	Total	12,142	1.6					VL	VH	H			H
Total - Category - C		20,248	2.6										
X - Other Materials	Rural	46,721	5.9										
	Urban	3,455	0.4										
	Total	50,176	6.3					VL	VH	H			VH
Total - Category - X		50,176	6.4										
TOTAL HOUSES*		785,416											
ROOF													
R1 - Light Weight Sloping Roof	Rural	237,376	30.2										
	Urban	27,602	3.5										
	Total	264,978	33.7					VL	VH	VH			VH
R2 - Heavy Weight Sloping Roof	Rural	64,483	8.2										
	Urban	9,964	1.3										
	Total	74,447	9.5					VL	H	M			H
R3 - Flat Roof	Rural	353,396	45.0										
	Urban	92,595	11.8										
	Total	445,991	56.8										
TOTAL HOUSES*		785,416											

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. **817 mm**

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
 - Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
 - Category - C** : Reinforced building, well built wooden structures
 - Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
 - Category - R2** - Heavy Weight (Tiles, Stone/Slate)
 - Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
 Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
 * Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : AP 04 ANDHRA PRADESH EAST GODAVARI

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
						52.2	47.8	51.4	39.1	9.5		31.5
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	168,968	11.1									
	Urban	31,214	2.0									
	Total	200,182	13.1			M	L	VH	H	M		VH
A2 - Stone Wall not packed with mortar	Rural	15,026	1.0									
	Urban	9,479	0.6									
	Total	24,505	1.6			M	L	H	M	L		VH
Total - Category - A		224,687	14.7									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	794,741	52.1									
	Urban	310,328	20.3									
	Total	1,105,069	72.4			L	VL	H	M	L		H/M
Total - Category - B		1,105,069	72.4									
C1 - Concrete Wall	Rural	18,744	1.2									
	Urban	16,662	1.1									
	Total	35,406	2.3			VL	VL	L	VL	VL		L/VL
C2 - Wood wall	Rural	16,896	1.1									
	Urban	936	0.1									
	Total	17,832	1.2			VL	VL	VH	H	M		H
Total - Category - C		53,238	3.5									
X - Other Materials	Rural	129,420	8.5									
	Urban	13,644	0.9									
	Total	143,064	9.4			VL	VL	VH	H	M		VH
Total - Category - X		143,064	9.4									
TOTAL HOUSES*		1,526,058										

Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
ROOF												
R1 - Light Weight Sloping Roof	Rural	283,934	18.6									
	Urban	50,549	3.3									
	Total	334,483	21.9			L	VL	VH	VH	H		VH
R2 - Heavy Weight Sloping Roof	Rural	462,611	30.3									
	Urban	68,457	4.5									
	Total	531,068	34.8			L	VL	H	M	L		H
R3 - Flat Roof	Rural	397,250	26.0									
	Urban	263,257	17.3									
	Total	660,507	43.3									
TOTAL HOUSES*		1,526,058										

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. **830 mm**

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
 - Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
 - Category - C** : Reinforced building, well built wooden structures
 - Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
 - Category - R2** - Heavy Weight (Tiles, Stone/Slate)
 - Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

Table No. : AP 05 ANDHRA PRADESH WEST GODAVARI

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	132,350	11.1									
	Urban	20,051	1.7									
	Total	152,401	12.8			M		VH	H	M		VH
A2 - Stone Wall not packed with mortar	Rural	19,947	1.7									
	Urban	5,411	0.5									
	Total	25,358	2.2			M		H	M	L		VH
Total - Category - A		177,759	14.9									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	647,303	54.2									
	Urban	190,593	15.9									
	Total	837,896	70.1			L		H	M	L		H/M
Total - Category - B		837,896	70.1									
C1 - Concrete Wall	Rural	14,496	1.2									
	Urban	7,489	0.6									
	Total	21,985	1.8			VL		L	VL	VL		L/VL
C2 - Wood wall	Rural	5,642	0.5									
	Urban	643	0.1									
	Total	6,285	0.6			VL		VH	H	M		H
Total - Category - C		28,270	2.4									
X - Other Materials	Rural	141,016	11.8									
	Urban	10,194	0.9									
	Total	151,210	12.7			VL		VH	H	M		VH
Total - Category - X		151,210	12.7									
TOTAL HOUSES*		1,195,135										

Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
ROOF												
R1 - Light Weight Sloping Roof	Rural	299,072	25.0									
	Urban	48,677	4.1									
	Total	347,749	29.1			L		VH	VH	H		VH
R2 - Heavy Weight Sloping Roof	Rural	277,633	23.2									
	Urban	34,406	2.9									
	Total	312,039	26.1			L		H	M	L		H
R3 - Flat Roof	Rural	384,049	32.1									
	Urban	151,298	12.7									
	Total	535,347	44.8									
TOTAL HOUSES*		1,195,135										

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. **801 mm**

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
 - Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
 - Category - C** : Reinforced building, well built wooden structures
 - Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
 - Category - R2** - Heavy Weight (Tiles, Stone/Slate)
 - Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

**Distribution of Houses by Predominant Materials of Roof and Wall
and Level of Damage Risk**

Table No. : AP 06

ANDHRA PRADESH

KRISHNA

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %		
		No. of Houses	%	EQ Zone				Wind Velocity m/s						
				V	IV	III	II	55 & 50	47	44 & 39	33			
				Area in %				Area in %						
						100				54.1		45.9		45.6
WALL														
A1 - Mud & Unburnt Brick Wall	Rural	124,877	8.8											
	Urban	21,745	1.5											
	Total	146,622	10.3			M		VH		M				VH
A2 - Stone Wall not packed with mortar	Rural	17,941	1.3											
	Urban	18,133	1.3											
	Total	36,074	2.6			M		H		L				VH
Total - Category - A		182,696	12.9											
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	539,229	38.2											
	Urban	457,383	32.4											
	Total	996,612	70.6			L		H		L				H/M
Total - Category - B		996,612	70.6											
C1 - Concrete Wall	Rural	11,374	0.8											
	Urban	19,815	1.4											
	Total	31,189	2.2			VL		L		VL				L/VL
C2 - Wood wall	Rural	10,349	0.7											
	Urban	1,265	0.1											
	Total	11,614	0.8			VL		VH		M				H
Total - Category - C		42,803	3.0											
X - Other Materials	Rural	166,552	11.8											
	Urban	22,808	1.6											
	Total	189,360	13.4			VL		VH		M				VH
Total - Category - X		189,360	13.4											
TOTAL HOUSES*		1,411,471												

ROOF														
R1 - Light Weight Sloping Roof	Rural	413,701	29.3											
	Urban	169,397	12.0											
	Total	583,098	41.3			L		VH		H				VH
R2 - Heavy Weight Sloping Roof	Rural	81,372	5.8											
	Urban	35,653	2.5											
	Total	117,025	8.3			L		H		L				H
R3 - Flat Roof	Rural	375,249	26.6											
	Urban	336,099	23.8											
	Total	711,348	50.4											
TOTAL HOUSES*		1,411,471												

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. **696 mm**

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
EQ Zone IV : High Damage Risk Zone (MSK VIII)
EQ Zone III : Moderate Damage Risk Zone (MSK VII)
EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

**Distribution of Houses by Predominant Materials of Roof and Wall
and Level of Damage Risk**

Table No. : AP 07

ANDHRA PRADESH

GUNTUR

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
						56.7	43.3	30.2		69.8		13.5
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	94,976	6.4									
	Urban	18,863	1.3									
	Total	113,839	7.7			M	L	VH		M		VH
A2 - Stone Wall not packed with mortar	Rural	43,029	2.9									
	Urban	13,144	0.9									
	Total	56,173	3.8			M	L	H		L		VH
Total - Category - A		170,012	11.5									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	682,618	46.0									
	Urban	400,067	27.0									
	Total	1,082,685	73.0			L	VL	H		L		H/M
Total - Category - B		1,082,685	73.0									
C1 - Concrete Wall	Rural	16,999	1.1									
	Urban	18,069	1.2									
	Total	35,068	2.3			VL	VL	L		VL		L/VL
C2 - Wood wall	Rural	8,707	0.6									
	Urban	1,321	0.1									
	Total	10,028	0.7			VL	VL	VH		M		H
Total - Category - C		45,096	3.0									
X - Other Materials	Rural	159,983	10.8									
	Urban	25,240	1.7									
	Total	185,223	12.5			VL	VL	VH		M		VH
Total - Category - X		185,223	12.5									
TOTAL HOUSES*		1,483,016										

ROOF														
R1 - Light Weight Sloping Roof	Rural	424,913	28.7											
	Urban	143,442	9.7											
	Total	568,355	38.4			L	VL	VH		H			VH	
R2 - Heavy Weight Sloping Roof	Rural	104,523	7.0											
	Urban	37,938	2.6											
	Total	142,461	9.6			L	VL	H		L			H	
R3 - Flat Roof	Rural	476,876	32.2											
	Urban	295,324	19.9											
	Total	772,200	52.1											
TOTAL HOUSES*		1,483,016												

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. **576 mm**

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
EQ Zone IV : High Damage Risk Zone (MSK VIII)
EQ Zone III : Moderate Damage Risk Zone (MSK VII)
EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : AP 08 ANDHRA PRADESH PRAKASAM

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
WALL						29.3	70.7	34.7		65.3		5.2
A1 - Mud & Unburnt Brick Wall	Rural	77,792	7.9									
	Urban	8,495	0.9									
	Total	86,287	8.8			M	L	VH		M		VH
A2 - Stone Wall not packed with mortar	Rural	35,313	3.6									
	Urban	5,733	0.6									
	Total	41,046	4.2			M	L	H		L		VH
Total - Category - A		127,333	12.9									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	600,352	60.9									
	Urban	164,274	16.7									
	Total	764,626	77.6			L	VL	H		L		H/M
Total - Category - B		764,626	77.6									
C1 - Concrete Wall	Rural	6,076	0.6									
	Urban	3,970	0.4									
	Total	10,046	1.0			VL	VL	L		VL		L/VL
C2 - Wood wall	Rural	3,399	0.3									
	Urban	360	-									
	Total	3,759	0.3			VL	VL	VH		M		H
Total - Category - C		13,805	1.4									
X - Other Materials	Rural	70,666	7.2									
	Urban	8,628	0.9									
	Total	79,294	8.1			VL	VL	VH		M		VH
Total - Category - X		79,294	8.0									
TOTAL HOUSES*		985,058										

ROOF		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
R1 - Light Weight Sloping Roof	Rural	255,346	25.9									
	Urban	52,607	5.3									
	Total	307,953	31.2			L	VL	VH		H		VH
R2 - Heavy Weight Sloping Roof	Rural	94,104	9.6									
	Urban	17,741	1.8									
	Total	111,845	11.4			L	VL	H		L		H
R3 - Flat Roof	Rural	444,148	45.1									
	Urban	121,112	12.3									
	Total	565,260	57.4									
TOTAL HOUSES*		985,058										

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. **547 mm**

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
 - Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
 - Category - C** : Reinforced building, well built wooden structures
 - Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
 - Category - R2** - Heavy Weight (Tiles, Stone/Slate)
 - Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

Table No. : AP 09 ANDHRA PRADESH S.P.S. NELLORE

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
WALL						82.6	17.4	53.9		46.1		2.6
A1 - Mud & Unburnt Brick Wall	Rural	76,916	8.8									
	Urban	13,703	1.6									
	Total	90,619	10.4			M	L	VH		M		VH
A2 - Stone Wall not packed with mortar	Rural	12,107	1.4									
	Urban	3,839	0.4									
	Total	15,946	1.8			M	L	H		L		VH
Total - Category - A		106,565	12.2									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	480,261	55.1									
	Urban	212,008	24.3									
	Total	692,269	79.4			L	VL	H		L		H/M
Total - Category - B		692,269	79.4									
C1 - Concrete Wall	Rural	4,439	0.5									
	Urban	5,012	0.6									
	Total	9,451	1.1			VL	VL	L		VL		L/VL
C2 - Wood wall	Rural	4,782	0.5									
	Urban	523	0.1									
	Total	5,305	0.6			VL	VL	VH		M		H
Total - Category - C		14,756	1.7									
X - Other Materials	Rural	52,624	6.0									
	Urban	5,383	0.6									
	Total	58,007	6.6			VL	VL	VH		M		VH
Total - Category - X		58,007	6.7									
TOTAL HOUSES*		871,597										

ROOF		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
R1 - Light Weight Sloping Roof	Rural	235,291	27.0									
	Urban	72,947	8.4									
	Total	308,238	35.4			L	VL	VH		H		VH
R2 - Heavy Weight Sloping Roof	Rural	16,164	1.9									
	Urban	7,499	0.9									
	Total	23,663	2.8			L	VL	H		L		H
R3 - Flat Roof	Rural	379,674	43.6									
	Urban	160,022	18.4									
	Total	539,696	62.0									
TOTAL HOUSES*		871,597										

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. **597 mm**

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
 - Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
 - Category - C** : Reinforced building, well built wooden structures
 - Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
 - Category - R2** - Heavy Weight (Tiles, Stone/Slate)
 - Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : AP 10 ANDHRA PRADESH Y.S.R.

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %		
		No. of Houses	%	EQ Zone				Wind Velocity m/s						
				V	IV	III	II	55 & 50	47	44 & 39	33			
				Area in %				Area in %						
						12.4	87.6				94.2	5.8	3.9	
WALL														
A1 - Mud & Unburnt Brick Wall	Rural	59,663	7.6											
	Urban	10,585	1.4											
	Total	70,248	9.0			M	L				M	L		VH
A2 - Stone Wall not packed with mortar	Rural	62,988	8.0											
	Urban	24,455	3.1											
	Total	87,443	11.1			M	L				L	VL		VH
Total - Category - A		157,691	20.1											
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	381,326	48.7											
	Urban	215,831	27.6											
	Total	597,157	76.3			L	VL				L	VL		H/M
Total - Category - B		597,157	76.2											
C1 - Concrete Wall	Rural	3,968	0.5											
	Urban	4,347	0.6											
	Total	8,315	1.1			VL	VL				VL	VL		L/VL
C2 - Wood wall	Rural	1,928	0.2											
	Urban	580	0.1											
	Total	2,508	0.3			VL	VL				M	L		H
Total - Category - C		10,823	1.4											
X - Other Materials	Rural	13,465	1.7											
	Urban	4,103	0.5											
	Total	17,568	2.2			VL	VL				M	L		VH
Total - Category - X		17,568	2.2											
TOTAL HOUSES*		783,239												

ROOF		Rural	Urban	Total	%	EQ Zone				Wind Velocity m/s				Flood Prone Area in %
						V	IV	III	II	55 & 50	47	44 & 39	33	
R1 - Light Weight Sloping Roof	Rural	174,248	22.2											
	Urban	65,256	8.3											
	Total	239,504	30.5			L	VL				H	M		VH
R2 - Heavy Weight Sloping Roof	Rural	68,485	8.7											
	Urban	20,563	2.6											
	Total	89,048	11.3			L	VL				L	VL		H
R3 - Flat Roof	Rural	280,605	35.8											
	Urban	174,082	22.2											
	Total	454,687	58.0											
TOTAL HOUSES*		783,239												

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 577 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
 - Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
 - Category - C** : Reinforced building, well built wooden structures
 - Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
 - Category - R2** - Heavy Weight (Tiles, Stone/Slate)
 - Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : AP 11 ANDHRA PRADESH KURNOOL

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %		
		No. of Houses	%	EQ Zone				Wind Velocity m/s						
				V	IV	III	II	55 & 50	47	44 & 39	33			
				Area in %				Area in %						
WALL														
A1 - Mud & Unburnt Brick Wall	Rural	61,269	6.2											
	Urban	14,566	1.5											
	Total	75,835	7.7								L		M	VH
A2 - Stone Wall not packed with mortar	Rural	142,008	14.4											
	Urban	27,496	2.8											
	Total	169,504	17.2								L		L	VH
Total - Category - A		245,339	24.8											
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	427,267	43.3											
	Urban	216,684	21.9											
	Total	643,951	65.2								VL		L	H/M
Total - Category - B		643,951	65.2											
C1 - Concrete Wall	Rural	6,760	0.7											
	Urban	6,902	0.7											
	Total	13,662	1.4								VL		VL	L/VL
C2 - Wood wall	Rural	6,133	0.6											
	Urban	1,956	0.2											
	Total	8,089	0.8								VL		M	H
Total - Category - C		21,751	2.2											
X - Other Materials	Rural	61,256	6.2											
	Urban	15,246	1.5											
	Total	76,502	7.7								VL		M	VH
Total - Category - X		76,502	7.7											
TOTAL HOUSES*		987,543												

ROOF		Rural	Urban	Total	%	EQ Zone				Wind Velocity m/s				Flood Prone Area in %
						V	IV	III	II	55 & 50	47	44 & 39	33	
R1 - Light Weight Sloping Roof	Rural	395,187	40.0											
	Urban	74,020	7.5											
	Total	469,207	47.5								VL		H	VH
R2 - Heavy Weight Sloping Roof	Rural	63,514	6.4											
	Urban	21,866	2.2											
	Total	85,380	8.6								VL		L	H
R3 - Flat Roof	Rural	245,992	24.9											
	Urban	186,964	18.9											
	Total	432,956	43.8											
TOTAL HOUSES*		987,543												

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 414 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
 - Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
 - Category - C** : Reinforced building, well built wooden structures
 - Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
 - Category - R2** - Heavy Weight (Tiles, Stone/Slate)
 - Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : AP 12 ANDHRA PRADESH ANANTAPUR

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
				Area in %				Area in %					
WALL							100			25.0	75.0	.2	
A1 - Mud & Unburnt Brick Wall	Rural	60,324	5.5										
	Urban	16,896	1.5										
	Total	77,220	7.0				L			M	L	VH	
A2 - Stone Wall not packed with mortar	Rural	94,522	8.6										
	Urban	23,351	2.1										
	Total	117,873	10.7				L			L	VL	VH	
Total - Category - A		195,093	17.8										
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	592,951	54.1										
	Urban	248,286	22.6										
	Total	841,237	76.7				VL			L	VL	H/M	
Total - Category - B		841,237	76.7										
C1 - Concrete Wall	Rural	7,634	0.7										
	Urban	7,587	0.7										
	Total	15,221	1.4				VL			VL	VL	L/VL	
C2 - Wood wall	Rural	4,717	0.4										
	Urban	1,163	0.1										
	Total	5,880	0.5				VL			M	L	H	
Total - Category - C		21,101	1.9										
X - Other Materials	Rural	29,705	2.7										
	Urban	9,126	0.8										
	Total	38,831	3.5				VL			M	L	VH	
Total - Category - X		38,831	3.5										
TOTAL HOUSES*		1,096,262											

ROOF		No. of Houses	%	Level of Risk under								Flood Prone Area in %	
				V	IV	III	II	55 & 50	47	44 & 39	33		
R1 - Light Weight Sloping Roof	Rural	239,729	21.9										
	Urban	71,789	6.5										
	Total	311,518	28.4				VL			H	M	VH	
R2 - Heavy Weight Sloping Roof	Rural	353,670	32.3										
	Urban	74,814	6.8										
	Total	428,484	39.1				VL			L	VL	H	
R3 - Flat Roof	Rural	196,454	17.9										
	Urban	159,806	14.6										
	Total	356,260	32.5										
TOTAL HOUSES*		1,096,262											

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. **548 mm**

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
 - Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
 - Category - C** : Reinforced building, well built wooden structures
 - Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
 - Category - R2** - Heavy Weight (Tiles, Stone/Slate)
 - Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

Table No. : AP 13 ANDHRA PRADESH CHITTOOR

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
				Area in %				Area in %					
WALL								61.4	38.6	6.9		34.4	58.7
A1 - Mud & Unburnt Brick Wall	Rural	138,927	12.0										
	Urban	19,018	1.6										
	Total	157,945	13.6				M	L	VH		M	L	
A2 - Stone Wall not packed with mortar	Rural	15,440	1.3										
	Urban	4,668	0.4										
	Total	20,108	1.7				M	L	H		L	VL	
Total - Category - A		178,053	15.4										
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	620,386	53.7										
	Urban	311,151	26.9										
	Total	931,537	80.6				L	VL	H		L	VL	
Total - Category - B		931,537	80.6										
C1 - Concrete Wall	Rural	8,030	0.7										
	Urban	9,519	0.8										
	Total	17,549	1.5				VL	VL	L		VL	VL	
C2 - Wood wall	Rural	1,337	0.1										
	Urban	363	-										
	Total	1,700	0.1				VL	VL	VH		M	L	
Total - Category - C		19,249	1.7										
X - Other Materials	Rural	22,070	1.9										
	Urban	4,462	0.4										
	Total	26,532	2.3				VL	VL	VH		M	L	
Total - Category - X		26,532	2.3										
TOTAL HOUSES*		1,155,371											

ROOF		No. of Houses	%	Level of Risk under								Flood Prone Area in %	
				V	IV	III	II	55 & 50	47	44 & 39	33		
R1 - Light Weight Sloping Roof	Rural	173,607	15.0										
	Urban	67,346	5.8										
	Total	240,953	20.8				L	VL	VH		H	M	
R2 - Heavy Weight Sloping Roof	Rural	164,082	14.2										
	Urban	28,397	2.5										
	Total	192,479	16.7				L	VL	H		L	VL	
R3 - Flat Roof	Rural	468,501	40.5										
	Urban	253,438	21.9										
	Total	721,939	62.4										
TOTAL HOUSES*		1,155,371											

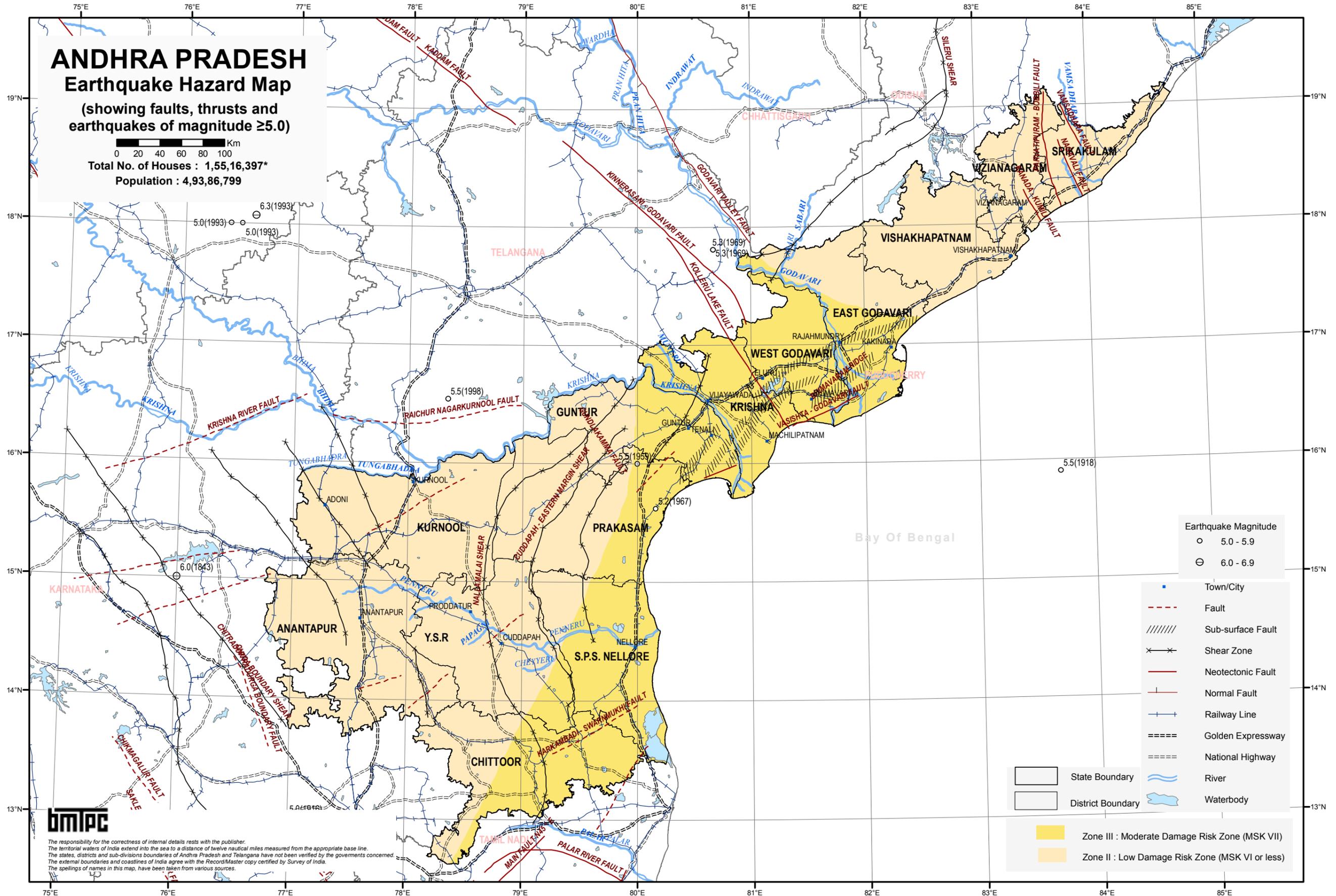
Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. **554 mm**

Housing Category : Wall Types

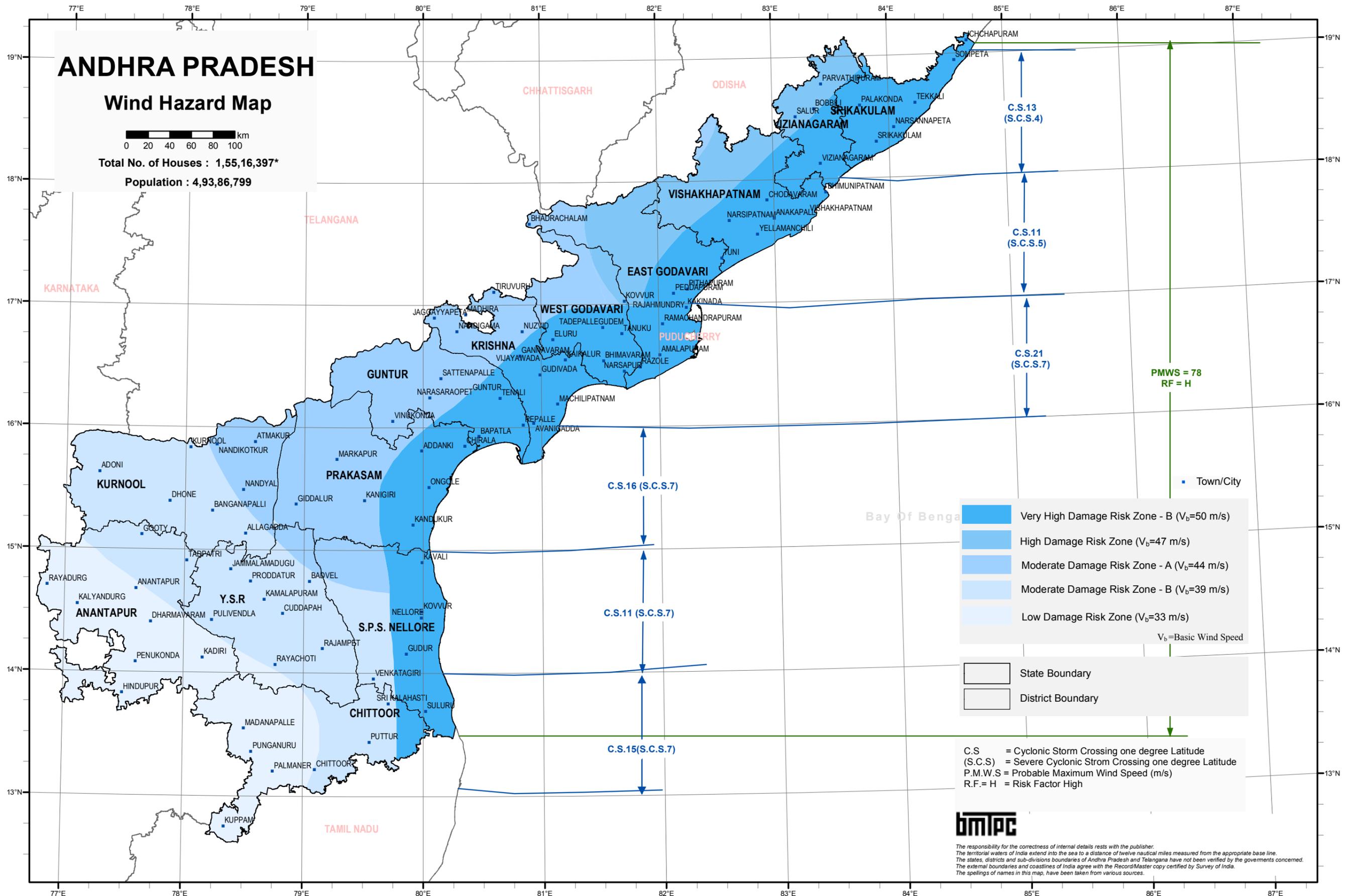
- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
 - Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
 - Category - C** : Reinforced building, well built wooden structures
 - Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

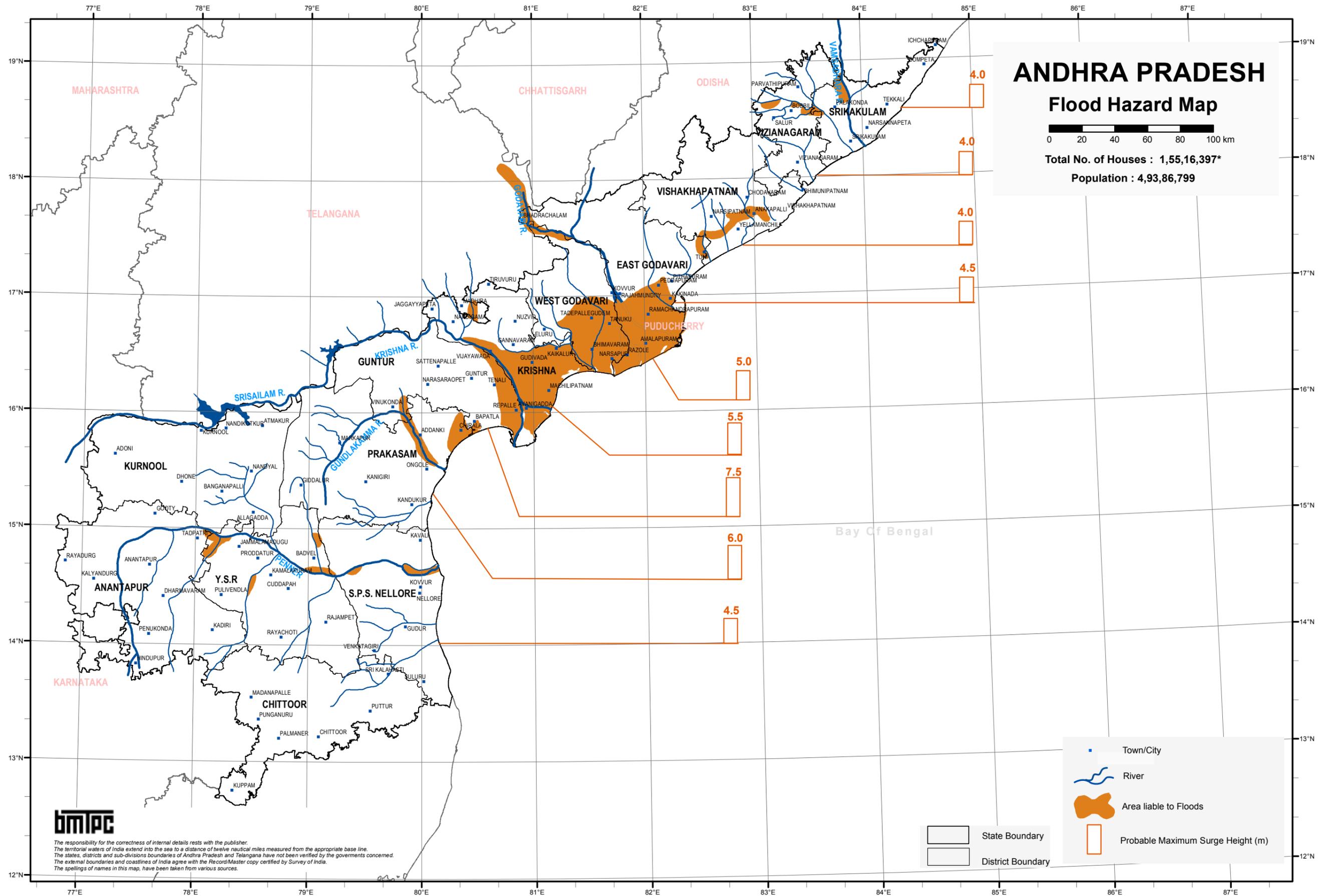
Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
 - Category - R2** - Heavy Weight (Tiles, Stone/Slate)
 - Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses



The responsibility for the correctness of internal details rests with the publisher.
 The territorial waters of India extend into the sea to a distance of twelve nautical miles measured from the appropriate base line.
 The states, districts and sub-divisions boundaries of Andhra Pradesh and Telangana have not been verified by the governments concerned.
 The external boundaries and coastlines of India agree with the Record/Master copy certified by Survey of India.
 The spellings of names in this map, have been taken from various sources.





BMTPC : Vulnerability Atlas - 3rd Edition; Peer Group, MoHUA; Map is Based on digitised data of SOI, GOI; Census of India 2011; Flood Atlas (1987), Task Force Report (2004), C.W.C., G.O.I. Houses/Population as per Census 2011; * Houses including vacant & locked houses.
Disclaimer: The maps are solely for thematic presentation.

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

ARUNACHAL PRADESH

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
				Area in %				Area in %					
STATE - ARUNACHAL PRADESH				100						5.6		94.4	
WALL													
A1 - Mud & Unburnt Brick Wall	Rural	3,921	1.2										
	Urban	2,466	0.7										
	Total	6,387	1.9							VH		M	
A2 - Stone Wall not packed with mortar	Rural	6,662	2.0										
	Urban	2,347	0.7										
	Total	9,009	2.7							VH		H	L
Total - Category - A		15,396	4.5										
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	14,627	4.3										
	Urban	16,496	4.9										
	Total	31,123	9.2							H		L	
Total - Category - B		31,123	9.2										
C1 - Concrete Wall	Rural	12,899	3.8										
	Urban	19,975	5.9										
	Total	32,874	9.7							M		L	VL
C2 - Wood wall	Rural	27,567	8.1										
	Urban	6,991	2.1										
	Total	34,558	10.2							M		VH	M
Total - Category - C		67,432	19.8										
X - Other Materials	Rural	184,184	54.2										
	Urban	41,688	12.3										
	Total	225,872	66.5							M		VH	M
Total - Category - X		225,872	66.5										
TOTAL HOUSES*		339,823											
ROOF													
R1 - Light Weight Sloping Roof	Rural	242,761	71.4										
	Urban	73,193	21.5										
	Total	315,954	92.9							M		VH	M
R2 - Heavy Weight Sloping Roof	Rural	2,928	0.9										
	Urban	2,203	0.6										
	Total	5,131	1.5							M		VH	H
R3 - Flat Roof	Rural	4,171	1.2										
	Urban	14,567	4.3										
	Total	18,738	5.5										
<i>Damage Risk as per that for the Wall supporting it</i>													
TOTAL HOUSES*		339,823											

Housing Category : Wall Types

Category - A : Buildings in field-stone, rural structures, unburnt brick houses, clay houses

Category - B : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone

Category - C : Reinforced building, well built wooden structures

Category - X : Other materials not covered in A,B,C. These are generally light.

Notes : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.

2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building

3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

Category - R1 - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)

Category - R2 - Heavy Weight (Tiles, Stone/Slate)

Category - R3 - Flat Roof (Brick, Concrete)

EQ Zone V : Very High Damage Risk Zone (MSK > IX)

EQ Zone IV : High Damage Risk Zone (MSK VIII)

EQ Zone III : Moderate Damage Risk Zone (MSK VII)

EQ Zone II : Low Damage Risk Zone (MSK < VI)

Level of Risk : VH = Very High; H = High;

M = Moderate; L = Low; VL = Very Low

* Total No. of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : AR 01

State : ARUNACHAL PRADESH

TAWANG

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
				Area in %				Area in %					
STATE - ARUNACHAL PRADESH				100									
WALL													
A1 - Mud & Unburnt Brick Wall	Rural	71	0.6										
	Urban	6	0.1										
	Total	77	0.7							VH		M	
A2 - Stone Wall not packed with mortar	Rural	3,842	34.5										
	Urban	10	0.1										
	Total	3,852	34.6							VH		L	
Total - Category - A		3,929	35.2										
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	1,327	11.9										
	Urban	530	4.8										
	Total	1,857	16.7							H		L	
Total - Category - B		1,857	16.7										
C1 - Concrete Wall	Rural	671	6.0										
	Urban	476	4.3										
	Total	1,147	10.3							M		VL	
C2 - Wood wall	Rural	789	7.1										
	Urban	134	1.2										
	Total	923	8.3							M		M	
Total - Category - C		2,070	18.6										
X - Other Materials	Rural	2,352	21.1										
	Urban	943	8.5										
	Total	3,295	29.6							M		M	
Total - Category - X		3,295	29.5										
TOTAL HOUSES*		11,151											
ROOF													
R1 - Light Weight Sloping Roof	Rural	8,652	77.6										
	Urban	1,503	13.5										
	Total	10,155	91.1							M		M	
R2 - Heavy Weight Sloping Roof	Rural	97	0.9										
	Urban	18	0.2										
	Total	115	1.1							M		H	
R3 - Flat Roof	Rural	303	2.7										
	Urban	578	5.2										
	Total	881	7.9										
<i>Damage Risk as per that for the Wall supporting it</i>													
TOTAL HOUSES*		11,151											

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 502 mm

Housing Category : Wall Types

Category - A : Buildings in field-stone, rural structures, unburnt brick houses, clay houses

Category - B : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone

Category - C : Reinforced building, well built wooden structures

Category - X : Other materials not covered in A,B,C. These are generally light.

Notes : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.

2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building

3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

Category - R1 - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)

Category - R2 - Heavy Weight (Tiles, Stone/Slate)

Category - R3 - Flat Roof (Brick, Concrete)

EQ Zone V : Very High Damage Risk Zone (MSK > IX)

EQ Zone IV : High Damage Risk Zone (MSK VIII)

EQ Zone III : Moderate Damage Risk Zone (MSK VII)

EQ Zone II : Low Damage Risk Zone (MSK < VI)

Level of Risk : VH = Very High; H = High;

M = Moderate; L = Low; VL = Very Low

* Total No. of Houses excluding Vacant/Locked Houses

**Distribution of Houses by Predominant Materials of Roof and Wall
and Level of Damage Risk**

Table No. : AR 02 State : ARUNACHAL PRADESH WEST KAMENG

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
		100								100		
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	672	3.3									
	Urban	252	1.2									
	Total	924	4.5	VH						M		
A2 - Stone Wall not packed with mortar	Rural	1,679	8.2									
	Urban	165	0.8									
	Total	1,844	9.0	VH						L		
Total - Category - A		2,768	13.5									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	1,712	8.3									
	Urban	894	4.4									
	Total	2,606	12.7	H						L		
Total - Category - B		2,606	12.7									
C1 - Concrete Wall	Rural	1,626	7.9									
	Urban	1,654	8.1									
	Total	3,280	16.0	M						VL		
C2 - Wood wall	Rural	3,574	17.4									
	Urban	430	2.1									
	Total	4,004	19.5	M						M		
Total - Category - C		7,284	35.5									
X - Other Materials	Rural	5,866	28.6									
	Urban	2,018	9.8									
	Total	7,884	38.4	M						M		
Total - Category - X		7,884	38.4									
TOTAL HOUSES*		20,542										

ROOF												
R1 - Light Weight Sloping Roof	Rural	14,705	71.6									
	Urban	4,300	20.9									
	Total	19,005	92.5	M						M		
R2 - Heavy Weight Sloping Roof	Rural	80	0.4									
	Urban	13	0.1									
	Total	93	0.5	M						H		
R3 - Flat Roof	Rural	344	1.7									
	Urban	1,100	5.4									
	Total	1,444	7.1									
<i>Damage Risk as per that for the Wall supporting it</i>												
TOTAL HOUSES*		20,542										

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. **502 mm**

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low

* Total No.of Houses excluding Vacant/Locked Houses

**Distribution of Houses by Predominant Materials of Roof and Wall
and Level of Damage Risk**

Table No. : AR 03 State : ARUNACHAL PRADESH EAST KAMENG

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
		100								100		
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	278	1.5									
	Urban	493	2.7									
	Total	771	4.2	VH						M		
A2 - Stone Wall not packed with mortar	Rural	69	0.4									
	Urban	59	0.3									
	Total	128	0.7	VH						L		
Total - Category - A		899	4.9									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	330	1.8									
	Urban	520	2.9									
	Total	850	4.7	H						L		
Total - Category - B		850	4.7									
C1 - Concrete Wall	Rural	364	2.0									
	Urban	1,073	5.9									
	Total	1,437	7.9	M						VL		
C2 - Wood wall	Rural	987	5.4									
	Urban	375	2.1									
	Total	1,362	7.5	M						M		
Total - Category - C		2,799	15.4									
X - Other Materials	Rural	11,554	63.6									
	Urban	2,071	11.4									
	Total	13,625	75.0	M						M		
Total - Category - X		13,625	75.0									
TOTAL HOUSES*		18,173										

ROOF												
R1 - Light Weight Sloping Roof	Rural	13,301	73.2									
	Urban	3,874	21.3									
	Total	17,175	94.5	M						M		
R2 - Heavy Weight Sloping Roof	Rural	203	1.1									
	Urban	129	0.7									
	Total	332	1.8	M						H		
R3 - Flat Roof	Rural	78	0.4									
	Urban	588	3.2									
	Total	666	3.6									
<i>Damage Risk as per that for the Wall supporting it</i>												
TOTAL HOUSES*		18,173										

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. **454 mm**

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low

* Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : AR 04 State : ARUNACHAL PRADESH PAPUM PARE

Table No. : AR 05 State : ARUNACHAL PRADESH UPPER SUBANSIRI

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
		100									100	
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	425	1.0									
	Urban	456	1.0									
	Total	881	2.0	VH							M	
A2 - Stone Wall not packed with mortar	Rural	259	0.6									
	Urban	888	2.0									
	Total	1,147	2.6	VH							L	
Total - Category - A		2,028	4.6									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	3,340	7.6									
	Urban	8,570	19.4									
	Total	11,910	27.0	H							L	
Total - Category - B		11,910	27.0									
C1 - Concrete Wall	Rural	1,258	2.9									
	Urban	6,605	15.0									
	Total	7,863	17.9	M							VL	
C2 - Wood wall	Rural	604	1.4									
	Urban	344	0.8									
	Total	948	2.2	M							M	
Total - Category - C		8,811	20.0									
X - Other Materials	Rural	12,155	27.6									
	Urban	9,208	20.9									
	Total	21,363	48.5	M							M	
Total - Category - X		21,363	48.4									
TOTAL HOUSES*		44,112										

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
		100									100	
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	86	0.5									
	Urban	106	0.6									
	Total	192	1.1	VH							M	
A2 - Stone Wall not packed with mortar	Rural	23	0.1									
	Urban	10	0.1									
	Total	33	0.2	VH							L	
Total - Category - A		225	1.3									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	295	1.7									
	Urban	193	1.1									
	Total	488	2.8	H							L	
Total - Category - B		488	2.8									
C1 - Concrete Wall	Rural	267	1.5									
	Urban	627	3.5									
	Total	894	5.0	M							VL	
C2 - Wood wall	Rural	700	4.0									
	Urban	589	3.3									
	Total	1,289	7.3	M							M	
Total - Category - C		2,183	12.4									
X - Other Materials	Rural	12,699	71.8									
	Urban	2,080	11.8									
	Total	14,779	83.6	M							M	
Total - Category - X		14,779	83.6									
TOTAL HOUSES*		17,675										

ROOF												
R1 - Light Weight Sloping Roof	Rural	16,169	36.7									
	Urban	17,323	39.3									
	Total	33,492	76.0	M							M	
R2 - Heavy Weight Sloping Roof	Rural	432	1.0									
	Urban	1,295	2.9									
	Total	1,727	3.9	M							H	
R3 - Flat Roof	Rural	1,440	3.3									
	Urban	7,453	16.9									
	Total	8,893	20.2									
<i>Damage Risk as per that for the Wall supporting it</i>												
TOTAL HOUSES*		44,112										

ROOF												
R1 - Light Weight Sloping Roof	Rural	13,709	77.6									
	Urban	3,132	17.7									
	Total	16,841	95.3	M							M	
R2 - Heavy Weight Sloping Roof	Rural	223	1.3									
	Urban	39	0.2									
	Total	262	1.5	M							H	
R3 - Flat Roof	Rural	138	0.8									
	Urban	434	2.5									
	Total	572	3.3									
<i>Damage Risk as per that for the Wall supporting it</i>												
TOTAL HOUSES*		17,675										

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. **587 mm**

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. **490 mm**

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)

- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
 Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
 * Total No.of Houses excluding Vacant/Locked Houses

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)

- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
 Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
 * Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : AR 06 State : ARUNACHAL PRADESH WEST SIANG

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
		100					3.8			96.2		
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	293	1.1									
	Urban	35	0.1									
	Total	328	1.2	VH				VH		M		
A2 - Stone Wall not packed with mortar	Rural	50	0.2									
	Urban	305	1.1									
	Total	355	1.3	VH				H		L		
Total - Category - A		683	2.5									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	691	2.5									
	Urban	1,015	3.7									
	Total	1,706	6.2	H				H		L		
Total - Category - B		1,706	6.2									
C1 - Concrete Wall	Rural	1,073	3.9									
	Urban	1,656	6.0									
	Total	2,729	9.9	M				L		VL		
C2 - Wood wall	Rural	4,248	15.5									
	Urban	500	1.8									
	Total	4,748	17.3	M				VH		M		
Total - Category - C		7,477	27.2									
X - Other Materials	Rural	13,932	50.8									
	Urban	3,652	13.3									
	Total	17,584	64.1	M				VH		M		
Total - Category - X		17,584	64.1									
TOTAL HOUSES*		27,450										

ROOF												
R1 - Light Weight Sloping Roof	Rural	19,862	72.4									
	Urban	5,578	20.3									
	Total	25,440	92.7	M				VH		M		
R2 - Heavy Weight Sloping Roof	Rural	133	0.5									
	Urban	197	0.7									
	Total	330	1.2	M				VH		H		
R3 - Flat Roof	Rural	292	1.1									
	Urban	1,388	5.1									
	Total	1,680	6.2									
<i>Damage Risk as per that for the Wall supporting it</i>												
TOTAL HOUSES*		27,450										

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 517 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
 - Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
 - Category - C** : Reinforced building, well built wooden structures
 - Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
 - Category - R2** - Heavy Weight (Tiles, Stone/Slate)
 - Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
 Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
 * Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : AR 07 State : ARUNACHAL PRADESH EAST SIANG

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
		100					43.6			56.4		
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	226	0.8									
	Urban	357	1.3									
	Total	583	2.1	VH				VH		M		
A2 - Stone Wall not packed with mortar	Rural	106	0.4									
	Urban	142	0.5									
	Total	248	0.9	VH				H		L		
Total - Category - A		831	3.1									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	957	3.6									
	Urban	792	3.0									
	Total	1,749	6.6	H				H		L		
Total - Category - B		1,749	6.5									
C1 - Concrete Wall	Rural	1,572	5.9									
	Urban	1,951	7.3									
	Total	3,523	13.2	M				L		VL		
C2 - Wood wall	Rural	2,329	8.7									
	Urban	407	1.5									
	Total	2,736	10.2	M				VH		M		
Total - Category - C		6,259	23.4									
X - Other Materials	Rural	13,446	50.3									
	Urban	4,442	16.6									
	Total	17,888	66.9	M				VH		M		
Total - Category - X		17,888	66.9									
TOTAL HOUSES*		26,727										

ROOF												
R1 - Light Weight Sloping Roof	Rural	18,207	68.1									
	Urban	7,060	26.4									
	Total	25,267	94.5	M				VH		M		
R2 - Heavy Weight Sloping Roof	Rural	170	0.6									
	Urban	161	0.6									
	Total	331	1.2	M				VH		H		
R3 - Flat Roof	Rural	259	1.0									
	Urban	870	3.3									
	Total	1,129	4.3									
<i>Damage Risk as per that for the Wall supporting it</i>												
TOTAL HOUSES*		26,727										

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 517 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
 - Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
 - Category - C** : Reinforced building, well built wooden structures
 - Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
 - Category - R2** - Heavy Weight (Tiles, Stone/Slate)
 - Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
 Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
 * Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : AR 08 State : ARUNACHAL PRADESH UPPER SIANG

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
		100									100	
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	150	1.5									
	Urban	68	0.7									
	Total	218	2.2	VH							M	
A2 - Stone Wall not packed with mortar	Rural	25	0.3									
	Urban	82	0.8									
	Total	107	1.1	VH							L	
Total - Category - A		325	3.3									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	271	2.8									
	Urban	183	1.9									
	Total	454	4.7	H							L	
Total - Category - B		454	4.7									
C1 - Concrete Wall	Rural	523	5.4									
	Urban	529	5.5									
	Total	1,052	10.9	M							VL	
C2 - Wood wall	Rural	3,852	39.7									
	Urban	139	1.4									
	Total	3,991	41.1	M							M	
Total - Category - C		5,043	52.0									
X - Other Materials	Rural	2,828	29.1									
	Urban	1,053	10.9									
	Total	3,881	40.0	M							M	
Total - Category - X		3,881	40.0									
TOTAL HOUSES*		9,703										

ROOF												
R1 - Light Weight Sloping Roof	Rural	7,551	77.8									
	Urban	1,875	19.3									
	Total	9,426	97.1	M							M	
R2 - Heavy Weight Sloping Roof	Rural	11	0.1									
	Urban	29	0.3									
	Total	40	0.4	M							H	
R3 - Flat Roof	Rural	87	0.9									
	Urban	150	1.5									
	Total	237	2.4									
<i>Damage Risk as per that for the Wall supporting it</i>												
TOTAL HOUSES*		9,703										

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 541 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes :**
1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)

- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
 Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
 * Total No.of Houses excluding Vacant/Locked Houses

Table No. : AR 09 State : ARUNACHAL PRADESH CHANGLANG

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %			
		No. of Houses	%	EQ Zone				Wind Velocity m/s							
				V	IV	III	II	55 & 50	47	44 & 39	33				
				Area in %				Area in %							
		100										2.1		97.9	
WALL															
A1 - Mud & Unburnt Brick Wall	Rural	354	0.9												
	Urban	70	0.2												
	Total	424	1.1	VH							VH		M		
A2 - Stone Wall not packed with mortar	Rural	117	0.3												
	Urban	25	0.1												
	Total	142	0.4	VH							H		L		
Total - Category - A		566	1.5												
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	1,680	4.5												
	Urban	1,117	3.0												
	Total	2,797	7.5	H							H		L		
Total - Category - B		2,797	7.5												
C1 - Concrete Wall	Rural	851	2.3												
	Urban	505	1.3												
	Total	1,356	3.6	M							L		VL		
C2 - Wood wall	Rural	1,519	4.1												
	Urban	900	2.4												
	Total	2,419	6.5	M							VH		M		
Total - Category - C		3,775	10.1												
X - Other Materials	Rural	27,202	72.6												
	Urban	3,143	8.4												
	Total	30,345	81.0	M							VH		M		
Total - Category - X		30,345	81.0												
TOTAL HOUSES*		37,483													

ROOF												
R1 - Light Weight Sloping Roof	Rural	31,277	83.4									
	Urban	5,481	14.6									
	Total	36,758	98.0	M							VH	M
R2 - Heavy Weight Sloping Roof	Rural	258	0.7									
	Urban	40	0.1									
	Total	298	0.8	M							VH	H
R3 - Flat Roof	Rural	188	0.5									
	Urban	239	0.6									
	Total	427	1.1									
<i>Damage Risk as per that for the Wall supporting it</i>												
TOTAL HOUSES*		37,483										

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 593 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes :**
1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)

- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
 Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
 * Total No.of Houses excluding Vacant/Locked Houses

**Distribution of Houses by Predominant Materials of Roof and Wall
and Level of Damage Risk**

Table No. : AR 10 State : ARUNACHAL PRADESH TIRAP

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
				100					4.8		95.2	
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	112	0.5									
	Urban	159	0.7									
	Total	271	1.2	VH					VH		M	
A2 - Stone Wall not packed with mortar	Rural	26	0.1									
	Urban	77	0.3									
	Total	103	0.4	VH					H		L	
Total - Category - A		374	1.6									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	952	4.2									
	Urban	1,005	4.4									
	Total	1,957	8.6	H					H		L	
Total - Category - B		1,957	8.6									
C1 - Concrete Wall	Rural	499	2.2									
	Urban	849	3.7									
	Total	1,348	5.9	M					L		VL	
C2 - Wood wall	Rural	170	0.7									
	Urban	767	3.4									
	Total	937	4.1	M					VH		M	
Total - Category - C		2,285	10.0									
X - Other Materials	Rural	15,882	69.5									
	Urban	2,358	10.3									
	Total	18,240	79.8	M					VH		M	
Total - Category - X		18,240	79.8									
TOTAL HOUSES*		22,856										

ROOF												
R1 - Light Weight Sloping Roof	Rural	17,378	76.0									
	Urban	4,802	21.0									
	Total	22,180	97.0	M					VH		M	
R2 - Heavy Weight Sloping Roof	Rural	128	0.6									
	Urban	51	0.2									
	Total	179	0.8	M					VH		H	
R3 - Flat Roof	Rural	135	0.6									
	Urban	362	1.6									
	Total	497	2.2									
<i>Damage Risk as per that for the Wall supporting it</i>												
TOTAL HOUSES*		22,856										

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. **593 mm**

Housing Category : Wall Types

Category - A : Buildings in field-stone, rural structures, unburnt brick houses, clay houses

Category - B : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone

Category - C : Reinforced building, well built wooden structures

Category - X : Other materials not covered in A,B,C. These are generally light.

Notes : 1. Flood prone area includes that protected area which may have more severe

damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.

2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building

3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

Category - R1 - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)

Category - R2 - Heavy Weight (Tiles, Stone/Slate)

Category - R3 - Flat Roof (Brick, Concrete)

EQ Zone V : Very High Damage Risk Zone (MSK > IX)

EQ Zone IV : High Damage Risk Zone (MSK VIII)

EQ Zone III : Moderate Damage Risk Zone (MSK VII)

EQ Zone II : Low Damage Risk Zone (MSK < VI)

Level of Risk : VH = Very High; H = High;

M = Moderate; L = Low; VL = Very Low

* Total No.of Houses excluding Vacant/Locked Houses

**Distribution of Houses by Predominant Materials of Roof and Wall
and Level of Damage Risk**

Table No. : AR 11 State : ARUNACHAL PRADESH LOWER SUBANSIRI

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
				100							100	
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	115	0.6									
	Urban	78	0.4									
	Total	193	1.0	VH							M	
A2 - Stone Wall not packed with mortar	Rural	119	0.6									
	Urban	153	0.7									
	Total	272	1.3	VH							L	
Total - Category - A		465	2.3									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	750	3.6									
	Urban	360	1.7									
	Total	1,110	5.3	H							L	
Total - Category - B		1,110	5.4									
C1 - Concrete Wall	Rural	1,155	5.6									
	Urban	1,497	7.3									
	Total	2,652	12.9	M							VL	
C2 - Wood wall	Rural	2,159	10.5									
	Urban	828	4.0									
	Total	2,987	14.5	M							M	
Total - Category - C		5,639	27.4									
X - Other Materials	Rural	12,043	58.4									
	Urban	1,348	6.5									
	Total	13,391	64.9	M							M	
Total - Category - X		13,391	65.0									
TOTAL HOUSES*		20,605										

ROOF												
R1 - Light Weight Sloping Roof	Rural	15,580	75.6									
	Urban	3,483	16.9									
	Total	19,063	92.5	M							M	
R2 - Heavy Weight Sloping Roof	Rural	226	1.1									
	Urban	91	0.4									
	Total	317	1.5	M							H	
R3 - Flat Roof	Rural	535	2.6									
	Urban	690	3.3									
	Total	1,225	5.9									
<i>Damage Risk as per that for the Wall supporting it</i>												
TOTAL HOUSES*		20,605										

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. **454 mm**

Housing Category : Wall Types

Category - A : Buildings in field-stone, rural structures, unburnt brick houses, clay houses

Category - B : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone

Category - C : Reinforced building, well built wooden structures

Category - X : Other materials not covered in A,B,C. These are generally light.

Notes : 1. Flood prone area includes that protected area which may have more severe

damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.

2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building

3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

Category - R1 - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)

Category - R2 - Heavy Weight (Tiles, Stone/Slate)

Category - R3 - Flat Roof (Brick, Concrete)

EQ Zone V : Very High Damage Risk Zone (MSK > IX)

EQ Zone IV : High Damage Risk Zone (MSK VIII)

EQ Zone III : Moderate Damage Risk Zone (MSK VII)

EQ Zone II : Low Damage Risk Zone (MSK < VI)

Level of Risk : VH = Very High; H = High;

M = Moderate; L = Low; VL = Very Low

* Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : AR 12 State : ARUNACHAL PRADESH KURUNG KUMEY

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
		100									100	
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	40	0.2									
	Urban	52	0.3									
	Total	92	0.5	VH							M	
A2 - Stone Wall not packed with mortar	Rural	37	0.2									
	Urban	19	0.1									
	Total	56	0.3	VH							L	
Total - Category - A		148	0.8									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	323	1.7									
	Urban	85	0.5									
	Total	408	2.2	H							L	
Total - Category - B		408	2.2									
C1 - Concrete Wall	Rural	166	0.9									
	Urban	43	0.2									
	Total	209	1.1	M							VL	
C2 - Wood wall	Rural	708	3.8									
	Urban	143	0.8									
	Total	851	4.6	M							M	
Total - Category - C		1,060	5.7									
X - Other Materials	Rural	16,431	89.0									
	Urban	420	2.3									
	Total	16,851	91.3	M							M	
Total - Category - X		16,851	91.2									
TOTAL HOUSES*		18,467										

ROOF												
R1 - Light Weight Sloping Roof	Rural	17,075	92.5									
	Urban	692	3.7									
	Total	17,767	96.2	M							M	
R2 - Heavy Weight Sloping Roof	Rural	560	3.0									
	Urban	49	0.3									
	Total	609	3.3	M							H	
R3 - Flat Roof	Rural	70	0.4									
	Urban	21	0.1									
	Total	91	0.5									
TOTAL HOUSES*		18,467										

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 512 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)

- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
 Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
 * Total No.of Houses excluding Vacant/Locked Houses

Table No. : AR 13 State : ARUNACHAL PRADESH DIBANG VALLEY

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
				Area in %				Area in %					
		100										100	
WALL													
A1 - Mud & Unburnt Brick Wall	Rural	6	0.2										
	Urban	29	1.1										
	Total	35	1.3	VH							M		
A2 - Stone Wall not packed with mortar	Rural	75	2.8										
	Urban	130	4.9										
	Total	205	7.7	VH							L		
Total - Category - A		240	9.0										
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	80	3.0										
	Urban	6	0.2										
	Total	86	3.2	H							L		
Total - Category - B		86	3.2										
C1 - Concrete Wall	Rural	84	3.2										
	Urban	81	3.0										
	Total	165	6.2	M							VL		
C2 - Wood wall	Rural	256	9.6										
	Urban	17	0.6										
	Total	273	10.2	M							M		
Total - Category - C		438	16.4										
X - Other Materials	Rural	1,386	52.0										
	Urban	515	19.3										
	Total	1,901	71.3	M							M		
Total - Category - X		1,901	71.3										
TOTAL HOUSES*		2,665											

ROOF												
R1 - Light Weight Sloping Roof	Rural	1,808	67.8									
	Urban	774	29.0									
	Total	2,582	96.8	M							M	
R2 - Heavy Weight Sloping Roof	Rural	72	2.7									
	Urban	-	-									
	Total	72	2.7	M							H	
R3 - Flat Roof	Rural	7	0.3									
	Urban	4	0.2									
	Total	11	0.5									
TOTAL HOUSES*		2,665										

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 473 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)

- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
 Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
 * Total No.of Houses excluding Vacant/Locked Houses

**Distribution of Houses by Predominant Materials of Roof and Wall
and Level of Damage Risk**

Table No. : AR 14 State : ARUNACHAL PRADESH LOWER DIBANG VALLEY

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
				100					26.4		73.6	
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	461	3.2									
	Urban	36	0.2									
	Total	497	3.4	VH					VH		M	
A2 - Stone Wall not packed with mortar	Rural	83	0.6									
	Urban	10	0.1									
	Total	93	0.7	VH					H		L	
Total - Category - A		590	4.1									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	462	3.2									
	Urban	221	1.5									
	Total	683	4.7	H					H		L	
Total - Category - B		683	4.7									
C1 - Concrete Wall	Rural	917	6.3									
	Urban	384	2.6									
	Total	1,301	8.9	M					L		VL	
C2 - Wood wall	Rural	2,025	13.9									
	Urban	159	1.1									
	Total	2,184	15.0	M					VH		M	
Total - Category - C		3,485	23.9									
X - Other Materials	Rural	6,988	48.0									
	Urban	2,811	19.3									
	Total	9,799	67.3	M					VH		M	
Total - Category - X		9,799	67.3									
TOTAL HOUSES*		14,557										
ROOF												
R1 - Light Weight Sloping Roof	Rural	10,661	73.2									
	Urban	3,293	22.6									
	Total	13,954	95.8	M					VH		M	
R2 - Heavy Weight Sloping Roof	Rural	156	1.1									
	Urban	17	0.1									
	Total	173	1.2	M					VH		H	
R3 - Flat Roof	Rural	119	0.8									
	Urban	311	2.1									
	Total	430	2.9									
TOTAL HOUSES*		14,557										

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. **587 mm**

Housing Category : Wall Types

Category - A : Buildings in field-stone, rural structures, unburnt brick houses, clay houses

Category - B : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone

Category - C : Reinforced building, well built wooden structures

Category - X : Other materials not covered in A,B,C. These are generally light.

Notes : 1. Flood prone area includes that protected area which may have more severe

damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.

2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building

3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

Category - R1 - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)

Category - R2 - Heavy Weight (Tiles, Stone/Slate)

Category - R3 - Flat Roof (Brick, Concrete)

EQ Zone V : Very High Damage Risk Zone (MSK > IX)

EQ Zone IV : High Damage Risk Zone (MSK VIII)

EQ Zone III : Moderate Damage Risk Zone (MSK VII)

EQ Zone II : Low Damage Risk Zone (MSK < VI)

Level of Risk : VH = Very High; H = High;

M = Moderate; L = Low; VL = Very Low

* Total No.of Houses excluding Vacant/Locked Houses

**Distribution of Houses by Predominant Materials of Roof and Wall
and Level of Damage Risk**

Table No. : AR 15 State : ARUNACHAL PRADESH LOHIT

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
				100					35.6		64.4	
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	613	1.5									
	Urban	269	0.6									
	Total	882	2.1	VH					VH		M	
A2 - Stone Wall not packed with mortar	Rural	126	0.3									
	Urban	222	0.5									
	Total	348	0.8	VH					H		L	
Total - Category - A		1,230	2.9									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	1,412	3.4									
	Urban	994	2.4									
	Total	2,406	5.8	H					H		L	
Total - Category - B		2,406	5.7									
C1 - Concrete Wall	Rural	1,324	3.2									
	Urban	2,045	4.9									
	Total	3,369	8.1	M					L		VL	
C2 - Wood wall	Rural	3,083	7.4									
	Urban	1,227	2.9									
	Total	4,310	10.3	M					VH		M	
Total - Category - C		7,679	18.3									
X - Other Materials	Rural	25,210	60.1									
	Urban	5,413	12.9									
	Total	30,623	73.0	M					VH		M	
Total - Category - X		30,623	73.0									
TOTAL HOUSES*		41,938										
ROOF												
R1 - Light Weight Sloping Roof	Rural	31,477	75.1									
	Urban	9,718	23.2									
	Total	41,195	98.3	M					VH		M	
R2 - Heavy Weight Sloping Roof	Rural	137	0.3									
	Urban	73	0.2									
	Total	210	0.5	M					VH		H	
R3 - Flat Roof	Rural	154	0.4									
	Urban	379	0.9									
	Total	533	1.3									
TOTAL HOUSES*		41,938										

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. **587 mm**

Housing Category : Wall Types

Category - A : Buildings in field-stone, rural structures, unburnt brick houses, clay houses

Category - B : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone

Category - C : Reinforced building, well built wooden structures

Category - X : Other materials not covered in A,B,C. These are generally light.

Notes : 1. Flood prone area includes that protected area which may have more severe

damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.

2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building

3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

Category - R1 - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)

Category - R2 - Heavy Weight (Tiles, Stone/Slate)

Category - R3 - Flat Roof (Brick, Concrete)

EQ Zone V : Very High Damage Risk Zone (MSK > IX)

EQ Zone IV : High Damage Risk Zone (MSK VIII)

EQ Zone III : Moderate Damage Risk Zone (MSK VII)

EQ Zone II : Low Damage Risk Zone (MSK < VI)

Level of Risk : VH = Very High; H = High;

M = Moderate; L = Low; VL = Very Low

* Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : AR 16 State : ARUNACHAL PRADESH ANJAW

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
		100								100		
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	19	0.3									
	Urban	-	-									
	Total	19	0.3	VH						M		
A2 - Stone Wall not packed with mortar	Rural	26	0.5									
	Urban	50	0.9									
	Total	76	1.4	VH						L		
Total - Category - A		95	1.7									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	45	0.8									
	Urban	11	0.2									
	Total	56	1.0	H						L		
Total - Category - B		56	1.0									
C1 - Concrete Wall	Rural	549	9.6									
	Urban	-	-									
	Total	549	9.6	M						VL		
C2 - Wood wall	Rural	564	9.9									
	Urban	32	0.6									
	Total	596	10.5	M						M		
Total - Category - C		1,145	20.0									
X - Other Materials	Rural	4,210	73.6									
	Urban	213	3.7									
	Total	4,423	77.3	M						M		
Total - Category - X		4,423	77.3									
TOTAL HOUSES*		5,719										
ROOF												
R1 - Light Weight Sloping Roof	Rural	5,349	93.5									
	Urban	305	5.3									
	Total	5,654	98.8	M						M		
R2 - Heavy Weight Sloping Roof	Rural	42	0.7									
	Urban	1	-									
	Total	43	0.7	M						H		
R3 - Flat Roof	Rural	22	0.4									
	Urban	-	-									
	Total	22	0.4									
TOTAL HOUSES*		5,719										

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. **347 mm**

Housing Category : Wall Types

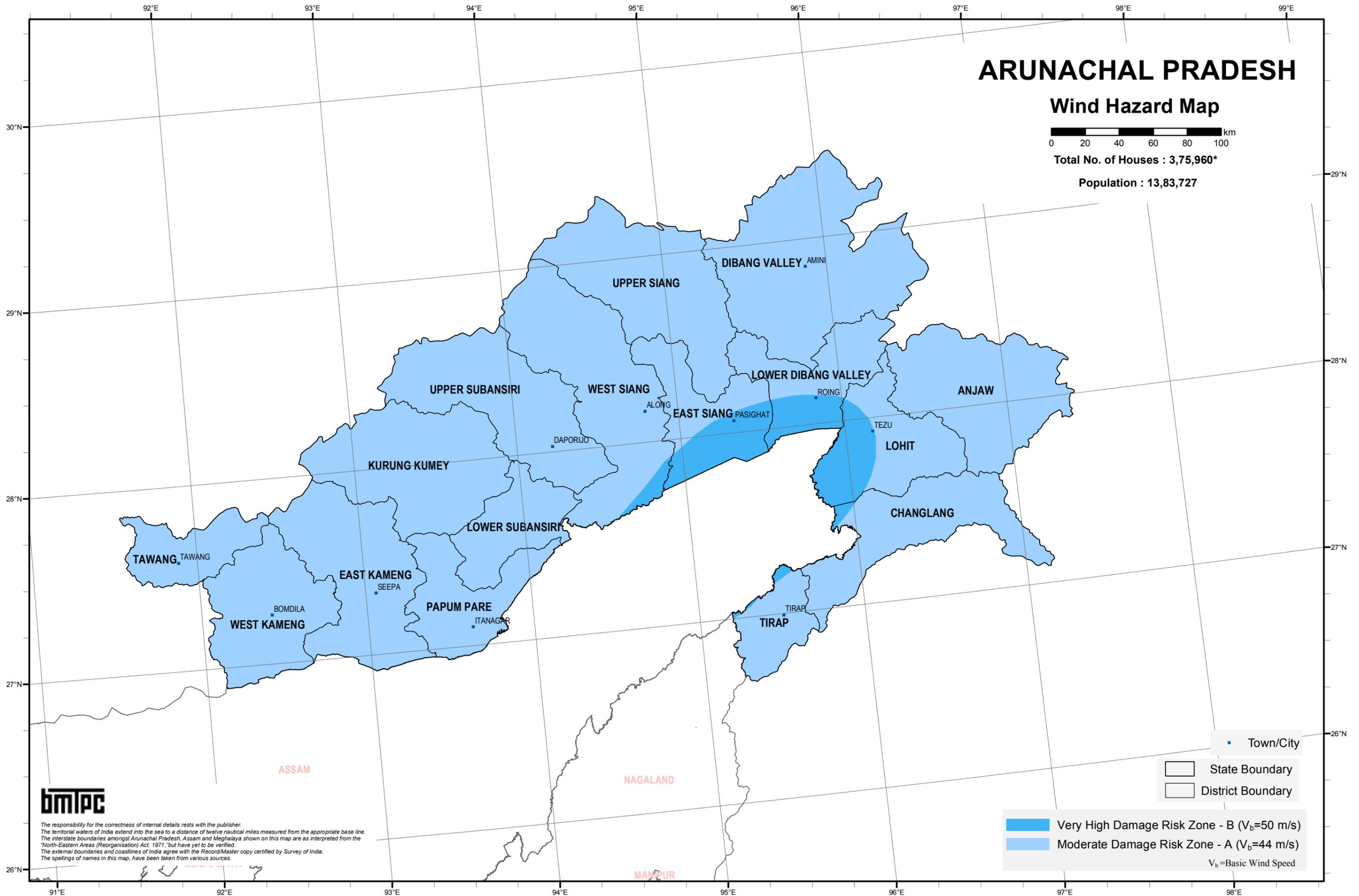
- Category - A :** Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B :** Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C :** Reinforced building, well built wooden structures
- Category - X :** Other materials not covered in A,B,C. These are generally light.

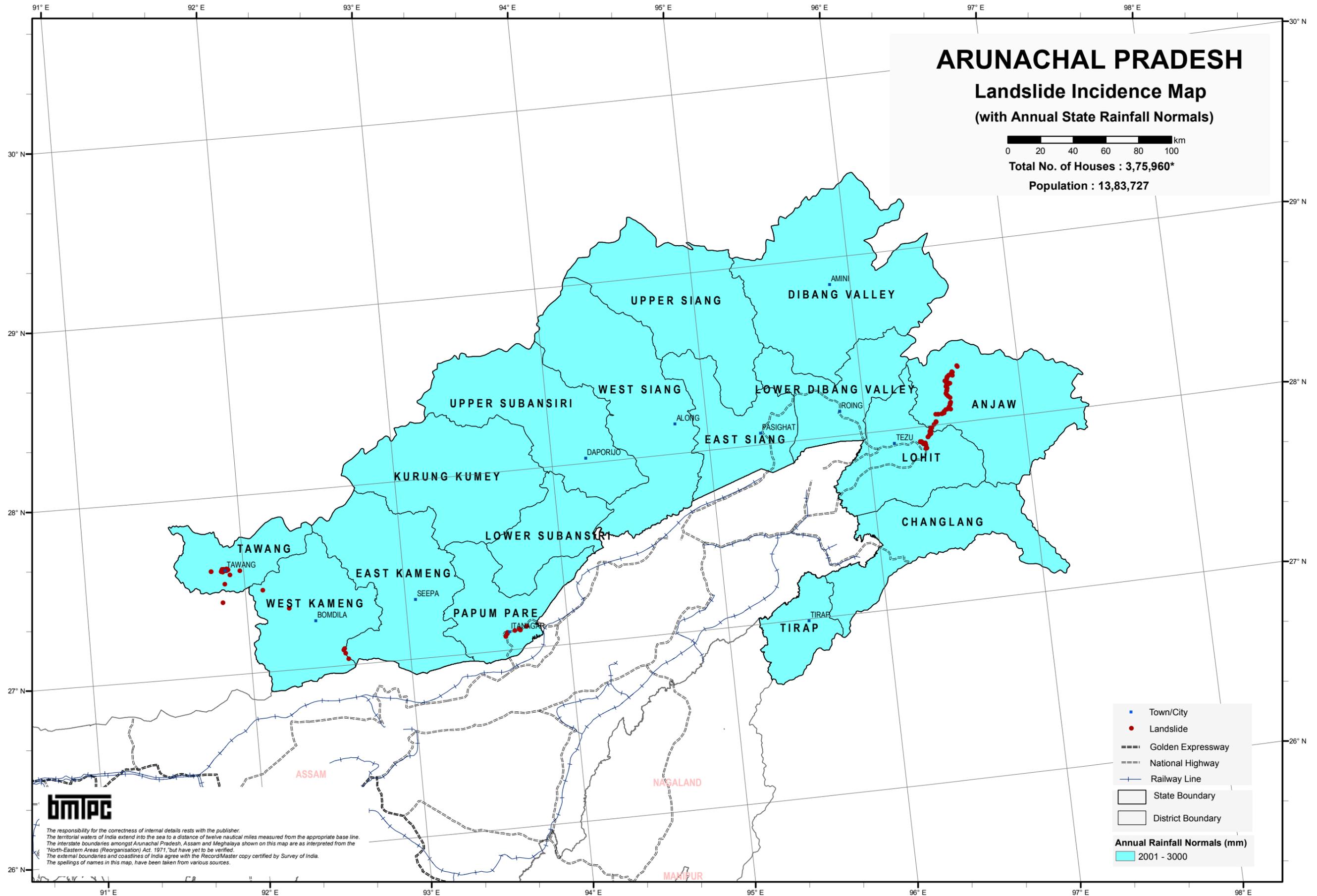
- Notes :**
1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1 -** Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
 - Category - R2 -** Heavy Weight (Tiles, Stone/Slate)
 - Category - R3 -** Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low

* Total No. of Houses excluding Vacant/Locked Houses





ARUNACHAL PRADESH

Landslide Incidence Map (with Annual State Rainfall Normals)

0 20 40 60 80 100 km

Total No. of Houses : 3,75,960*

Population : 13,83,727

- Town/City
- Landslide
- === Golden Expressway
- National Highway
- + Railway Line
- State Boundary
- District Boundary

Annual Rainfall Normals (mm)
 2001 - 3000

The responsibility for the correctness of internal details rests with the publisher.
 The territorial waters of India extend into the sea to a distance of twelve nautical miles measured from the appropriate base line.
 The interstate boundaries amongst Arunachal Pradesh, Assam and Meghalaya shown on this map are as interpreted from the "North-Eastern Areas (Reorganisation) Act, 1971," but have yet to be verified.
 The external boundaries and coastlines of India agree with the Record/Master copy certified by Survey of India.
 The spellings of names in this map, have been taken from various sources.

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

ASSAM

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %		
		No. of Houses	%	EQ Zone				Wind Velocity m/s						
				V	IV	III	II	55 & 50	47	44 & 39	33			
				Area in %				Area in %						
STATE - ASSAM		100								83.7	12.4	3.9		14.7
WALL														
A1 - Mud & Unburnt Brick Wall	Rural	239,983	2.7											
	Urban	30,313	0.3											
	Total	270,296	3.0	VH						VH	H	M		VH
A2 - Stone Wall not packed with mortar	Rural	38,911	0.4											
	Urban	24,510	0.3											
	Total	63,421	0.7	VH						H	M	L		VH
Total - Category - A		333,717	3.8											
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	1,274,874	14.6											
	Urban	670,587	7.7											
	Total	1,945,461	22.3	H						H	M	L		H/M
Total - Category - B		1,945,461	22.2											
C1 - Concrete Wall	Rural	129,355	1.5											
	Urban	137,082	1.6											
	Total	266,437	3.1	M						L	VL	VL		L/VL
C2 - Wood wall	Rural	123,233	1.4											
	Urban	31,574	0.4											
	Total	154,807	1.8	M						VH	H	M		H
Total - Category - C		421,244	4.8											
X - Other Materials	Rural	5,593,922	63.9											
	Urban	462,363	5.3											
	Total	6,056,285	69.2	M						VH	H	M		VH
Total - Category - X		6,056,285	69.2											
TOTAL HOUSES*		8,756,707												

ROOF														
R1 - Light Weight Sloping Roof	Rural	7,228,611	82.5											
	Urban	1,079,682	12.3											
	Total	8,308,293	94.8	M						VH	VH	H		VH
R2 - Heavy Weight Sloping Roof	Rural	111,015	1.3											
	Urban	46,634	0.5											
	Total	157,649	1.8	H						H	M	L		H
R3 - Flat Roof	Rural	60,652	0.7											
	Urban	230,113	2.6											
	Total	290,765	3.3											
<i>Damage Risk as per that for the Wall supporting it</i>														
TOTAL HOUSES*		8,756,707												

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
 - Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
 - Category - C** : Reinforced building, well built wooden structures
 - Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
 - Category - R2** - Heavy Weight (Tiles, Stone/Slate)
 - Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : AS 01

State : ASSAM

KOKRAJHAR

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %		
		No. of Houses	%	EQ Zone				Wind Velocity m/s						
				V	IV	III	II	55 & 50	47	44 & 39	33			
				Area in %				Area in %						
STATE - ASSAM		100												13.8
WALL														
A1 - Mud & Unburnt Brick Wall	Rural	14,576	6.7											
	Urban	352	0.2											
	Total	14,928	6.9	VH							H			VH
A2 - Stone Wall not packed with mortar	Rural	1,512	0.7											
	Urban	792	0.4											
	Total	2,304	1.1	VH							M			VH
Total - Category - A		17,232	7.9											
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	25,919	11.9											
	Urban	6,959	3.2											
	Total	32,878	15.1	H							M			H/M
Total - Category - B		32,878	15.1											
C1 - Concrete Wall	Rural	5,779	2.7											
	Urban	2,592	1.2											
	Total	8,371	3.9	M							VL			L/VL
C2 - Wood wall	Rural	8,774	4.0											
	Urban	1,007	0.5											
	Total	9,781	4.5	M							H			H
Total - Category - C		18,152	8.4											
X - Other Materials	Rural	144,862	66.7											
	Urban	4,144	1.9											
	Total	149,006	68.6	M							H			VH
Total - Category - X		149,006	68.6											
TOTAL HOUSES*		217,268												

ROOF														
R1 - Light Weight Sloping Roof	Rural	187,887	86.5											
	Urban	13,635	6.3											
	Total	201,522	92.8	M							VH			VH
R2 - Heavy Weight Sloping Roof	Rural	11,521	5.3											
	Urban	828	0.4											
	Total	12,349	5.7	H							M			H
R3 - Flat Roof	Rural	2,014	0.9											
	Urban	1,383	0.6											
	Total	3,397	1.5											
<i>Damage Risk as per that for the Wall supporting it</i>														
TOTAL HOUSES*		217,268												

Probable Maximum Precipitation at a Station of the district in one day for areal extent of 1000 sq.km. is **674 mm**

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
 - Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
 - Category - C** : Reinforced building, well built wooden structures
 - Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
 - Category - R2** - Heavy Weight (Tiles, Stone/Slate)
 - Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : AS 02 State : ASSAM DHUBRI

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %		
		No. of Houses	%	EQ Zone				Wind Velocity m/s						
				V	IV	III	II	55 & 50	47	44 & 39	33			
				Area in %				Area in %						
				100					4.8	95.2			38.1	
WALL														
A1 - Mud & Unburnt Brick Wall	Rural	8,385	1.6											
	Urban	1,351	0.3											
	Total	9,736	1.9	VH					VH	H				VH
A2 - Stone Wall not packed with mortar	Rural	2,013	0.4											
	Urban	1,138	0.2											
	Total	3,151	0.6	VH					H	M				VH
Total - Category - A		12,887	2.5											
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	37,002	7.2											
	Urban	20,637	4.0											
	Total	57,639	11.2	H					H	M				H/M
Total - Category - B		57,639	11.3											
C1 - Concrete Wall	Rural	8,654	1.7											
	Urban	5,937	1.2											
	Total	14,591	2.9	M					L	VL				L/VL
C2 - Wood wall	Rural	5,172	1.0											
	Urban	2,358	0.5											
	Total	7,530	1.5	M					VH	H				H
Total - Category - C		22,121	4.3											
X - Other Materials	Rural	393,901	76.9											
	Urban	25,552	5.0											
	Total	419,453	81.9	M					VH	H				VH
Total - Category - X		419,453	81.9											
TOTAL HOUSES*		512,100												
ROOF														
R1 - Light Weight Sloping Roof	Rural	428,562	83.7											
	Urban	46,659	9.1											
	Total	475,221	92.8	M					VH	VH				VH
R2 - Heavy Weight Sloping Roof	Rural	24,470	4.8											
	Urban	4,603	0.9											
	Total	29,073	5.7	H					H	M				H
R3 - Flat Roof	Rural	2,095	0.4											
	Urban	5,711	1.1											
	Total	7,806	1.5											
TOTAL HOUSES*		512,100												

Probable Maximum Precipitation at a Station of the district in one day for areal extent of 1000 sq.km. is 764 mm

Housing Category : Wall Types

- Category - A :** Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B :** Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C :** Reinforced building, well built wooden structures
- Category - X :** Other materials not covered in A,B,C. These are generally light.

- Notes :**
1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1 - Light Weight** (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2 - Heavy Weight** (Tiles, Stone/Slate)
- Category - R3 - Flat Roof** (Brick, Concrete)
- EQ Zone V :** Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV :** High Damage Risk Zone (MSK VIII)
- EQ Zone III :** Moderate Damage Risk Zone (MSK VII)
- EQ Zone II :** Low Damage Risk Zone (MSK < VI)

Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low

* Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : AS 03 State : ASSAM GOALPARA

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %		
		No. of Houses	%	EQ Zone				Wind Velocity m/s						
				V	IV	III	II	55 & 50	47	44 & 39	33			
				Area in %				Area in %						
				100					73.1	26.9			.8	
WALL														
A1 - Mud & Unburnt Brick Wall	Rural	5,354	2.0											
	Urban	615	0.2											
	Total	5,969	2.2	VH					VH	H				VH
A2 - Stone Wall not packed with mortar	Rural	933	0.4											
	Urban	441	0.2											
	Total	1,374	0.6	VH					H	M				VH
Total - Category - A		7,343	2.8											
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	34,964	13.4											
	Urban	14,075	5.4											
	Total	49,039	18.8	H					H	M				H/M
Total - Category - B		49,039	18.7											
C1 - Concrete Wall	Rural	6,405	2.4											
	Urban	2,469	0.9											
	Total	8,874	3.3	M					L	VL				L/VL
C2 - Wood wall	Rural	4,365	1.7											
	Urban	758	0.3											
	Total	5,123	2.0	M					VH	H				H
Total - Category - C		13,997	5.4											
X - Other Materials	Rural	172,310	65.9											
	Urban	18,907	7.2											
	Total	191,217	73.1	M					VH	H				VH
Total - Category - X		191,217	73.1											
TOTAL HOUSES*		261,596												
ROOF														
R1 - Light Weight Sloping Roof	Rural	221,012	84.5											
	Urban	35,782	13.7											
	Total	256,794	98.2	M					VH	VH				VH
R2 - Heavy Weight Sloping Roof	Rural	2,547	1.0											
	Urban	452	0.2											
	Total	2,999	1.2	H					H	M				H
R3 - Flat Roof	Rural	772	0.3											
	Urban	1,031	0.4											
	Total	1,803	0.7											
TOTAL HOUSES*		261,596												

Probable Maximum Precipitation at a Station of the district in one day for areal extent of 1000 sq.km. is 732 mm

Housing Category : Wall Types

- Category - A :** Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B :** Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C :** Reinforced building, well built wooden structures
- Category - X :** Other materials not covered in A,B,C. These are generally light.

- Notes :**
1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1 - Light Weight** (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2 - Heavy Weight** (Tiles, Stone/Slate)
- Category - R3 - Flat Roof** (Brick, Concrete)
- EQ Zone V :** Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV :** High Damage Risk Zone (MSK VIII)
- EQ Zone III :** Moderate Damage Risk Zone (MSK VII)
- EQ Zone II :** Low Damage Risk Zone (MSK < VI)

Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low

* Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : AS 04 State : ASSAM BARPETA

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %		
		No. of Houses	%	EQ Zone				Wind Velocity m/s						
				V	IV	III	II	55 & 50	47	44 & 39	33			
				Area in %				Area in %						
		100								94.4	5.6			2.8
WALL														
A1 - Mud & Unburnt Brick Wall	Rural	3,253	0.7											
	Urban	727	0.1											
	Total	3,980	0.8	VH						VH	H			VH
A2 - Stone Wall not packed with mortar	Rural	1,124	0.2											
	Urban	963	0.2											
	Total	2,087	0.4	VH						H	M			VH
Total - Category - A		6,067	1.2											
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	42,157	8.7											
	Urban	21,388	4.4											
	Total	63,545	13.1	H						H	M			H/M
Total - Category - B		63,545	13.0											
C1 - Concrete Wall	Rural	7,887	1.6											
	Urban	7,011	1.4											
	Total	14,898	3.0	M						L	VL			L/VL
C2 - Wood wall	Rural	4,051	0.8											
	Urban	980	0.2											
	Total	5,031	1.0	M						VH	H			H
Total - Category - C		19,929	4.1											
X - Other Materials	Rural	380,596	78.1											
	Urban	17,196	3.5											
	Total	397,792	81.6	M						VH	H			VH
Total - Category - X		397,792	81.6											
TOTAL HOUSES*		487,333												

ROOF														
R1 - Light Weight Sloping Roof	Rural	436,029	89.5											
	Urban	43,942	9.0											
	Total	479,971	98.5	M						VH	VH			VH
R2 - Heavy Weight Sloping Roof	Rural	1,946	0.4											
	Urban	671	0.1											
	Total	2,617	0.5	H						H	M			H
R3 - Flat Roof	Rural	1,093	0.2											
	Urban	3,652	0.7											
	Total	4,745	0.9							Damage Risk as per that for the Wall supporting it				
TOTAL HOUSES*		487,333												

Probable Maximum Precipitation at a Station of the district in 24 hrs is 520 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes :**
1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low

* Total No. of Houses excluding Vacant/Locked Houses

Table No. : AS 05 State : ASSAM MORIGAON

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %		
		No. of Houses	%	EQ Zone				Wind Velocity m/s						
				V	IV	III	II	55 & 50	47	44 & 39	33			
				Area in %				Area in %						
		100								100				
WALL														
A1 - Mud & Unburnt Brick Wall	Rural	7,764	3.1											
	Urban	432	0.2											
	Total	8,196	3.3	VH										VH
A2 - Stone Wall not packed with mortar	Rural	866	0.3											
	Urban	340	0.1											
	Total	1,206	0.4	VH										H
Total - Category - A		9,402	3.7											
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	33,296	13.3											
	Urban	11,473	4.6											
	Total	44,769	17.9	H										H
Total - Category - B		44,769	17.8											
C1 - Concrete Wall	Rural	2,852	1.1											
	Urban	637	0.3											
	Total	3,489	1.4	M										L
C2 - Wood wall	Rural	2,876	1.1											
	Urban	605	0.2											
	Total	3,481	1.3	M										VH
Total - Category - C		6,970	2.8											
X - Other Materials	Rural	180,240	71.7											
	Urban	9,838	3.9											
	Total	190,078	75.6	M										VH
Total - Category - X		190,078	75.7											
TOTAL HOUSES*		251,219												

ROOF														
R1 - Light Weight Sloping Roof	Rural	226,097	90.0											
	Urban	21,176	8.4											
	Total	247,273	98.4	M										VH
R2 - Heavy Weight Sloping Roof	Rural	1,137	0.5											
	Urban	195	0.1											
	Total	1,332	0.6	H										H
R3 - Flat Roof	Rural	660	0.3											
	Urban	1,954	0.8											
	Total	2,614	1.1							Damage Risk as per that for the Wall supporting it				
TOTAL HOUSES*		251,219												

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 529 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes :**
1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low

* Total No. of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : AS 06 State : ASSAM NAGAON

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %		
		No. of Houses	%	EQ Zone				Wind Velocity m/s						
				V	IV	III	II	55 & 50	47	44 & 39	33			
Area in %				Area in %										
				100						100				18.2
WALL														
A1 - Mud & Unburnt Brick Wall	Rural	25,332	3.3											
	Urban	2,842	0.4											
	Total	28,174	3.7	VH					VH					VH
A2 - Stone Wall not packed with mortar	Rural	4,186	0.5											
	Urban	2,612	0.3											
	Total	6,798	0.8	VH					H					VH
Total - Category - A		34,972	4.5											
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	122,739	15.9											
	Urban	42,608	5.5											
	Total	165,347	21.4	H					H					H/M
Total - Category - B		165,347	21.4											
C1 - Concrete Wall	Rural	13,081	1.7											
	Urban	13,197	1.7											
	Total	26,278	3.4	M					L					L/VL
C2 - Wood wall	Rural	16,444	2.1											
	Urban	4,845	0.6											
	Total	21,289	2.7	M					VH					H
Total - Category - C		47,567	6.2											
X - Other Materials	Rural	475,846	61.6											
	Urban	48,346	6.3											
	Total	524,192	67.9	M					VH					VH
Total - Category - X		524,192	67.9											
TOTAL HOUSES*		772,078												
ROOF														
R1 - Light Weight Sloping Roof	Rural	648,546	84.0											
	Urban	98,984	12.8											
	Total	747,530	96.8	M					VH					VH
R2 - Heavy Weight Sloping Roof	Rural	5,019	0.7											
	Urban	2,625	0.3											
	Total	7,644	1.0	H					H					H
R3 - Flat Roof	Rural	4,063	0.5											
	Urban	12,841	1.7											
	Total	16,904	2.2											
<i>Damage Risk as per that for the Wall supporting it</i>														
TOTAL HOUSES*		772,078												

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 655 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes :**
1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)

- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
* Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : AS 07 State : ASSAM SONITPUR

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %				
		No. of Houses	%	EQ Zone				Wind Velocity m/s								
				V	IV	III	II	55 & 50	47	44 & 39	33					
Area in %				Area in %												
				100						78.3				21.7		11.4
WALL																
A1 - Mud & Unburnt Brick Wall	Rural	20,917	4.0													
	Urban	1,694	0.3													
	Total	22,611	4.3	VH					VH					M		VH
A2 - Stone Wall not packed with mortar	Rural	2,514	0.5													
	Urban	508	0.1													
	Total	3,022	0.6	VH					H					L		VH
Total - Category - A		25,633	4.8													
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	102,264	19.3													
	Urban	31,424	5.9													
	Total	133,688	25.2	H					H					L		H/M
Total - Category - B		133,688	25.3													
C1 - Concrete Wall	Rural	14,347	2.7													
	Urban	8,451	1.6													
	Total	22,798	4.3	M					L					VL		L/VL
C2 - Wood wall	Rural	5,503	1.0													
	Urban	1,092	0.2													
	Total	6,595	1.2	M					VH					M		H
Total - Category - C		29,393	5.6													
X - Other Materials	Rural	323,997	61.2													
	Urban	16,530	3.1													
	Total	340,527	64.3	M					VH					M		VH
Total - Category - X		340,527	64.3													
TOTAL HOUSES*		529,241														
ROOF																
R1 - Light Weight Sloping Roof	Rural	462,563	87.4													
	Urban	50,135	9.5													
	Total	512,698	96.9	M					VH					H		VH
R2 - Heavy Weight Sloping Roof	Rural	4,715	0.9													
	Urban	1,206	0.2													
	Total	5,921	1.1	H					H					L		H
R3 - Flat Roof	Rural	2,264	0.4													
	Urban	8,358	1.6													
	Total	10,622	2.0													
<i>Damage Risk as per that for the Wall supporting it</i>																
TOTAL HOUSES*		529,241														

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 770 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes :**
1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)

- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
* Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : AS 08 State : ASSAM LAKHIMPUR

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %		
		No. of Houses	%	EQ Zone				Wind Velocity m/s						
				V	IV	III	II	55 & 50	47	44 & 39	33			
				Area in %				Area in %						
		100								64.5		35.5		39.6
WALL														
A1 - Mud & Unburnt Brick Wall	Rural	3,493	1.1											
	Urban	1,124	0.4											
	Total	4,617	1.5	VH						VH		M		VH
A2 - Stone Wall not packed with mortar	Rural	987	0.3											
	Urban	136	-											
	Total	1,123	0.3	VH						H		L		VH
Total - Category - A		5,740	1.8											
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	42,303	13.3											
	Urban	15,132	4.8											
	Total	57,435	18.1	H						H		L		H/M
Total - Category - B		57,435	18.0											
C1 - Concrete Wall	Rural	3,567	1.1											
	Urban	1,312	0.4											
	Total	4,879	1.5	M						L		VL		L/VL
C2 - Wood wall	Rural	1,606	0.5											
	Urban	307	0.1											
	Total	1,913	0.6	M						VH		M		H
Total - Category - C		6,792	2.1											
X - Other Materials	Rural	235,260	73.9											
	Urban	13,125	4.1											
	Total	248,385	78.0	M						VH		M		VH
Total - Category - X		248,385	78.0											
TOTAL HOUSES*		318,352												

ROOF														
R1 - Light Weight Sloping Roof	Rural	284,509	89.4											
	Urban	27,130	8.5											
	Total	311,639	97.9	M						VH		H		VH
R2 - Heavy Weight Sloping Roof	Rural	1,462	0.5											
	Urban	551	0.2											
	Total	2,013	0.7	H						H		L		H
R3 - Flat Roof	Rural	1,245	0.4											
	Urban	3,455	1.1											
	Total	4,700	1.5											
TOTAL HOUSES*		318,352												

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 587 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
- 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
- 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low

* Total No.of Houses excluding Vacant/Locked Houses

Table No. : AS 09 State : ASSAM DHEMAJI

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %		
		No. of Houses	%	EQ Zone				Wind Velocity m/s						
				V	IV	III	II	55 & 50	47	44 & 39	33			
				Area in %				Area in %						
		100								84.6		15.4		61.9
WALL														
A1 - Mud & Unburnt Brick Wall	Rural	1,692	0.8											
	Urban	340	0.2											
	Total	2,032	1.0	VH						VH		M		VH
A2 - Stone Wall not packed with mortar	Rural	536	0.2											
	Urban	135	0.1											
	Total	671	0.3	VH						H		L		VH
Total - Category - A		2,703	1.2											
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	14,347	6.4											
	Urban	6,197	2.8											
	Total	20,544	9.2	H						H		L		H/M
Total - Category - B		20,544	9.2											
C1 - Concrete Wall	Rural	610	0.3											
	Urban	250	0.1											
	Total	860	0.4	M						L		VL		L/VL
C2 - Wood wall	Rural	645	0.3											
	Urban	326	0.1											
	Total	971	0.4	M						VH		M		H
Total - Category - C		1,831	0.8											
X - Other Materials	Rural	189,831	85.3											
	Urban	7,751	3.5											
	Total	197,582	88.8	M						VH		M		VH
Total - Category - X		197,582	88.7											
TOTAL HOUSES*		222,660												

ROOF														
R1 - Light Weight Sloping Roof	Rural	205,817	92.4											
	Urban	13,434	6.0											
	Total	219,251	98.4	M						VH		H		VH
R2 - Heavy Weight Sloping Roof	Rural	1,084	0.5											
	Urban	532	0.2											
	Total	1,616	0.7	H						H		L		H
R3 - Flat Roof	Rural	760	0.3											
	Urban	1,033	0.5											
	Total	1,793	0.8											
TOTAL HOUSES*		222,660												

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 561 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
- 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
- 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low

* Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : AS 10 State : ASSAM TINSUKIA

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
				Area in %				Area in %					
				100					90.5		9.5		1.6
WALL													
A1 - Mud & Unburnt Brick Wall	Rural	7,557	2.1										
	Urban	1,936	0.5										
	Total	9,493	2.6	VH					VH		M		VH
A2 - Stone Wall not packed with mortar	Rural	1,923	0.5										
	Urban	1,181	0.3										
	Total	3,104	0.8	VH					H		L		VH
Total - Category - A		12,597	3.5										
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	72,290	20.0										
	Urban	39,853	11.0										
	Total	112,143	31.0	H					H		L		H/M
Total - Category - B		112,143	31.0										
C1 - Concrete Wall	Rural	2,895	0.8										
	Urban	5,945	1.6										
	Total	8,840	2.4	M					L		VL		L/VL
C2 - Wood wall	Rural	3,436	1.0										
	Urban	2,581	0.7										
	Total	6,017	1.7	M					VH		M		H
Total - Category - C		14,857	4.1										
X - Other Materials	Rural	192,021	53.1										
	Urban	29,990	8.3										
	Total	222,011	61.4	M					VH		M		VH
Total - Category - X		222,011	61.4										
TOTAL HOUSES*		361,608											
ROOF													
R1 - Light Weight Sloping Roof	Rural	273,923	75.8										
	Urban	66,877	18.5										
	Total	340,800	94.3	M					VH		H		VH
R2 - Heavy Weight Sloping Roof	Rural	3,870	1.1										
	Urban	2,571	0.7										
	Total	6,441	1.8	H					H		L		H
R3 - Flat Roof	Rural	2,329	0.6										
	Urban	12,038	3.3										
	Total	14,367	3.9										
TOTAL HOUSES*		361,608											

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 565 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes :**
1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)

- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
* Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : AS 11 State : ASSAM DIBRUGARH

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
				Area in %				Area in %					
				100					100				17.1
WALL													
A1 - Mud & Unburnt Brick Wall	Rural	6,025	1.7										
	Urban	1,668	0.5										
	Total	7,693	2.2	VH					VH				VH
A2 - Stone Wall not packed with mortar	Rural	1,145	0.3										
	Urban	1,374	0.4										
	Total	2,519	0.7	VH					H				VH
Total - Category - A		10,212	2.8										
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	76,682	21.1										
	Urban	42,450	11.7										
	Total	119,132	32.8	H					H				H/M
Total - Category - B		119,132	32.8										
C1 - Concrete Wall	Rural	1,452	0.4										
	Urban	3,197	0.9										
	Total	4,649	1.3	M					L				L/VL
C2 - Wood wall	Rural	889	0.2										
	Urban	1,061	0.3										
	Total	1,950	0.5	M					VH				H
Total - Category - C		6,599	1.8										
X - Other Materials	Rural	204,935	56.5										
	Urban	22,034	6.1										
	Total	226,969	62.6	M					VH				VH
Total - Category - X		226,969	62.5										
TOTAL HOUSES*		362,912											
ROOF													
R1 - Light Weight Sloping Roof	Rural	281,655	77.6										
	Urban	52,715	14.5										
	Total	334,370	92.1	M					VH				VH
R2 - Heavy Weight Sloping Roof	Rural	4,372	1.2										
	Urban	4,096	1.1										
	Total	8,468	2.3	H					H				H
R3 - Flat Roof	Rural	5,101	1.4										
	Urban	14,973	4.1										
	Total	20,074	5.5										
TOTAL HOUSES*		362,912											

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 565 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes :**
1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)

- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
* Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : AS 12 State : ASSAM SIVASAGAR

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
		100						100				
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	5,245	1.4									
	Urban	646	0.2									
	Total	5,891	1.6	VH					VH			
A2 - Stone Wall not packed with mortar	Rural	1,367	0.4									
	Urban	284	0.1									
	Total	1,651	0.5	VH					H			
Total - Category - A		7,542	2.0									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	79,376	20.6									
	Urban	20,996	5.5									
	Total	100,372	26.1	H					H			
Total - Category - B		100,372	26.1									
C1 - Concrete Wall	Rural	2,299	0.6									
	Urban	2,651	0.7									
	Total	4,950	1.3	M					L			
C2 - Wood wall	Rural	978	0.3									
	Urban	498	0.1									
	Total	1,476	0.4	M					VH			
Total - Category - C		6,426	1.7									
X - Other Materials	Rural	257,185	66.8									
	Urban	13,709	3.6									
	Total	270,894	70.4	M					VH			
Total - Category - X		270,894	70.3									
TOTAL HOUSES*		385,234										

ROOF												
R1 - Light Weight Sloping Roof	Rural	333,341	86.5									
	Urban	27,379	7.1									
	Total	360,720	93.6	M					VH			
R2 - Heavy Weight Sloping Roof	Rural	4,161	1.1									
	Urban	1,696	0.4									
	Total	5,857	1.5	H					H			
R3 - Flat Roof	Rural	8,948	2.3									
	Urban	9,709	2.5									
	Total	18,657	4.8									
<i>Damage Risk as per that for the Wall supporting it</i>												
TOTAL HOUSES*		385,234										

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 590 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
- 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
- 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low

* Total No.of Houses excluding Vacant/Locked Houses

Table No. : AS 13 State : ASSAM JORHAT

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %		
		No. of Houses	%	EQ Zone				Wind Velocity m/s						
				V	IV	III	II	55 & 50	47	44 & 39	33			
				Area in %				Area in %						
		100								100				22.9
WALL														
A1 - Mud & Unburnt Brick Wall	Rural	6,014	1.7											
	Urban	1,831	0.5											
	Total	7,845	2.2	VH					VH					
A2 - Stone Wall not packed with mortar	Rural	1,196	0.3											
	Urban	809	0.2											
	Total	2,005	0.5	VH					H					VH
Total - Category - A		9,850	2.8											
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	60,025	17.1											
	Urban	41,258	11.8											
	Total	101,283	28.9	H					H					H/M
Total - Category - B		101,283	28.9											
C1 - Concrete Wall	Rural	1,895	0.5											
	Urban	3,115	0.9											
	Total	5,010	1.4	M					L					L/VL
C2 - Wood wall	Rural	1,303	0.4											
	Urban	1,516	0.4											
	Total	2,819	0.8	M					VH					H
Total - Category - C		7,829	2.2											
X - Other Materials	Rural	207,177	59.2											
	Urban	23,950	6.8											
	Total	231,127	66.0	M					VH					VH
Total - Category - X		231,127	66.0											
TOTAL HOUSES*		350,089												

ROOF												
R1 - Light Weight Sloping Roof	Rural	270,784	77.3									
	Urban	56,663	16.2									
	Total	327,447	93.5	M					VH			VH
R2 - Heavy Weight Sloping Roof	Rural	4,244	1.2									
	Urban	3,007	0.9									
	Total	7,251	2.1	H					H			H
R3 - Flat Roof	Rural	2,582	0.7									
	Urban	12,809	3.7									
	Total	15,391	4.4									
<i>Damage Risk as per that for the Wall supporting it</i>												
TOTAL HOUSES*		350,089										

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 587 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
- 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
- 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low

* Total No.of Houses excluding Vacant/Locked Houses

**Distribution of Houses by Predominant Materials of Roof and Wall
and Level of Damage Risk**

Table No. : AS 14 State : ASSAM GOLAGHAT

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
				Area in %				Area in %					
				100					100				22.6
WALL													
A1 - Mud & Unburnt Brick Wall	Rural	6,921	2.2										
	Urban	998	0.3										
	Total	7,919	2.5	VH					VH				VH
A2 - Stone Wall not packed with mortar	Rural	928	0.3										
	Urban	434	0.1										
	Total	1,362	0.4	VH					H				VH
Total - Category - A		9,281	3.0										
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	40,557	12.9										
	Urban	15,440	4.9										
	Total	55,997	17.8	H					H				H/M
Total - Category - B		55,997	17.8										
C1 - Concrete Wall	Rural	1,989	0.6										
	Urban	873	0.3										
	Total	2,862	0.9	M					L				L/VL
C2 - Wood wall	Rural	882	0.3										
	Urban	388	0.1										
	Total	1,270	0.4	M					VH				H
Total - Category - C		4,132	1.3										
X - Other Materials	Rural	231,870	73.8										
	Urban	12,930	4.1										
	Total	244,800	77.9	M					VH				VH
Total - Category - X		244,800	77.9										
TOTAL HOUSES*		314,210											
ROOF													
R1 - Light Weight Sloping Roof	Rural	279,229	88.9										
	Urban	27,267	8.7										
	Total	306,496	97.6	M					VH				VH
R2 - Heavy Weight Sloping Roof	Rural	2,393	0.8										
	Urban	706	0.2										
	Total	3,099	1.0	H					H				H
R3 - Flat Roof	Rural	1,525	0.5										
	Urban	3,090	1.0										
	Total	4,615	1.5										
TOTAL HOUSES*		314,210											

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 674 mm

Housing Category : Wall Types

- Category - A :** Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B :** Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C :** Reinforced building, well built wooden structures
- Category - X :** Other materials not covered in A,B,C. These are generally light.

- Notes :** 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1 - Light Weight** (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2 - Heavy Weight** (Tiles, Stone/Slate)
- Category - R3 - Flat Roof** (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)

- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

**Distribution of Houses by Predominant Materials of Roof and Wall
and Level of Damage Risk**

Table No. : AS 15 State : ASSAM KARBI ANGLONG

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
				Area in %				Area in %					
				100					100				10.5
WALL													
A1 - Mud & Unburnt Brick Wall	Rural	12,858	5.4										
	Urban	1,079	0.5										
	Total	13,937	5.9	VH					VH				VH
A2 - Stone Wall not packed with mortar	Rural	967	0.4										
	Urban	555	0.2										
	Total	1,522	0.6	VH					H				VH
Total - Category - A		15,459	6.5										
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	15,134	6.3										
	Urban	9,195	3.8										
	Total	24,329	10.1	H					H				H/M
Total - Category - B		24,329	10.2										
C1 - Concrete Wall	Rural	2,395	1.0										
	Urban	2,520	1.1										
	Total	4,915	2.1	M					L				L/VL
C2 - Wood wall	Rural	2,912	1.2										
	Urban	485	0.2										
	Total	3,397	1.4	M					VH				H
Total - Category - C		8,312	3.5										
X - Other Materials	Rural	171,824	71.9										
	Urban	19,171	8.0										
	Total	190,995	79.9	M					VH				VH
Total - Category - X		190,995	79.9										
TOTAL HOUSES*		239,095											
ROOF													
R1 - Light Weight Sloping Roof	Rural	201,552	84.3										
	Urban	30,437	12.7										
	Total	231,989	97.0	M					VH				VH
R2 - Heavy Weight Sloping Roof	Rural	3,049	1.3										
	Urban	586	0.2										
	Total	3,635	1.5	H					H				H
R3 - Flat Roof	Rural	1,489	0.6										
	Urban	1,982	0.8										
	Total	3,471	1.4										
TOTAL HOUSES*		239,095											

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 650 mm

Housing Category : Wall Types

- Category - A :** Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B :** Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C :** Reinforced building, well built wooden structures
- Category - X :** Other materials not covered in A,B,C. These are generally light.

- Notes :** 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1 - Light Weight** (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2 - Heavy Weight** (Tiles, Stone/Slate)
- Category - R3 - Flat Roof** (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)

- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : AS 16 State : ASSAM DIMA HASAO

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
		100						100				
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	451	0.8									
	Urban	531	1.0									
	Total	982	1.8	VH					VH			
A2 - Stone Wall not packed with mortar	Rural	201	0.4									
	Urban	804	1.5									
	Total	1,005	1.9	VH					H			
Total - Category - A		1,987	3.7									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	3,004	5.5									
	Urban	6,499	12.0									
	Total	9,503	17.5	H					H			
Total - Category - B		9,503	17.5									
C1 - Concrete Wall	Rural	693	1.3									
	Urban	972	1.8									
	Total	1,665	3.1	M					L			
C2 - Wood wall	Rural	411	0.8									
	Urban	1,010	1.9									
	Total	1,421	2.7	M					VH			
Total - Category - C		3,086	5.7									
X - Other Materials	Rural	30,532	56.1									
	Urban	9,270	17.0									
	Total	39,802	73.1	M					VH			
Total - Category - X		39,802	73.2									
TOTAL HOUSES*		54,378										

ROOF												
R1 - Light Weight Sloping Roof	Rural	34,446	63.3									
	Urban	17,066	31.4									
	Total	51,512	94.7	M					VH			
R2 - Heavy Weight Sloping Roof	Rural	578	1.1									
	Urban	584	1.1									
	Total	1,162	2.2	H					H			
R3 - Flat Roof	Rural	268	0.5									
	Urban	1,436	2.6									
	Total	1,704	3.1									
<i>Damage Risk as per that for the Wall supporting it</i>												
TOTAL HOUSES*		54,378										

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 545 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
- 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
- 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low

* Total No.of Houses excluding Vacant/Locked Houses

Table No. : AS 17 State : ASSAM CACHAR

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %		
		No. of Houses	%	EQ Zone				Wind Velocity m/s						
				V	IV	III	II	55 & 50	47	44 & 39	33			
				Area in %				Area in %						
		100								100				4.8
WALL														
A1 - Mud & Unburnt Brick Wall	Rural	31,745	7.5											
	Urban	2,824	0.7											
	Total	34,569	8.2	VH					VH					
A2 - Stone Wall not packed with mortar	Rural	4,281	1.0											
	Urban	3,498	0.8											
	Total	7,779	1.8	VH					H					VH
Total - Category - A		42,348	10.0											
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	81,684	19.2											
	Urban	42,252	9.9											
	Total	123,936	29.1	H					H					H/M
Total - Category - B		123,936	29.2											
C1 - Concrete Wall	Rural	2,049	0.5											
	Urban	4,415	1.0											
	Total	6,464	1.5	M					L					L/VL
C2 - Wood wall	Rural	8,937	2.1											
	Urban	1,852	0.4											
	Total	10,789	2.5	M					VH					H
Total - Category - C		17,253	4.1											
X - Other Materials	Rural	211,463	49.8											
	Urban	29,685	7.0											
	Total	241,148	56.8	M					VH					VH
Total - Category - X		241,148	56.8											
TOTAL HOUSES*		424,685												

ROOF												
R1 - Light Weight Sloping Roof	Rural	325,776	76.7									
	Urban	59,970	14.1									
	Total	385,746	90.8	M					VH			VH
R2 - Heavy Weight Sloping Roof	Rural	7,943	1.9									
	Urban	4,989	1.2									
	Total	12,932	3.1	H					H			H
R3 - Flat Roof	Rural	6,440	1.5									
	Urban	19,567	4.6									
	Total	26,007	6.1									
<i>Damage Risk as per that for the Wall supporting it</i>												
TOTAL HOUSES*		424,685										

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 545 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
- 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
- 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low

* Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : AS 18

State : ASSAM

KARIMGANJ

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %			
		No. of Houses	%	EQ Zone				Wind Velocity m/s							
				V	IV	III	II	55 & 50	47	44 & 39	33				
				Area in %				Area in %							
				100						100					5.7
WALL															
A1 - Mud & Unburnt Brick Wall	Rural	24,134	8.4												
	Urban	751	0.3												
	Total	24,885	8.7	VH					VH						VH
A2 - Stone Wall not packed with mortar	Rural	2,514	0.9												
	Urban	729	0.3												
	Total	3,243	1.2	VH					H						VH
Total - Category - A		28,128	9.8												
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	79,984	27.7												
	Urban	19,733	6.8												
	Total	99,717	34.5	H					H						H/M
Total - Category - B		99,717	34.6												
C1 - Concrete Wall	Rural	1,204	0.4												
	Urban	840	0.3												
	Total	2,044	0.7	M					L						L/VL
C2 - Wood wall	Rural	5,079	1.8												
	Urban	500	0.2												
	Total	5,579	2.0	M					VH						H
Total - Category - C		7,623	2.6												
X - Other Materials	Rural	144,700	50.2												
	Urban	8,287	2.9												
	Total	152,987	53.1	M					VH						VH
Total - Category - X		152,987	53.0												
TOTAL HOUSES*		288,455													
ROOF															
R1 - Light Weight Sloping Roof	Rural	247,417	85.8												
	Urban	22,588	7.8												
	Total	270,005	93.6	M					VH						VH
R2 - Heavy Weight Sloping Roof	Rural	4,902	1.7												
	Urban	1,663	0.6												
	Total	6,565	2.3	H					H						H
R3 - Flat Roof	Rural	5,296	1.8												
	Urban	6,589	2.3												
	Total	11,885	4.1												
TOTAL HOUSES*		288,455													

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 545 mm

Housing Category : Wall Types

Category - A : Buildings in field-stone, rural structures, unburnt brick houses, clay houses

Category - B : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone

Category - C : Reinforced building, well built wooden structures

Category - X : Other materials not covered in A,B,C. These are generally light.

Notes : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.

2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building

3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

Category - R1 - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)

Category - R2 - Heavy Weight (Tiles, Stone/Slate)

Category - R3 - Flat Roof (Brick, Concrete)

EQ Zone V : Very High Damage Risk Zone (MSK > IX)

EQ Zone IV : High Damage Risk Zone (MSK VIII)

EQ Zone III : Moderate Damage Risk Zone (MSK VII)

EQ Zone II : Low Damage Risk Zone (MSK < VI)

Level of Risk : VH = Very High; H = High;

M = Moderate; L = Low; VL = Very Low

* Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : AS 19

State : ASSAM

HAILAKANDI

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %			
		No. of Houses	%	EQ Zone				Wind Velocity m/s							
				V	IV	III	II	55 & 50	47	44 & 39	33				
				Area in %				Area in %							
				100						100					5.6
WALL															
A1 - Mud & Unburnt Brick Wall	Rural	10,735	6.2												
	Urban	282	0.2												
	Total	11,017	6.4	VH					VH						VH
A2 - Stone Wall not packed with mortar	Rural	959	0.6												
	Urban	294	0.2												
	Total	1,253	0.8	VH					H						VH
Total - Category - A		12,270	7.1												
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	36,670	21.3												
	Urban	9,656	5.6												
	Total	46,326	26.9	H					H						H/M
Total - Category - B		46,326	26.9												
C1 - Concrete Wall	Rural	380	0.2												
	Urban	124	0.1												
	Total	504	0.3	M					L						L/VL
C2 - Wood wall	Rural	7,447	4.3												
	Urban	458	0.3												
	Total	7,905	4.6	M					VH						H
Total - Category - C		8,409	4.9												
X - Other Materials	Rural	101,006	58.6												
	Urban	4,473	2.6												
	Total	105,479	61.2	M					VH						VH
Total - Category - X		105,479	61.2												
TOTAL HOUSES*		172,484													
ROOF															
R1 - Light Weight Sloping Roof	Rural	151,903	88.1												
	Urban	12,573	7.3												
	Total	164,476	95.4	M					VH						VH
R2 - Heavy Weight Sloping Roof	Rural	3,220	1.9												
	Urban	641	0.4												
	Total	3,861	2.3	H					H						H
R3 - Flat Roof	Rural	2,074	1.2												
	Urban	2,073	1.2												
	Total	4,147	2.4												
TOTAL HOUSES*		172,484													

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 545 mm

Housing Category : Wall Types

Category - A : Buildings in field-stone, rural structures, unburnt brick houses, clay houses

Category - B : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone

Category - C : Reinforced building, well built wooden structures

Category - X : Other materials not covered in A,B,C. These are generally light.

Notes : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.

2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building

3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

Category - R1 - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)

Category - R2 - Heavy Weight (Tiles, Stone/Slate)

Category - R3 - Flat Roof (Brick, Concrete)

EQ Zone V : Very High Damage Risk Zone (MSK > IX)

EQ Zone IV : High Damage Risk Zone (MSK VIII)

EQ Zone III : Moderate Damage Risk Zone (MSK VII)

EQ Zone II : Low Damage Risk Zone (MSK < VI)

Level of Risk : VH = Very High; H = High;

M = Moderate; L = Low; VL = Very Low

* Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : AS 20 State : ASSAM BONGAIGAON

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
		100						20.1	79.9			9.2
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	3,590	1.7									
	Urban	612	0.3									
	Total	4,202	2.0	VH				VH	H			VH
A2 - Stone Wall not packed with mortar	Rural	889	0.4									
	Urban	671	0.3									
	Total	1,560	0.7	VH				H	M			VH
Total - Category - A		5,762	2.7									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	23,532	11.1									
	Urban	17,750	8.4									
	Total	41,282	19.5	H				H	M			H/M
Total - Category - B		41,282	19.5									
C1 - Concrete Wall	Rural	4,535	2.1									
	Urban	5,128	2.4									
	Total	9,663	4.5	M				L	VL			L/VL
C2 - Wood wall	Rural	2,601	1.2									
	Urban	647	0.3									
	Total	3,248	1.5	M				VH	H			H
Total - Category - C		12,911	6.1									
X - Other Materials	Rural	141,730	67.0									
	Urban	9,974	4.7									
	Total	151,704	71.7	M				VH	H			VH
Total - Category - X		151,704	71.7									
TOTAL HOUSES*		211,659										

ROOF												
R1 - Light Weight Sloping Roof	Rural	172,483	81.5									
	Urban	27,129	12.8									
	Total	199,612	94.3	M				VH	VH			VH
R2 - Heavy Weight Sloping Roof	Rural	3,511	1.7									
	Urban	1,023	0.5									
	Total	4,534	2.2	H				H	M			H
R3 - Flat Roof	Rural	883	0.4									
	Urban	6,630	3.1									
	Total	7,513	3.5									
<i>Damage Risk as per that for the Wall supporting it</i>												
TOTAL HOUSES*		211,659										

Probable Maximum Precipitation at a Station of the district in 24 hrs is 560 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
- 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
- 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low

* Total No.of Houses excluding Vacant/Locked Houses

Table No. : AS 21 State : ASSAM CHIRANG

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
		100								100		
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	5,306	3.9									
	Urban	176	0.1									
	Total	5,482	4.0	VH						H		
A2 - Stone Wall not packed with mortar	Rural	990	0.7									
	Urban	114	0.1									
	Total	1,104	0.8	VH						M		
Total - Category - A		6,586	4.8									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	11,395	8.3									
	Urban	4,927	3.6									
	Total	16,322	11.9	H						M		
Total - Category - B		16,322	11.9									
C1 - Concrete Wall	Rural	3,152	2.3									
	Urban	269	0.2									
	Total	3,421	2.5	M						VL		
C2 - Wood wall	Rural	4,116	3.0									
	Urban	345	0.3									
	Total	4,461	3.3	M						H		
Total - Category - C		7,882	5.7									
X - Other Materials	Rural	101,282	73.8									
	Urban	5,143	3.7									
	Total	106,425	77.5	M						H		
Total - Category - X		106,425	77.6									
TOTAL HOUSES*		137,215										

ROOF												
R1 - Light Weight Sloping Roof	Rural	122,756	89.5									
	Urban	10,257	7.5									
	Total	133,013	97.0	M						VH		
R2 - Heavy Weight Sloping Roof	Rural	2,393	1.7									
	Urban	457	0.3									
	Total	2,850	2.0	H						M		
R3 - Flat Roof	Rural	1,092	0.8									
	Urban	260	0.2									
	Total	1,352	1.0									
<i>Damage Risk as per that for the Wall supporting it</i>												
TOTAL HOUSES*		137,215										

Probable Maximum Precipitation at a Station of the district in one day for areal extent of 1000 sq.km. is 560 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
- 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
- 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low

* Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : AS 22 State : ASSAM KAMRUP

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %			
		No. of Houses	%	EQ Zone				Wind Velocity m/s							
				V	IV	III	II	55 & 50	47	44 & 39	33				
				Area in %				Area in %							
				100						100				9.8	
WALL															
A1 - Mud & Unburnt Brick Wall	Rural	10,070	2.4												
	Urban	1,685	0.4												
	Total	11,755	2.8	VH					VH					VH	
A2 - Stone Wall not packed with mortar	Rural	2,610	0.6												
	Urban	698	0.2												
	Total	3,308	0.8	VH					H					VH	
Total - Category - A		15,063	3.6												
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	82,154	19.5												
	Urban	19,014	4.5												
	Total	101,168	24.0	H					H					H/M	
Total - Category - B		101,168	24.0												
C1 - Concrete Wall	Rural	11,749	2.8												
	Urban	3,377	0.8												
	Total	15,126	3.6	M					L					L/VL	
C2 - Wood wall	Rural	17,510	4.2												
	Urban	2,906	0.7												
	Total	20,416	4.9	M					VH					H	
Total - Category - C		35,542	8.4												
X - Other Materials	Rural	255,867	60.7												
	Urban	13,574	3.2												
	Total	269,441	63.9	M					VH					VH	
Total - Category - X		269,441	64.0												
TOTAL HOUSES*		421,214													

ROOF															
R1 - Light Weight Sloping Roof	Rural	373,193	88.6												
	Urban	38,114	9.0												
	Total	411,307	97.6	M					VH					VH	
R2 - Heavy Weight Sloping Roof	Rural	4,467	1.1												
	Urban	656	0.2												
	Total	5,123	1.3	H					H					H	
R3 - Flat Roof	Rural	2,300	0.5												
	Urban	2,484	0.6												
	Total	4,784	1.1												
<i>Damage Risk as per that for the Wall supporting it</i>															
TOTAL HOUSES*		421,214													

Probable Maximum Precipitation at a Station of the district in one day for areal extent of 1000 sq.km. is 529 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)

- Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
 * Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : AS 23 State : ASSAM KAMRUP METROPOLITAN

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %			
		No. of Houses	%	EQ Zone				Wind Velocity m/s							
				V	IV	III	II	55 & 50	47	44 & 39	33				
				Area in %				Area in %							
				100						100					
WALL															
A1 - Mud & Unburnt Brick Wall	Rural	2,558	0.7												
	Urban	4,913	1.3												
	Total	7,471	2.0	VH					VH						
A2 - Stone Wall not packed with mortar	Rural	373	0.1												
	Urban	5,222	1.4												
	Total	5,595	1.5	VH					H						
Total - Category - A		13,066	3.4												
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	17,052	4.4												
	Urban	187,682	48.7												
	Total	204,734	53.1	H					H						
Total - Category - B		204,734	53.2												
C1 - Concrete Wall	Rural	2,104	0.5												
	Urban	51,631	13.4												
	Total	53,735	13.9	M					L						
C2 - Wood wall	Rural	1,332	0.3												
	Urban	3,789	1.0												
	Total	5,121	1.3	M					VH						
Total - Category - C		58,856	15.3												
X - Other Materials	Rural	34,198	8.9												
	Urban	74,250	19.3												
	Total	108,448	28.2	M					VH						
Total - Category - X		108,448	28.2												
TOTAL HOUSES*		385,104													

ROOF															
R1 - Light Weight Sloping Roof	Rural	55,373	14.4												
	Urban	222,106	57.7												
	Total	277,479	72.1	M					VH						
R2 - Heavy Weight Sloping Roof	Rural	784	0.2												
	Urban	11,391	3.0												
	Total	12,175	3.2	H					H						
R3 - Flat Roof	Rural	1,460	0.4												
	Urban	93,990	24.4												
	Total	95,450	24.8												
<i>Damage Risk as per that for the Wall supporting it</i>															
TOTAL HOUSES*		385,104													

Probable Maximum Precipitation at a Station of the district in one day for areal extent of 1000 sq.km. is 529 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)

- Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
 * Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : AS 24 State : ASSAM NALBARI

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %				
		No. of Houses	%	EQ Zone				Wind Velocity m/s								
				V	IV	III	II	55 & 50	47	44 & 39	33					
				Area in %				Area in %								
		100								100					54.1	
WALL																
A1 - Mud & Unburnt Brick Wall	Rural	2,559	1.1													
	Urban	427	0.2													
	Total	2,986	1.3	VH						VH						VH
A2 - Stone Wall not packed with mortar	Rural	991	0.4													
	Urban	103	-													
	Total	1,094	0.4	VH						H						VH
Total - Category - A		4,080	1.8													
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	37,297	16.0													
	Urban	9,223	4.0													
	Total	46,520	20.0	H						H						H/M
Total - Category - B		46,520	20.0													
C1 - Concrete Wall	Rural	13,702	5.9													
	Urban	6,431	2.8													
	Total	20,133	8.7	M						L						L/VL
C2 - Wood wall	Rural	3,151	1.4													
	Urban	455	0.2													
	Total	3,606	1.6	M						VH						H
Total - Category - C		23,739	10.2													
X - Other Materials	Rural	148,349	63.7													
	Urban	10,036	4.3													
	Total	158,385	68.0	M						VH						VH
Total - Category - X		158,385	68.1													
TOTAL HOUSES*		232,724														

ROOF																
R1 - Light Weight Sloping Roof	Rural	204,286	87.8													
	Urban	24,996	10.7													
	Total	229,282	98.5	M						VH						VH
R2 - Heavy Weight Sloping Roof	Rural	836	0.4													
	Urban	262	0.1													
	Total	1,098	0.5	H						H						H
R3 - Flat Roof	Rural	927	0.4													
	Urban	1,417	0.6													
	Total	2,344	1.0													
TOTAL HOUSES*		232,724														

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 503 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
- 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
- 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low

* Total No.of Houses excluding Vacant/Locked Houses

Table No. : AS 25 State : ASSAM BAKSA

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %				
		No. of Houses	%	EQ Zone				Wind Velocity m/s								
				V	IV	III	II	55 & 50	47	44 & 39	33					
				Area in %				Area in %								
		100								64.0	36.0				6.0	
WALL																
A1 - Mud & Unburnt Brick Wall	Rural	4,378	1.5													
	Urban	25	-													
	Total	4,403	1.5	VH						VH	H					VH
A2 - Stone Wall not packed with mortar	Rural	925	0.3													
	Urban	76	-													
	Total	1,001	0.3	VH						H	M					VH
Total - Category - A		5,404	1.9													
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	22,124	7.7													
	Urban	1,073	0.4													
	Total	23,197	8.1	H						H	M					H/M
Total - Category - B		23,197	8.0													
C1 - Concrete Wall	Rural	4,706	1.6													
	Urban	138	-													
	Total	4,844	1.6	M						L	VL					L/VL
C2 - Wood wall	Rural	4,288	1.5													
	Urban	92	-													
	Total	4,380	1.5	M						VH	H					H
Total - Category - C		9,224	3.2													
X - Other Materials	Rural	248,849	86.2													
	Urban	2,039	0.7													
	Total	250,888	86.9	M						VH	H					VH
Total - Category - X		250,888	86.9													
TOTAL HOUSES*		288,713														

ROOF																
R1 - Light Weight Sloping Roof	Rural	282,040	97.7													
	Urban	3,299	1.1													
	Total	285,339	98.8	M						VH	VH					VH
R2 - Heavy Weight Sloping Roof	Rural	2,061	0.7													
	Urban	72	-													
	Total	2,133	0.7	H						H	M					H
R3 - Flat Roof	Rural	1,169	0.4													
	Urban	72	-													
	Total	1,241	0.4													
TOTAL HOUSES*		288,713														

Probable Maximum Precipitation at a Station of the district in one day for areal extent of 1000 sq.km. is 560 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
- 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
- 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low

* Total No.of Houses excluding Vacant/Locked Houses

**Distribution of Houses by Predominant Materials of Roof and Wall
and Level of Damage Risk**

Table No. : AS 26 State : ASSAM DARRANG

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
		100						100				
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	2,839	1.0									
	Urban	284	0.1									
	Total	3,123	1.1	VH					VH			
A2 - Stone Wall not packed with mortar	Rural	1,040	0.4									
	Urban	203	0.1									
	Total	1,243	0.5	VH					H			
Total - Category - A		4,366	1.5									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	37,414	13.3									
	Urban	8,722	3.1									
	Total	46,136	16.4	H					H			
Total - Category - B		46,136	16.3									
C1 - Concrete Wall	Rural	4,819	1.7									
	Urban	1,845	0.7									
	Total	6,664	2.4	M					L			
C2 - Wood wall	Rural	5,017	1.8									
	Urban	405	0.1									
	Total	5,422	1.9	M					VH			
Total - Category - C		12,086	4.3									
X - Other Materials	Rural	212,353	75.2									
	Urban	7,263	2.6									
	Total	219,616	77.8	M					VH			
Total - Category - X		219,616	77.8									
TOTAL HOUSES*		282,204										
ROOF												
R1 - Light Weight Sloping Roof	Rural	261,183	92.6									
	Urban	16,971	6.0									
	Total	278,154	98.6	M					VH			
R2 - Heavy Weight Sloping Roof	Rural	1,522	0.5									
	Urban	401	0.1									
	Total	1,923	0.6	H					H			
R3 - Flat Roof	Rural	777	0.3									
	Urban	1,350	0.5									
	Total	2,127	0.8									
TOTAL HOUSES*		282,204										

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 529 mm

Housing Category : Wall Types

- Category - A :** Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B :** Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C :** Reinforced building, well built wooden structures
- Category - X :** Other materials not covered in A,B,C. These are generally light.

- Notes :** 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1 - Light Weight** (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2 - Heavy Weight** (Tiles, Stone/Slate)
- Category - R3 - Flat Roof** (Brick, Concrete)
- EQ Zone V :** Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV :** High Damage Risk Zone (MSK VIII)
- EQ Zone III :** Moderate Damage Risk Zone (MSK VII)
- EQ Zone II :** Low Damage Risk Zone (MSK < VI)

- Level of Risk : VH = Very High; H = High;
M = Moderate; L = Low; VL = Very Low
* Total No.of Houses excluding Vacant/Locked Houses

**Distribution of Houses by Predominant Materials of Roof and Wall
and Level of Damage Risk**

Table No. : AS 27 State : ASSAM UDALGURI

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
		100						86.1	8.4	5.5		
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	6,232	2.3									
	Urban	168	0.1									
	Total	6,400	2.4	VH					VH	H	M	
A2 - Stone Wall not packed with mortar	Rural	941	0.3									
	Urban	396	0.1									
	Total	1,337	0.4	VH					H	M	L	
Total - Category - A		7,737	2.8									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	43,509	15.9									
	Urban	4,971	1.8									
	Total	48,480	17.7	H					H	M	L	
Total - Category - B		48,480	17.8									
C1 - Concrete Wall	Rural	4,155	1.5									
	Urban	1,755	0.6									
	Total	5,910	2.1	M					L	VL	VL	
C2 - Wood wall	Rural	3,508	1.3									
	Urban	308	0.1									
	Total	3,816	1.4	M					VH	H	M	
Total - Category - C		9,726	3.6									
X - Other Materials	Rural	201,738	73.9									
	Urban	5,196	1.9									
	Total	206,934	75.8	M					VH	H	M	
Total - Category - X		206,934	75.8									
TOTAL HOUSES*		272,877										
ROOF												
R1 - Light Weight Sloping Roof	Rural	256,249	93.9									
	Urban	12,398	4.5									
	Total	268,647	98.4	M					VH	VH	H	
R2 - Heavy Weight Sloping Roof	Rural	2,808	1.0									
	Urban	170	0.1									
	Total	2,978	1.1	H					H	M	L	
R3 - Flat Roof	Rural	1,026	0.4									
	Urban	226	0.1									
	Total	1,252	0.5									
TOTAL HOUSES*		272,877										

Probable Maximum Precipitation at a Station of the district in one day for areal extent of 1000 sq.km. is 440 mm

Housing Category : Wall Types

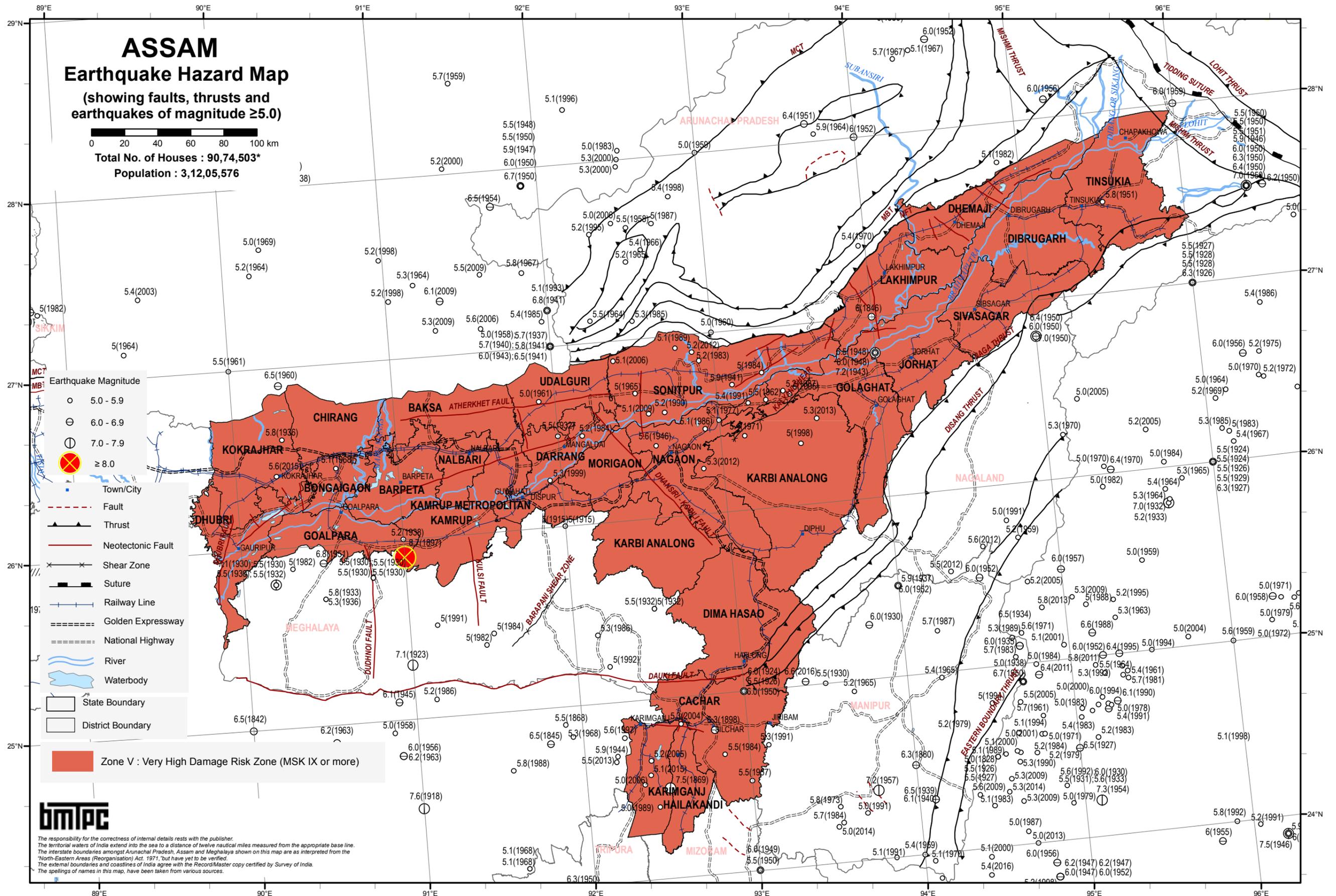
- Category - A :** Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B :** Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C :** Reinforced building, well built wooden structures
- Category - X :** Other materials not covered in A,B,C. These are generally light.

- Notes :** 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
3. Source of Housing Data : Census of Housing, GOI, 2011

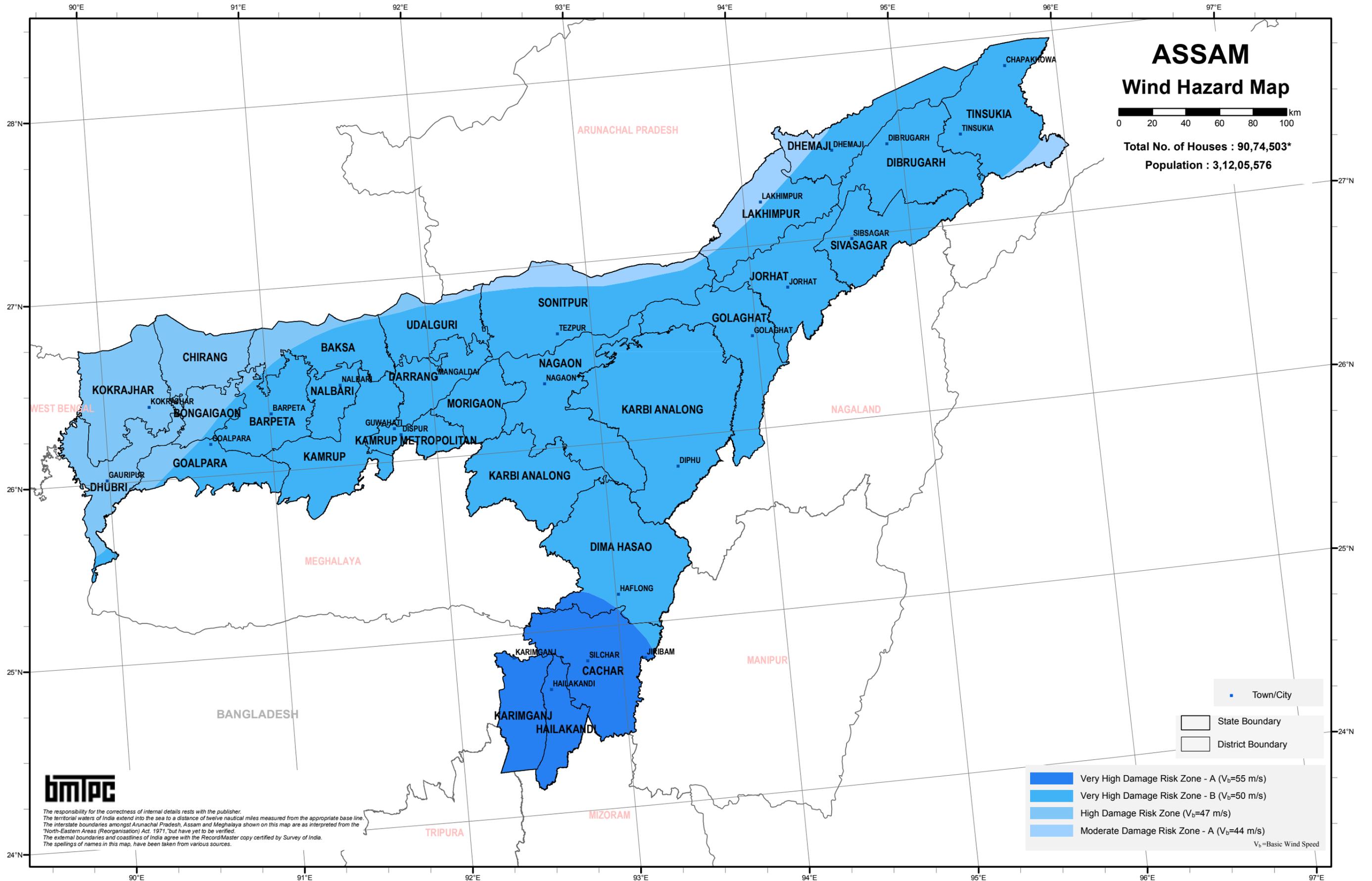
Housing Category : Roof Type

- Category - R1 - Light Weight** (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2 - Heavy Weight** (Tiles, Stone/Slate)
- Category - R3 - Flat Roof** (Brick, Concrete)
- EQ Zone V :** Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV :** High Damage Risk Zone (MSK VIII)
- EQ Zone III :** Moderate Damage Risk Zone (MSK VII)
- EQ Zone II :** Low Damage Risk Zone (MSK < VI)

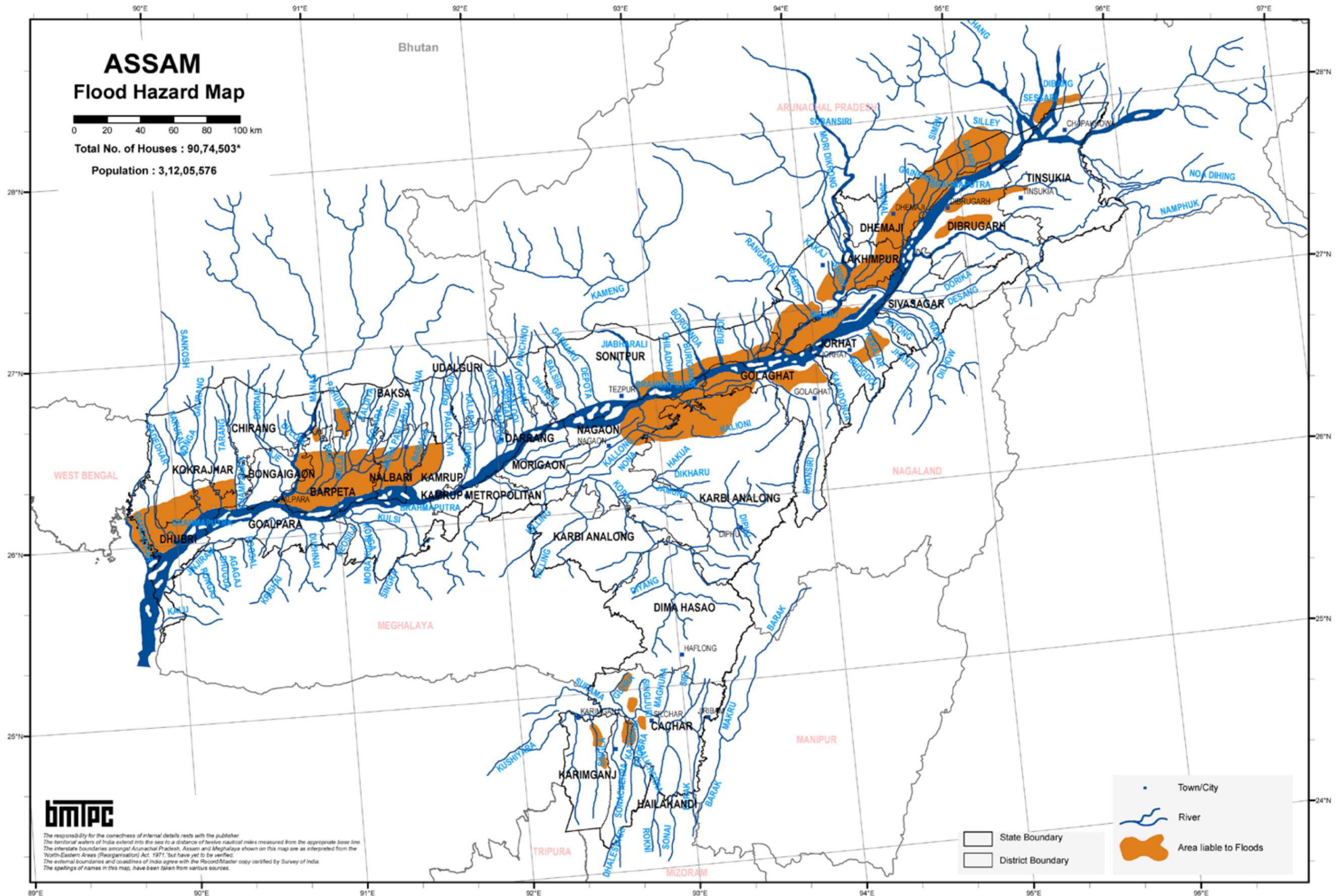
- Level of Risk : VH = Very High; H = High;
M = Moderate; L = Low; VL = Very Low
* Total No.of Houses excluding Vacant/Locked Houses



BMTPC : Vulnerability Atlas - 3rd Edition : Peer Group, MoHUA, GOI; Map is Based on digitised data of SOI; Seismic Zones of India Map IS: 1893 (Part I): 2002, BIS; Earthquake Epicentre from IMD; Seismotectonic Atlas of India and its Environs, GSI; Houses/Population as per Census 2011; *Houses including vacant & locked houses. Disclaimer: The maps are solely for thematic presentation.

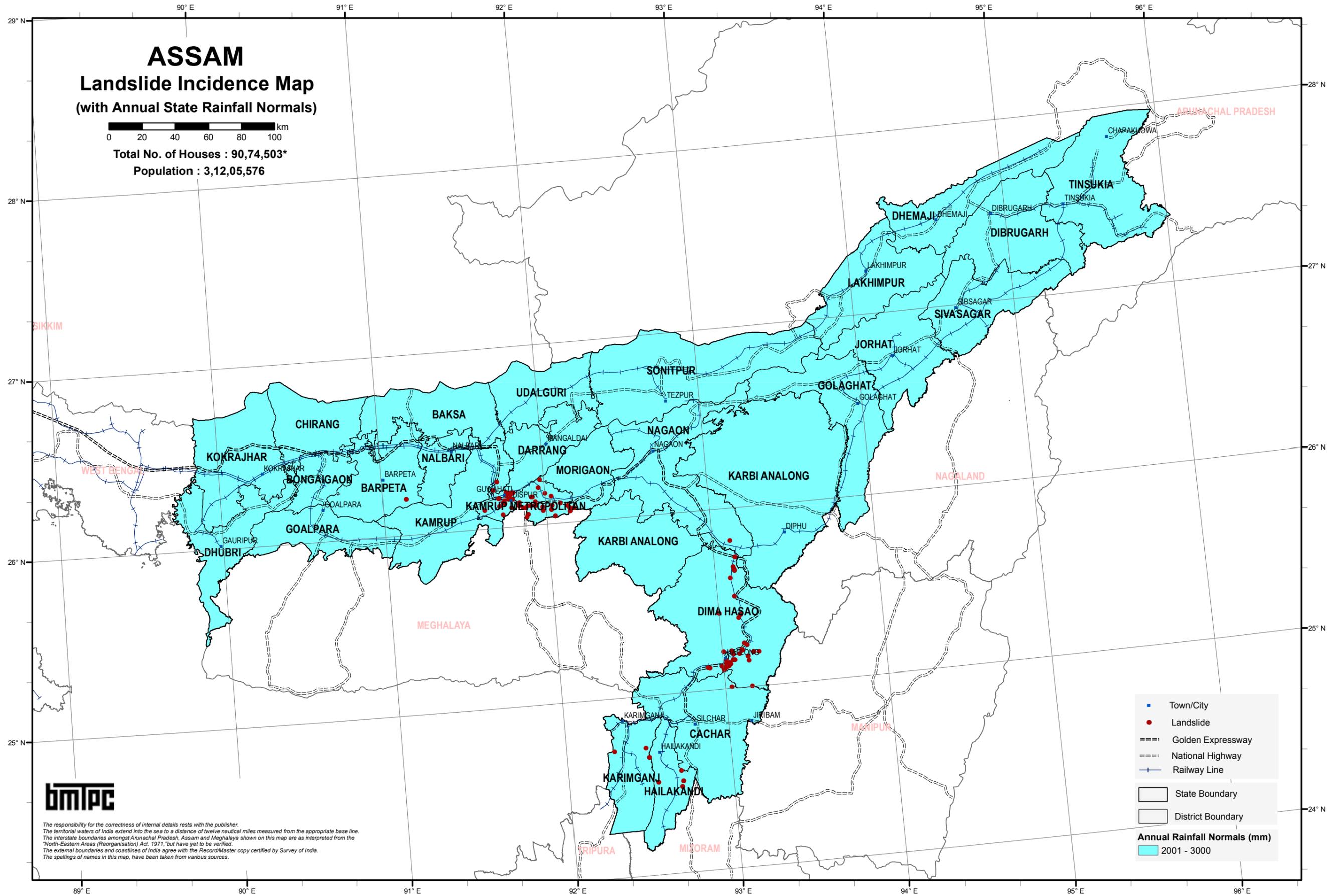


The responsibility for the correctness of internal details rests with the publisher.
The territorial waters of India extend into the sea to a distance of twelve nautical miles measured from the appropriate base line.
The interstate boundaries amongst Arunachal Pradesh, Assam and Meghalaya shown on this map are as interpreted from the "North-Eastern Areas (Reorganisation) Act, 1971", but have yet to be verified.
The external boundaries and coastlines of India agree with the Record Master copy certified by Survey of India.
The spellings of names in this map, have been taken from various sources.



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BMPIC : Vulnerability Atlas - 3rd Edition; Peer Group, MoHUA; Map is Based on digitised data of SOI, GOI; Census of India 2011; Flood Atlas (1987), Task Force Report (2004), C.W.C., G.O.I. Houses/Population as per Census 2011; * Houses including vacant & locked houses.
Disclaimer: The maps are solely for thematic presentation.



Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : BH 04 State : BIHAR SITAMARHI

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %		
		No. of Houses	%	EQ Zone				Wind Velocity m/s						
				V	IV	III	II	55 & 50	47	44 & 39	33			
				Area in %				Area in %						
		86.2	13.8							100			85.1	
WALL														
A1 - Mud & Unburnt Brick Wall	Rural	85,640	10.1											
	Urban	4,339	0.5											
	Total	89,979	10.6	VH	H					H				VH
A2 - Stone Wall not packed with mortar	Rural	3,949	0.5											
	Urban	586	0.1											
	Total	4,535	0.6	VH	H					M				VH
Total - Category - A		94,514	11.2											
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	365,234	43.3											
	Urban	32,871	3.9											
	Total	398,105	47.2	H	M					M				H/M
Total - Category - B		398,105	47.2											
C1 - Concrete Wall	Rural	2,729	0.3											
	Urban	611	0.1											
	Total	3,340	0.4	M	L					VL				L/VL
C2 - Wood wall	Rural	6,826	0.8											
	Urban	320	-											
	Total	7,146	0.8	M	L					H				H
Total - Category - C		10,486	1.2											
X - Other Materials	Rural	332,382	39.4											
	Urban	8,262	1.0											
	Total	340,644	40.4	M	VL					H				VH
Total - Category - X		340,644	40.4											
TOTAL HOUSES*		843,749												
ROOF														
R1 - Light Weight Sloping Roof	Rural	345,716	41.0											
	Urban	12,504	1.5											
	Total	358,220	42.5	M	M					VH				VH
R2 - Heavy Weight Sloping Roof	Rural	293,893	34.8											
	Urban	12,097	1.4											
	Total	305,990	36.2	H	M					M				H
R3 - Flat Roof	Rural	157,151	18.6											
	Urban	22,388	2.7											
	Total	179,539	21.3	Damage Risk as per that for the Wall supporting it										
TOTAL HOUSES*		843,749												

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 553 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)

Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
 * Total No. of Houses excluding Vacant/Locked Houses

Table No. : BH 05 State : BIHAR MADHUBANI

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %		
		No. of Houses	%	EQ Zone				Wind Velocity m/s						
				V	IV	III	II	55 & 50	47	44 & 39	33			
				Area in %				Area in %						
		100											48.5	
WALL														
A1 - Mud & Unburnt Brick Wall	Rural	107,153	10.0											
	Urban	2,875	0.3											
	Total	110,028	10.3	VH						H				VH
A2 - Stone Wall not packed with mortar	Rural	6,917	0.6											
	Urban	412	-											
	Total	7,329	0.6	VH						M				VH
Total - Category - A		117,357	11.0											
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	447,907	41.9											
	Urban	26,621	2.5											
	Total	474,528	44.4	H						M				H/M
Total - Category - B		474,528	44.4											
C1 - Concrete Wall	Rural	5,219	0.5											
	Urban	396	-											
	Total	5,615	0.5	M						VL				L/VL
C2 - Wood wall	Rural	4,361	0.4											
	Urban	159	-											
	Total	4,520	0.4	M						H				H
Total - Category - C		10,135	0.9											
X - Other Materials	Rural	457,747	42.8											
	Urban	8,528	0.8											
	Total	466,275	43.6	M						H				VH
Total - Category - X		466,275	43.6											
TOTAL HOUSES*		1,068,295												
ROOF														
R1 - Light Weight Sloping Roof	Rural	660,518	61.8											
	Urban	15,829	1.5											
	Total	676,347	63.3	M						VH				VH
R2 - Heavy Weight Sloping Roof	Rural	152,409	14.3											
	Urban	4,948	0.5											
	Total	157,357	14.8	H						M				H
R3 - Flat Roof	Rural	216,377	20.3											
	Urban	18,214	1.7											
	Total	234,591	22.0	Damage Risk as per that for the Wall supporting it										
TOTAL HOUSES*		1,068,295												

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 591 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)

Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
 * Total No. of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : BH 06 State : BIHAR SUPAUL

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %		
		No. of Houses	%	EQ Zone				Wind Velocity m/s						
				V	IV	III	II	55 & 50	47	44 & 39	33			
				Area in %				Area in %						
		100								100			58.3	
WALL														
A1 - Mud & Unburnt Brick Wall	Rural	18,935	3.2											
	Urban	997	0.2											
	Total	19,932	3.4	VH						H				VH
A2 - Stone Wall not packed with mortar	Rural	1,377	0.2											
	Urban	80	-											
	Total	1,457	0.2	VH						M				VH
Total - Category - A		21,389	3.6											
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	113,976	19.3											
	Urban	12,503	2.1											
	Total	126,479	21.4	H						M				H/M
Total - Category - B		126,479	21.4											
C1 - Concrete Wall	Rural	1,312	0.2											
	Urban	401	0.1											
	Total	1,713	0.3	M						VL				L/VL
C2 - Wood wall	Rural	1,688	0.3											
	Urban	191	-											
	Total	1,879	0.3	M						H				H
Total - Category - C		3,592	0.6											
X - Other Materials	Rural	428,395	72.4											
	Urban	11,970	2.0											
	Total	440,365	74.4	M						H				VH
Total - Category - X		440,365	74.4											
TOTAL HOUSES*		591,825												
ROOF														
R1 - Light Weight Sloping Roof	Rural	487,029	82.3											
	Urban	16,145	2.7											
	Total	503,174	85.0	M						VH				VH
R2 - Heavy Weight Sloping Roof	Rural	37,196	6.3											
	Urban	1,243	0.2											
	Total	38,439	6.5	H						M				H
R3 - Flat Roof	Rural	41,458	7.0											
	Urban	8,754	1.5											
	Total	50,212	8.5											
TOTAL HOUSES*		591,825												

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 729 mm

Housing Category : Wall Types

Category - A : Buildings in field-stone, rural structures, unburnt brick houses, clay houses

Category - B : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone

Category - C : Reinforced building, well built wooden structures

Category - X : Other materials not covered in A,B,C. These are generally light.

Notes : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.

2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building

3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

Category - R1 - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)

Category - R2 - Heavy Weight (Tiles, Stone/Slate)

Category - R3 - Flat Roof (Brick, Concrete)

EQ Zone V : Very High Damage Risk Zone (MSK > IX)

EQ Zone IV : High Damage Risk Zone (MSK VIII)

EQ Zone III : Moderate Damage Risk Zone (MSK VII)

EQ Zone II : Low Damage Risk Zone (MSK < VI)

Level of Risk : VH = Very High; H = High;

M = Moderate; L = Low; VL = Very Low

* Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : BH 07 State : BIHAR ARARIA

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %		
		No. of Houses	%	EQ Zone				Wind Velocity m/s						
				V	IV	III	II	55 & 50	47	44 & 39	33			
				Area in %				Area in %						
		84.3	15.7							100			46.9	
WALL														
A1 - Mud & Unburnt Brick Wall	Rural	18,377	2.6											
	Urban	3,193	0.5											
	Total	21,570	3.1	VH	H					H				VH
A2 - Stone Wall not packed with mortar	Rural	1,440	0.2											
	Urban	247	-											
	Total	1,687	0.2	VH	H					M				VH
Total - Category - A		23,257	3.3											
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	86,057	12.4											
	Urban	21,348	3.1											
	Total	107,405	15.5	H	M					M				H/M
Total - Category - B		107,405	15.4											
C1 - Concrete Wall	Rural	1,755	0.3											
	Urban	183	-											
	Total	1,938	0.3	M	L					VL				L/VL
C2 - Wood wall	Rural	2,402	0.3											
	Urban	740	0.1											
	Total	3,142	0.4	M	L					H				H
Total - Category - C		5,080	0.7											
X - Other Materials	Rural	543,844	78.2											
	Urban	16,107	2.3											
	Total	559,951	80.5	M	VL					H				VH
Total - Category - X		559,951	80.5											
TOTAL HOUSES*		695,693												
ROOF														
R1 - Light Weight Sloping Roof	Rural	596,282	85.7											
	Urban	18,295	2.6											
	Total	614,577	88.3	M	M					VH				VH
R2 - Heavy Weight Sloping Roof	Rural	16,029	2.3											
	Urban	8,604	1.2											
	Total	24,633	3.5	H	M					M				H
R3 - Flat Roof	Rural	41,564	6.0											
	Urban	14,919	2.1											
	Total	56,483	8.1											
TOTAL HOUSES*		695,693												

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 729 mm

Housing Category : Wall Types

Category - A : Buildings in field-stone, rural structures, unburnt brick houses, clay houses

Category - B : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone

Category - C : Reinforced building, well built wooden structures

Category - X : Other materials not covered in A,B,C. These are generally light.

Notes : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.

2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building

3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

Category - R1 - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)

Category - R2 - Heavy Weight (Tiles, Stone/Slate)

Category - R3 - Flat Roof (Brick, Concrete)

EQ Zone V : Very High Damage Risk Zone (MSK > IX)

EQ Zone IV : High Damage Risk Zone (MSK VIII)

EQ Zone III : Moderate Damage Risk Zone (MSK VII)

EQ Zone II : Low Damage Risk Zone (MSK < VI)

Level of Risk : VH = Very High; H = High;

M = Moderate; L = Low; VL = Very Low

* Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : BH 08 State : BIHAR KISHANGANJ

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %		
		No. of Houses	%	EQ Zone				Wind Velocity m/s						
				V	IV	III	II	55 & 50	47	44 & 39	33			
				Area in %				Area in %						
		18.4	81.6							100			90.2	
WALL														
A1 - Mud & Unburnt Brick Wall	Rural	17,381	4.0											
	Urban	2,442	0.6											
	Total	19,823	4.6	VH	H					H				VH
A2 - Stone Wall not packed with mortar	Rural	1,303	0.3											
	Urban	216	-											
	Total	1,519	0.3	VH	H					M				VH
Total - Category - A		21,342	4.9											
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	106,517	24.3											
	Urban	20,460	4.7											
	Total	126,977	29.0	H	M					M				H/M
Total - Category - B		126,977	29.0											
C1 - Concrete Wall	Rural	935	0.2											
	Urban	538	0.1											
	Total	1,473	0.3	M	L					VL				L/VL
C2 - Wood wall	Rural	1,135	0.3											
	Urban	365	0.1											
	Total	1,500	0.4	M	L					H				H
Total - Category - C		2,973	0.7											
X - Other Materials	Rural	269,910	61.6											
	Urban	16,865	3.8											
	Total	286,775	65.4	M	VL					H				VH
Total - Category - X		286,775	65.5											
TOTAL HOUSES*		438,067												
ROOF														
R1 - Light Weight Sloping Roof	Rural	349,834	79.9											
	Urban	23,331	5.3											
	Total	373,165	85.2	M	M					VH				VH
R2 - Heavy Weight Sloping Roof	Rural	11,334	2.6											
	Urban	3,998	0.9											
	Total	15,332	3.5	H	M					M				H
R3 - Flat Roof	Rural	36,013	8.2											
	Urban	13,557	3.1											
	Total	49,570	11.3	Damage Risk as per that for the Wall supporting it										
TOTAL HOUSES*		438,067												

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 743 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes :**
1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)

- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 - EQ Zone IV : High Damage Risk Zone (MSK VIII)
 - EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 - EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low

* Total No.of Houses excluding Vacant/Locked Houses

Table No. : BH 09 State : BIHAR PURNIA

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %				
		No. of Houses	%	EQ Zone				Wind Velocity m/s								
				V	IV	III	II	55 & 50	47	44 & 39	33					
				Area in %				Area in %								
		4.7	95.3										100			24.1
WALL																
A1 - Mud & Unburnt Brick Wall	Rural	26,901	3.4													
	Urban	2,355	0.3													
	Total	29,256	3.7	VH	H					H					VH	
A2 - Stone Wall not packed with mortar	Rural	1,776	0.2													
	Urban	661	0.1													
	Total	2,437	0.3	VH	H					M					VH	
Total - Category - A		31,693	4.0													
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	128,099	16.3													
	Urban	42,652	5.4													
	Total	170,751	21.7	H	M					M					H/M	
Total - Category - B		170,751	21.7													
C1 - Concrete Wall	Rural	2,005	0.3													
	Urban	498	0.1													
	Total	2,503	0.4	M	L					VL					L/VL	
C2 - Wood wall	Rural	1,482	0.2													
	Urban	560	0.1													
	Total	2,042	0.3	M	L					H					H	
Total - Category - C		4,545	0.6													
X - Other Materials	Rural	544,816	69.3													
	Urban	34,142	4.3													
	Total	578,958	73.6	M	VL					H					VH	
Total - Category - X		578,958	73.7													
TOTAL HOUSES*		785,947														
ROOF																
R1 - Light Weight Sloping Roof	Rural	613,347	78.0													
	Urban	45,119	5.7													
	Total	658,466	83.7	M	M					VH					VH	
R2 - Heavy Weight Sloping Roof	Rural	31,322	4.0													
	Urban	4,715	0.6													
	Total	36,037	4.6	H	M					M					H	
R3 - Flat Roof	Rural	60,410	7.7													
	Urban	31,034	3.9													
	Total	91,444	11.6	Damage Risk as per that for the Wall supporting it												
TOTAL HOUSES*		785,947														

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 736 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes :**
1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)

- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 - EQ Zone IV : High Damage Risk Zone (MSK VIII)
 - EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 - EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low

* Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : BH 12 State : BIHAR SAHARSA

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %		
		No. of Houses	%	EQ Zone				Wind Velocity m/s						
				V	IV	III	II	55 & 50	47	44 & 39	33			
				Area in %				Area in %						
		42.8	57.2							100			62.9	
WALL														
A1 - Mud & Unburnt Brick Wall	Rural	45,487	9.9											
	Urban	6,806	1.5											
	Total	52,293	11.4	VH	H					H				VH
A2 - Stone Wall not packed with mortar	Rural	1,057	0.2											
	Urban	349	0.1											
	Total	1,406	0.3	VH	H					M				VH
Total - Category - A		53,699	11.6											
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	147,531	32.0											
	Urban	25,042	5.4											
	Total	172,573	37.4	H	M					M				H/M
Total - Category - B		172,573	37.4											
C1 - Concrete Wall	Rural	1,158	0.3											
	Urban	377	0.1											
	Total	1,535	0.4	M	L					VL				L/VL
C2 - Wood wall	Rural	1,460	0.3											
	Urban	162	-											
	Total	1,622	0.3	M	L					H				H
Total - Category - C		3,157	0.7											
X - Other Materials	Rural	229,313	49.7											
	Urban	2,866	0.6											
	Total	232,179	50.3	M	VL					H				VH
Total - Category - X		232,179	50.3											
TOTAL HOUSES*		461,608												

ROOF														
R1 - Light Weight Sloping Roof	Rural	257,307	55.7											
	Urban	8,096	1.8											
	Total	265,403	57.5	M	M					VH				VH
R2 - Heavy Weight Sloping Roof	Rural	103,637	22.5											
	Urban	12,591	2.7											
	Total	116,228	25.2	H	M					M				H
R3 - Flat Roof	Rural	65,062	14.1											
	Urban	14,915	3.2											
	Total	79,977	17.3	Damage Risk as per that for the Wall supporting it										
TOTAL HOUSES*		461,608												

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 679 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes :**
1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)

Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
* Total No.of Houses excluding Vacant/Locked Houses

Table No. : BH 13 State : BIHAR DARBHANGA

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %		
		No. of Houses	%	EQ Zone				Wind Velocity m/s						
				V	IV	III	II	55 & 50	47	44 & 39	33			
				Area in %				Area in %						
		63.5	36.5											76.6
WALL														
A1 - Mud & Unburnt Brick Wall	Rural	107,669	11.1											
	Urban	7,762	0.8											
	Total	115,431	11.9	VH	H					H				VH
A2 - Stone Wall not packed with mortar	Rural	5,058	0.5											
	Urban	862	0.1											
	Total	5,920	0.6	VH	H					M				VH
Total - Category - A		121,351	12.5											
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	482,853	49.6											
	Urban	70,678	7.3											
	Total	553,531	56.9	H	M					M				H/M
Total - Category - B		553,531	56.9											
C1 - Concrete Wall	Rural	6,653	0.7											
	Urban	983	0.1											
	Total	7,636	0.8	M	L					VL				L/VL
C2 - Wood wall	Rural	4,581	0.5											
	Urban	373	-											
	Total	4,954	0.5	M	L					H				H
Total - Category - C		12,590	1.3											
X - Other Materials	Rural	276,597	28.4											
	Urban	9,034	0.9											
	Total	285,631	29.3	M	VL					H				VH
Total - Category - X		285,631	29.4											
TOTAL HOUSES*		973,103												

ROOF														
R1 - Light Weight Sloping Roof	Rural	387,380	39.8											
	Urban	28,684	2.9											
	Total	416,064	42.7	M	M					VH				VH
R2 - Heavy Weight Sloping Roof	Rural	305,764	31.4											
	Urban	14,592	1.5											
	Total	320,356	32.9	H	M					M				H
R3 - Flat Roof	Rural	190,267	19.6											
	Urban	46,416	4.8											
	Total	236,683	24.4	Damage Risk as per that for the Wall supporting it										
TOTAL HOUSES*		973,103												

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 629 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes :**
1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)

Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
* Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : BH 14 State : BIHAR MUZAFFARPUR

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %		
		No. of Houses	%	EQ Zone				Wind Velocity m/s						
				V	IV	III	II	55 & 50	47	44 & 39	33			
				Area in %				Area in %						
				2.7	97.3						100			23.9
WALL														
A1 - Mud & Unburnt Brick Wall	Rural	105,131	9.6											
	Urban	6,639	0.6											
	Total	111,770	10.2	VH	H					H				VH
A2 - Stone Wall not packed with mortar	Rural	7,405	0.7											
	Urban	1,696	0.2											
	Total	9,101	0.9	VH	H					M				VH
Total - Category - A		120,871	11.1											
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	471,713	43.2											
	Urban	87,391	8.0											
	Total	559,104	51.2	H	M					M				H/M
Total - Category - B		559,104	51.2											
C1 - Concrete Wall	Rural	6,309	0.6											
	Urban	2,071	0.2											
	Total	8,380	0.8	M	L					VL				L/VL
C2 - Wood wall	Rural	5,252	0.5											
	Urban	1,439	0.1											
	Total	6,691	0.6	M	L					H				H
Total - Category - C		15,071	1.4											
X - Other Materials	Rural	384,398	35.2											
	Urban	13,586	1.2											
	Total	397,984	36.4	M	VL					H				VH
Total - Category - X		397,984	36.4											
TOTAL HOUSES*		1,093,030												

ROOF														
R1 - Light Weight Sloping Roof	Rural	538,908	49.3											
	Urban	32,637	3.0											
	Total	571,545	52.3	M	M					VH				VH
R2 - Heavy Weight Sloping Roof	Rural	206,085	18.9											
	Urban	13,278	1.2											
	Total	219,363	20.1	H	M					M				H
R3 - Flat Roof	Rural	235,215	21.5											
	Urban	66,907	6.1											
	Total	302,122	27.6	<i>Damage Risk as per that for the Wall supporting it</i>										
TOTAL HOUSES*		1,093,030												

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 576 mm

Housing Category : Wall Types

- Category - A :** Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B :** Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C :** Reinforced building, well built wooden structures
- Category - X :** Other materials not covered in A,B,C. These are generally light.

- Notes :**
1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1 - Light Weight** (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2 - Heavy Weight** (Tiles, Stone/Slate)
- Category - R3 - Flat Roof** (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)

Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
* Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : BH 15 State : BIHAR GOPALGANJ

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %		
		No. of Houses	%	EQ Zone				Wind Velocity m/s						
				V	IV	III	II	55 & 50	47	44 & 39	33			
				Area in %				Area in %						
WALL														
A1 - Mud & Unburnt Brick Wall	Rural	25,578	4.7											
	Urban	2,246	0.4											
	Total	27,824	5.1							H				H
A2 - Stone Wall not packed with mortar	Rural	7,084	1.3											
	Urban	513	0.1											
	Total	7,597	1.4							H				M
Total - Category - A		35,421	6.6											
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	340,483	63.0											
	Urban	27,750	5.1											
	Total	368,233	68.1							M				M
Total - Category - B		368,233	68.2											
C1 - Concrete Wall	Rural	2,511	0.5											
	Urban	207	-											
	Total	2,718	0.5							L				VL
C2 - Wood wall	Rural	3,124	0.6											
	Urban	172	-											
	Total	3,296	0.6							L				H
Total - Category - C		6,014	1.1											
X - Other Materials	Rural	126,337	23.4											
	Urban	4,091	0.8											
	Total	130,428	24.2							VL				H
Total - Category - X		130,428	24.1											
TOTAL HOUSES*		540,096												

ROOF														
R1 - Light Weight Sloping Roof	Rural	215,436	39.9											
	Urban	10,185	1.9											
	Total	225,621	41.8							M				VH
R2 - Heavy Weight Sloping Roof	Rural	32,668	6.0											
	Urban	1,883	0.3											
	Total	34,551	6.3							M				M
R3 - Flat Roof	Rural	257,013	47.6											
	Urban	22,911	4.2											
	Total	279,924	51.8	<i>Damage Risk as per that for the Wall supporting it</i>										
TOTAL HOUSES*		540,096												

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 523 mm

Housing Category : Wall Types

- Category - A :** Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B :** Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C :** Reinforced building, well built wooden structures
- Category - X :** Other materials not covered in A,B,C. These are generally light.

- Notes :**
1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1 - Light Weight** (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2 - Heavy Weight** (Tiles, Stone/Slate)
- Category - R3 - Flat Roof** (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)

Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
* Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : BH 16 State : BIHAR SIWAN

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %		
		No. of Houses	%	EQ Zone				Wind Velocity m/s						
				V	IV	III	II	55 & 50	47	44 & 39	33			
				Area in %				Area in %						
				96.0	4.0					100			15.2	
WALL														
A1 - Mud & Unburnt Brick Wall	Rural	55,978	8.5											
	Urban	2,273	0.3											
	Total	58,251	8.8		H	M				H				VH
A2 - Stone Wall not packed with mortar	Rural	8,023	1.2											
	Urban	505	0.1											
	Total	8,528	1.3		H	M				M				VH
Total - Category - A		66,779	10.2											
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	480,257	73.3											
	Urban	34,119	5.2											
	Total	514,376	78.5		M	L				M				H/M
Total - Category - B		514,376	78.5											
C1 - Concrete Wall	Rural	3,824	0.6											
	Urban	706	0.1											
	Total	4,530	0.7		L	VL				VL				L/ VL
C2 - Wood wall	Rural	2,974	0.5											
	Urban	222	-											
	Total	3,196	0.5		L	VL				H				H
Total - Category - C		7,726	1.2											
X - Other Materials	Rural	65,107	9.9											
	Urban	1,142	0.2											
	Total	66,249	10.1		VL	VL				H				VH
Total - Category - X		66,249	10.1											
TOTAL HOUSES*		655,130												
ROOF														
R1 - Light Weight Sloping Roof	Rural	189,332	28.9											
	Urban	6,532	1.0											
	Total	195,864	29.9		M	L				VH				VH
R2 - Heavy Weight Sloping Roof	Rural	45,983	7.0											
	Urban	2,158	0.3											
	Total	48,141	7.3		M	L				M				H
R3 - Flat Roof	Rural	380,848	58.1											
	Urban	30,277	4.6											
	Total	411,125	62.7											
TOTAL HOUSES*		655,130												

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 523 mm

Housing Category : Wall Types
Category - A : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
Category - B : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
Category - C : Reinforced building, well built wooden structures
Category - X : Other materials not covered in A,B,C. These are generally light.

Notes : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and chocked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type
Category - R1 - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
Category - R2 - Heavy Weight (Tiles, Stone/Slate)
Category - R3 - Flat Roof (Brick, Concrete)
 EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
 Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
 * Total No.of Houses excluding Vacant/Locked Houses

Table No. : BH 17 State : BIHAR SARAN

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %		
		No. of Houses	%	EQ Zone				Wind Velocity m/s						
				V	IV	III	II	55 & 50	47	44 & 39	33			
				Area in %				Area in %						
				100						100			12.6	
WALL														
A1 - Mud & Unburnt Brick Wall	Rural	116,501	15.5											
	Urban	8,696	1.2											
	Total	125,197	16.7		H					H				VH
A2 - Stone Wall not packed with mortar	Rural	9,766	1.3											
	Urban	868	0.1											
	Total	10,634	1.4		H					M				VH
Total - Category - A		135,831	18.1											
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	452,888	60.2											
	Urban	54,463	7.2											
	Total	507,351	67.4		M					M				H/M
Total - Category - B		507,351	67.4											
C1 - Concrete Wall	Rural	5,008	0.7											
	Urban	1,046	0.1											
	Total	6,054	0.8		L					VL				L/ VL
C2 - Wood wall	Rural	5,180	0.7											
	Urban	649	0.1											
	Total	5,829	0.8		L					H				H
Total - Category - C		11,883	1.6											
X - Other Materials	Rural	92,092	12.2											
	Urban	5,163	0.7											
	Total	97,255	12.9		VL					H				VH
Total - Category - X		97,255	12.9											
TOTAL HOUSES*		752,320												
ROOF														
R1 - Light Weight Sloping Roof	Rural	240,791	32.0											
	Urban	18,495	2.5											
	Total	259,286	34.5		M					VH				VH
R2 - Heavy Weight Sloping Roof	Rural	113,148	15.0											
	Urban	9,032	1.2											
	Total	122,180	16.2		M					M				H
R3 - Flat Roof	Rural	327,496	43.5											
	Urban	43,358	5.8											
	Total	370,854	49.3											
TOTAL HOUSES*		752,320												

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 523 mm

Housing Category : Wall Types
Category - A : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
Category - B : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
Category - C : Reinforced building, well built wooden structures
Category - X : Other materials not covered in A,B,C. These are generally light.

Notes : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and chocked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type
Category - R1 - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
Category - R2 - Heavy Weight (Tiles, Stone/Slate)
Category - R3 - Flat Roof (Brick, Concrete)
 EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
 Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
 * Total No.of Houses excluding Vacant/Locked Houses

**Distribution of Houses by Predominant Materials of Roof and Wall
and Level of Damage Risk**

Table No. : BH 18 State : BIHAR VAISHALI

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
		100					100					
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	127,860	17.4									
	Urban	6,422	0.9									
	Total	134,282	18.3		H				H			
A2 - Stone Wall not packed with mortar	Rural	5,162	0.7									
	Urban	602	0.1									
	Total	5,764	0.8		H				M			
Total - Category - A		140,046	19.1									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	346,429	47.3									
	Urban	34,646	4.7									
	Total	381,075	52.0		M				M			
Total - Category - B		381,075	52.0									
C1 - Concrete Wall	Rural	6,216	0.8									
	Urban	888	0.1									
	Total	7,104	0.9		L				VL			
C2 - Wood wall	Rural	2,913	0.4									
	Urban	181	-									
	Total	3,094	0.4		L				H			
Total - Category - C		10,198	1.4									
X - Other Materials	Rural	196,422	26.8									
	Urban	4,992	0.7									
	Total	201,414	27.5		VL				H			
Total - Category - X		201,414	27.5									
TOTAL HOUSES*		732,733										
ROOF												
R1 - Light Weight Sloping Roof	Rural	337,844	46.1									
	Urban	14,320	2.0									
	Total	352,164	48.1		M				VH			
R2 - Heavy Weight Sloping Roof	Rural	141,786	19.4									
	Urban	8,996	1.2									
	Total	150,782	20.6		M				M			
R3 - Flat Roof	Rural	205,372	28.0									
	Urban	24,415	3.3									
	Total	229,787	31.3									
TOTAL HOUSES*		732,733										

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 523 mm

Housing Category : Wall Types

- Category - A :** Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B :** Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C :** Reinforced building, well built wooden structures
- Category - X :** Other materials not covered in A,B,C. These are generally light.

- Notes :** 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1 -** Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2 -** Heavy Weight (Tiles, Stone/Slate)
- Category - R3 -** Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;

M = Moderate; L = Low; VL = Very Low
* Total No.of Houses excluding Vacant/Locked Houses

**Distribution of Houses by Predominant Materials of Roof and Wall
and Level of Damage Risk**

Table No. : BH 19 State : BIHAR SAMASTIPUR

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
		100					100				25.0	
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	156,156	15.2									
	Urban	4,177	0.4									
	Total	160,333	15.6		H				H			VH
A2 - Stone Wall not packed with mortar	Rural	5,455	0.5									
	Urban	223	-									
	Total	5,678	0.5		H				M			VH
Total - Category - A		166,011	16.1									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	485,749	47.2									
	Urban	29,743	2.9									
	Total	515,492	50.1		M				M			H/M
Total - Category - B		515,492	50.1									
C1 - Concrete Wall	Rural	6,110	0.6									
	Urban	691	0.1									
	Total	6,801	0.7		L				VL			L/VL
C2 - Wood wall	Rural	8,258	0.8									
	Urban	632	0.1									
	Total	8,890	0.9		L				H			H
Total - Category - C		15,691	1.5									
X - Other Materials	Rural	327,493	31.8									
	Urban	4,210	0.4									
	Total	331,703	32.2		VL				H			VH
Total - Category - X		331,703	32.2									
TOTAL HOUSES*		1,028,897										
ROOF												
R1 - Light Weight Sloping Roof	Rural	426,729	41.5									
	Urban	9,452	0.9									
	Total	436,181	42.4		M				VH			VH
R2 - Heavy Weight Sloping Roof	Rural	332,265	32.3									
	Urban	5,888	0.6									
	Total	338,153	32.9		M				M			H
R3 - Flat Roof	Rural	230,227	22.4									
	Urban	24,336	2.4									
	Total	254,563	24.8									
TOTAL HOUSES*		1,028,897										

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 629 mm

Housing Category : Wall Types

- Category - A :** Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B :** Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C :** Reinforced building, well built wooden structures
- Category - X :** Other materials not covered in A,B,C. These are generally light.

- Notes :** 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1 -** Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2 -** Heavy Weight (Tiles, Stone/Slate)
- Category - R3 -** Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;

M = Moderate; L = Low; VL = Very Low
* Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : BH 28 State : BIHAR PATNA

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %		
		No. of Houses	%	EQ Zone				Wind Velocity m/s						
				V	IV	III	II	55 & 50	47	44 & 39	33			
				Area in %				Area in %						
					87.2	12.8				100			55.2	
WALL														
A1 - Mud & Unburnt Brick Wall	Rural	182,767	16.0											
	Urban	40,155	3.5											
	Total	222,922	19.5		H	M				H				VH
A2 - Stone Wall not packed with mortar	Rural	10,893	1.0											
	Urban	7,661	0.7											
	Total	18,554	1.7		H	M				M				VH
Total - Category - A		241,476	21.2											
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	384,909	33.7											
	Urban	423,078	37.1											
	Total	807,987	70.8		M	L				M				H/M
Total - Category - B		807,987	70.8											
C1 - Concrete Wall	Rural	6,910	0.6											
	Urban	18,144	1.6											
	Total	25,054	2.2		L	VL				VL				L/VL
C2 - Wood wall	Rural	1,218	0.1											
	Urban	1,176	0.1											
	Total	2,394	0.2		L	VL				H				H
Total - Category - C		27,448	2.4											
X - Other Materials	Rural	46,535	4.1											
	Urban	17,936	1.6											
	Total	64,471	5.7		VL	VL				H				VH
Total - Category - X		64,471	5.6											
TOTAL HOUSES*		1,141,382												
ROOF														
R1 - Light Weight Sloping Roof	Rural	192,531	16.9											
	Urban	79,223	6.9											
	Total	271,754	23.8		M	L				VH				VH
R2 - Heavy Weight Sloping Roof	Rural	148,488	13.0											
	Urban	50,736	4.4											
	Total	199,224	17.4		M	L				M				H
R3 - Flat Roof	Rural	292,213	25.6											
	Urban	378,191	33.1											
	Total	670,404	58.7											
TOTAL HOUSES*		1,141,382												

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 550 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes :**
1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)

- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 - EQ Zone IV : High Damage Risk Zone (MSK VIII)
 - EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 - EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low

* Total No.of Houses excluding Vacant/Locked Houses

Table No. : BH 29 State : BIHAR BHOJPUR

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %		
		No. of Houses	%	EQ Zone				Wind Velocity m/s						
				V	IV	III	II	55 & 50	47	44 & 39	33			
				Area in %				Area in %						
					15.9	84.1				100			4.9	
WALL														
A1 - Mud & Unburnt Brick Wall	Rural	112,399	22.8											
	Urban	9,768	2.0											
	Total	122,167	24.8		H	M				H				VH
A2 - Stone Wall not packed with mortar	Rural	7,720	1.6											
	Urban	1,549	0.3											
	Total	9,269	1.9		H	M				M				VH
Total - Category - A		131,436	26.7											
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	263,249	53.5											
	Urban	56,803	11.5											
	Total	320,052	65.0		M	L				M				H/M
Total - Category - B		320,052	65.0											
C1 - Concrete Wall	Rural	3,698	0.8											
	Urban	1,138	0.2											
	Total	4,836	1.0		L	VL				VL				L/VL
C2 - Wood wall	Rural	1,491	0.3											
	Urban	279	0.1											
	Total	1,770	0.4		L	VL				H				H
Total - Category - C		6,606	1.3											
X - Other Materials	Rural	31,715	6.4											
	Urban	2,413	0.5											
	Total	34,128	6.9		VL	VL				H				VH
Total - Category - X		34,128	6.9											
TOTAL HOUSES*		492,222												
ROOF														
R1 - Light Weight Sloping Roof	Rural	106,967	21.7											
	Urban	12,200	2.5											
	Total	119,167	24.2		M	L				VH				VH
R2 - Heavy Weight Sloping Roof	Rural	239,643	48.7											
	Urban	17,443	3.5											
	Total	257,086	52.2		M	L				M				H
R3 - Flat Roof	Rural	73,662	15.0											
	Urban	42,307	8.6											
	Total	115,969	23.6											
TOTAL HOUSES*		492,222												

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 523 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes :**
1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)

- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 - EQ Zone IV : High Damage Risk Zone (MSK VIII)
 - EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 - EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low

* Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : BH 32 State : BIHAR ROHTAS

Wall / Roof	Census Houses		Level of Risk under										
	No. of Houses	%	EQ Zone				Wind Velocity m/s				Flood Prone Area in %		
			V	IV	III	II	55 & 50	47	44 & 39	33			
			Area in %				Area in %						
					100					72.6	27.4		2.1
WALL													
A1 - Mud & Unburnt Brick Wall	Rural	174,980	30.0										
	Urban	13,661	2.3										
	Total	188,641	32.3			M				H	M		VH
A2 - Stone Wall not packed with mortar	Rural	8,130	1.4										
	Urban	1,641	0.3										
	Total	9,771	1.7			M				M	L		VH
Total - Category - A		198,412	34.0										
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	287,509	49.2										
	Urban	68,592	11.7										
	Total	356,101	60.9			L				M	L		H/M
Total - Category - B		356,101	61.0										
C1 - Concrete Wall	Rural	3,767	0.6										
	Urban	1,560	0.3										
	Total	5,327	0.9			VL				VL	VL		L/VL
C2 - Wood wall	Rural	1,243	0.2										
	Urban	190	-										
	Total	1,433	0.2			VL				H	M		H
Total - Category - C		6,760	1.2										
X - Other Materials	Rural	20,708	3.5										
	Urban	2,236	0.4										
	Total	22,944	3.9			VL				H	M		VH
Total - Category - X		22,944	3.9										
TOTAL HOUSES*		584,217											
ROOF													
R1 - Light Weight Sloping Roof	Rural	110,232	18.9										
	Urban	14,538	2.5										
	Total	124,770	21.4			L				VH	H		VH
R2 - Heavy Weight Sloping Roof	Rural	269,320	46.1										
	Urban	24,712	4.2										
	Total	294,032	50.3			L				M	L		H
R3 - Flat Roof	Rural	116,785	20.0										
	Urban	48,630	8.3										
	Total	165,415	28.3										
TOTAL HOUSES*		584,217											

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 523 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes :**
1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)

Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
* Total No.of Houses excluding Vacant/Locked Houses

Table No. : BH 33 State : BIHAR AURANGABAD

Wall / Roof	Census Houses		Level of Risk under													
	No. of Houses	%	EQ Zone				Wind Velocity m/s				Flood Prone Area in %					
			V	IV	III	II	55 & 50	47	44 & 39	33						
			Area in %				Area in %									
					100								34.4	65.6		11.3
WALL																
A1 - Mud & Unburnt Brick Wall	Rural	198,090	42.8													
	Urban	7,806	1.7													
	Total	205,896	44.5			M				H	M			VH		
A2 - Stone Wall not packed with mortar	Rural	3,530	0.8													
	Urban	958	0.2													
	Total	4,488	1.0			M				M	L			VH		
Total - Category - A		210,384	45.4													
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	189,214	40.9													
	Urban	34,449	7.4													
	Total	223,663	48.3			L				M	L			H/M		
Total - Category - B		223,663	48.3													
C1 - Concrete Wall	Rural	3,636	0.8													
	Urban	1,212	0.3													
	Total	4,848	1.1			VL				VL	VL			L/VL		
C2 - Wood wall	Rural	862	0.2													
	Urban	193	-													
	Total	1,055	0.2			VL				H	M			H		
Total - Category - C		5,903	1.3													
X - Other Materials	Rural	21,714	4.7													
	Urban	1,516	0.3													
	Total	23,230	5.0			VL				H	M			VH		
Total - Category - X		23,230	5.0													
TOTAL HOUSES*		463,180														
ROOF																
R1 - Light Weight Sloping Roof	Rural	129,874	28.0													
	Urban	7,201	1.6													
	Total	137,075	29.6			L				VH	H			VH		
R2 - Heavy Weight Sloping Roof	Rural	146,391	31.6													
	Urban	9,140	2.0													
	Total	155,531	33.6			L				M	L			H		
R3 - Flat Roof	Rural	140,781	30.4													
	Urban	29,793	6.4													
	Total	170,574	36.8													
TOTAL HOUSES*		463,180														

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 530 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes :**
1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)

Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
* Total No.of Houses excluding Vacant/Locked Houses

**Distribution of Houses by Predominant Materials of Roof and Wall
and Level of Damage Risk**

Table No. : BH 38 State : BIHAR ARWAL

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %				
		No. of Houses	%	EQ Zone				Wind Velocity m/s								
				V	IV	III	II	55 & 50	47	44 & 39	33					
				Area in %				Area in %								
						100					100				60.6	
WALL																
A1 - Mud & Unburnt Brick Wall	Rural	51,179	36.7													
	Urban	2,013	1.4													
	Total	53,192	38.1			M					H					VH
A2 - Stone Wall not packed with mortar	Rural	1,506	1.1													
	Urban	182	0.1													
	Total	1,688	1.2			M				M						VH
Total - Category - A		54,880	39.3													
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	71,716	51.4													
	Urban	7,025	5.0													
	Total	78,741	56.4			L				M						H/M
Total - Category - B		78,741	56.4													
C1 - Concrete Wall	Rural	1,064	0.8													
	Urban	94	0.1													
	Total	1,158	0.9			VL				VL						L/VL
C2 - Wood wall	Rural	245	0.2													
	Urban	16	-													
	Total	261	0.2			VL				H						H
Total - Category - C		1,419	1.0													
X - Other Materials	Rural	4,377	3.1													
	Urban	144	0.1													
	Total	4,521	3.2			VL				H						VH
Total - Category - X		4,521	3.2													
TOTAL HOUSES*		139,561														
ROOF																
R1 - Light Weight Sloping Roof	Rural	44,595	32.0													
	Urban	1,483	1.1													
	Total	46,078	33.1			L				VH						VH
R2 - Heavy Weight Sloping Roof	Rural	43,826	31.4													
	Urban	2,580	1.8													
	Total	46,406	33.2			L				M						H
R3 - Flat Roof	Rural	41,666	29.9													
	Urban	5,411	3.9													
	Total	47,077	33.8													
TOTAL HOUSES*		139,561														

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 578 mm

Housing Category : Wall Types

Category - A : Buildings in field-stone, rural structures, unburnt brick houses, clay houses

Category - B : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone

Category - C : Reinforced building, well built wooden structures

Category - X : Other materials not covered in A,B,C. These are generally light.

Notes : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.

2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building

3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

Category - R1 - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)

Category - R2 - Heavy Weight (Tiles, Stone/Slate)

Category - R3 - Flat Roof (Brick, Concrete)

EQ Zone V : Very High Damage Risk Zone (MSK > IX)

EQ Zone IV : High Damage Risk Zone (MSK VIII)

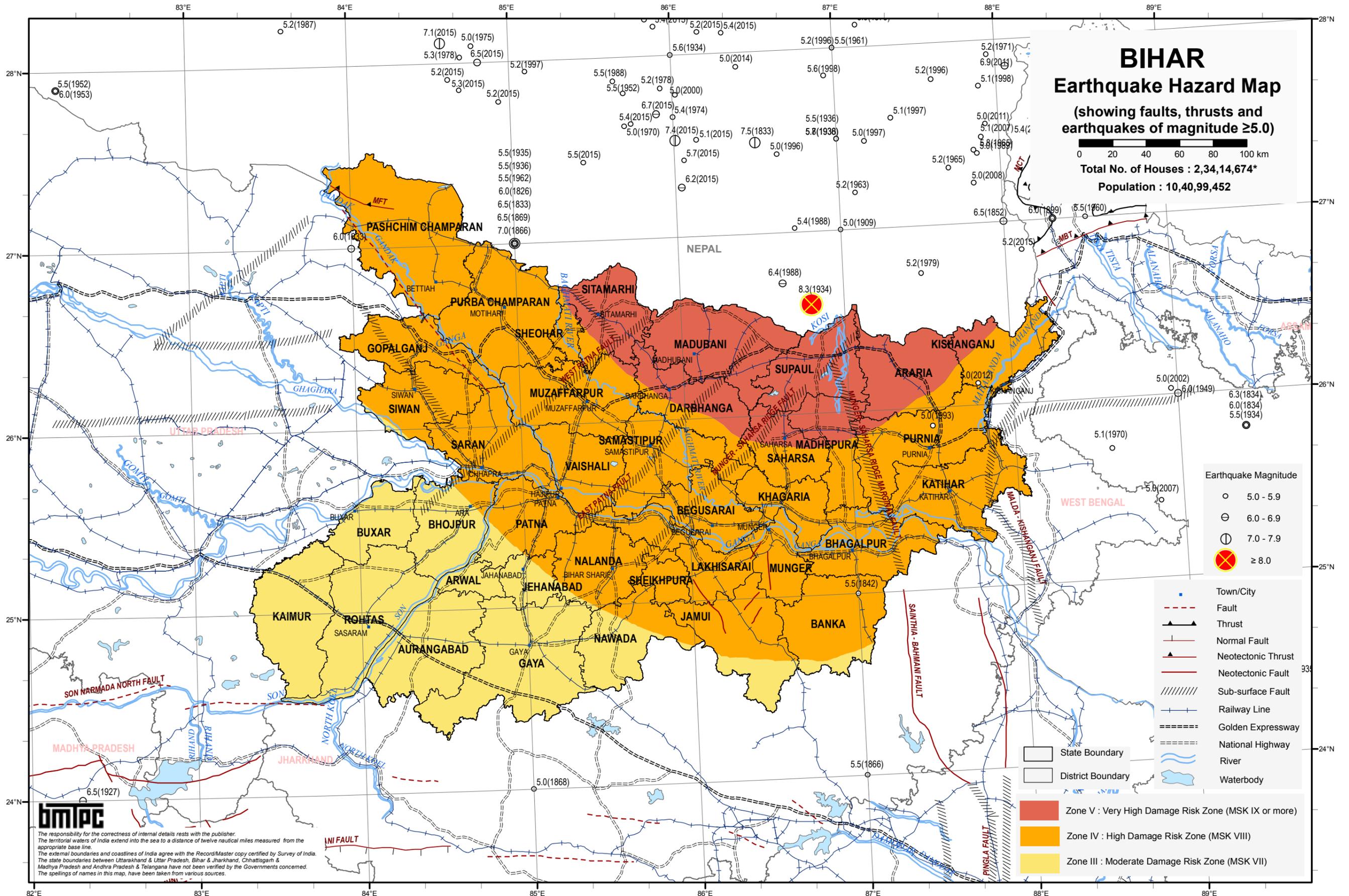
EQ Zone III : Moderate Damage Risk Zone (MSK VII)

EQ Zone II : Low Damage Risk Zone (MSK < VI)

Level of Risk : VH = Very High; H = High;

M = Moderate; L = Low; VL = Very Low

* Total No.of Houses excluding Vacant/Locked Houses



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The territorial waters of India extend into the sea to a distance of twelve nautical miles measured from the appropriate base line.
The external boundaries and coastlines of India agree with the Record Master copy certified by Survey of India.
The state boundaries between Uttarakhand & Uttar Pradesh, Bihar & Jharkhand, Chhattisgarh & Madhya Pradesh and Andhra Pradesh & Telangana have not been verified by the Governments concerned.
The spellings of names in this map, have been taken from various sources.

BMTPC : Vulnerability Atlas - 3rd Edition : Peer Group, MoHUA, GOI; Map is Based on digitised data of SOI; Seismic Zones of India Map IS: 1893 (Part I): 2002, BIS; Earthquake Epicentre from IMD; Seismotectonic Atlas of India and its Environs, GSI; Houses/Population as per Census 2011; *Houses including vacant & locked houses. Disclaimer: The maps are solely for thematic presentation.



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 The spellings of names in this map, have been taken from various sources.

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

CHHATTISGARH

Wall / Roof		Census Houses		Level of Risk under									Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
				Area in %				Area in %					
STATE - CHHATTISGARH													
WALL													
A1 - Mud & Unburnt Brick Wall	Rural	3,515,942	55.3										
	Urban	403,885	6.3										
	Total	3,919,827	61.6			M	L				M		
A2 - Stone Wall not packed with mortar	Rural	110,865	1.7										
	Urban	14,730	0.2										
	Total	125,595	1.9			M	L			L			
Total - Category - A		4,045,422	63.6										
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	1,133,013	17.8										
	Urban	983,896	15.5										
	Total	2,116,909	33.3			L	VL			L			
Total - Category - B		2,116,909	33.3										
C1 - Concrete Wall	Rural	25,793	0.4										
	Urban	26,695	0.4										
	Total	52,488	0.8			VL	VL			VL			
C2 - Wood wall	Rural	30,451	0.5										
	Urban	7,147	0.1										
	Total	37,598	0.6			VL	VL			M			
Total - Category - C		90,086	1.4										
X - Other Materials	Rural	80,836	1.3										
	Urban	27,858	0.4										
	Total	108,694	1.7			VL	VL			M			
Total - Category - X		108,694	1.7										
TOTAL HOUSES*		6,361,111											

ROOF												
R1 - Light Weight Sloping Roof	Rural	533,256	8.4									
	Urban	268,487	4.2									
	Total	801,743	12.6			L	VL			H		
R2 - Heavy Weight Sloping Roof	Rural	3,758,281	59.1									
	Urban	490,440	7.7									
	Total	4,248,721	66.8			L	VL			L		
R3 - Flat Roof	Rural	605,363	9.5									
	Urban	705,284	11.1									
	Total	1,310,647	20.6									
TOTAL HOUSES*												6,361,111

Housing Category : Wall Types

Category - A : Buildings in field-stone, rural structures, unburnt brick houses, clay houses

Category - B : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone

Category - C : Reinforced building, well built wooden structures

Category - X : Other materials not covered in A,B,C. These are generally light.

Notes : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.

2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building

3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

Category - R1 - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)

Category - R2 - Heavy Weight (Tiles, Stone/Slate)

Category - R3 - Flat Roof (Brick, Concrete)

EQ Zone V : Very High Damage Risk Zone (MSK > IX)

EQ Zone IV : High Damage Risk Zone (MSK VIII)

EQ Zone III : Moderate Damage Risk Zone (MSK VII)

EQ Zone II : Low Damage Risk Zone (MSK < VI)

Level of Risk : VH = Very High; H = High;

M = Moderate; L = Low; VL = Very Low

* Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : CT 01

State : CHHATTISGARH

KORIYA

Wall / Roof		Census Houses		Level of Risk under									Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
				Area in %				Area in %					
STATE - CHHATTISGARH													
WALL													
A1 - Mud & Unburnt Brick Wall	Rural	102,779	60.8										
	Urban	16,040	9.5										
	Total	118,819	70.3			M				M			
A2 - Stone Wall not packed with mortar	Rural	139	0.1										
	Urban	309	0.2										
	Total	448	0.3			M				L			
Total - Category - A		119,267	70.6										
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	11,985	7.1										
	Urban	35,727	21.1										
	Total	47,712	28.2			L				L			
Total - Category - B		47,712	28.2										
C1 - Concrete Wall	Rural	154	0.1										
	Urban	374	0.2										
	Total	528	0.3			VL				VL			
C2 - Wood wall	Rural	52	-										
	Urban	38	-										
	Total	90	-			VL				M			
Total - Category - C		618	0.4										
X - Other Materials	Rural	709	0.4										
	Urban	727	0.4										
	Total	1,436	0.8			VL				M			
Total - Category - X		1,436	0.8										
TOTAL HOUSES*		169,033											

ROOF												
R1 - Light Weight Sloping Roof	Rural	9,738	5.8									
	Urban	17,463	10.3									
	Total	27,201	16.1			L				H		
R2 - Heavy Weight Sloping Roof	Rural	97,891	57.9									
	Urban	16,536	9.8									
	Total	114,427	67.7			L				L		
R3 - Flat Roof	Rural	8,189	4.8									
	Urban	19,216	11.4									
	Total	27,405	16.2									
TOTAL HOUSES*												169,033

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 443 mm

Housing Category : Wall Types

Category - A : Buildings in field-stone, rural structures, unburnt brick houses, clay houses

Category - B : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone

Category - C : Reinforced building, well built wooden structures

Category - X : Other materials not covered in A,B,C. These are generally light.

Notes : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.

2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building

3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

Category - R1 - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)

Category - R2 - Heavy Weight (Tiles, Stone/Slate)

Category - R3 - Flat Roof (Brick, Concrete)

EQ Zone V : Very High Damage Risk Zone (MSK > IX)

EQ Zone IV : High Damage Risk Zone (MSK VIII)

EQ Zone III : Moderate Damage Risk Zone (MSK VII)

EQ Zone II : Low Damage Risk Zone (MSK < VI)

Level of Risk : VH = Very High; H = High;

M = Moderate; L = Low; VL = Very Low

* Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : CT 02

State : CHHATTISGARH

SURGUJA

Table No. : CT 03

State : CHHATTISGARH

JASHPUR

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
				Area in %				Area in %					
WALL						68.2	31.8					100	
A1 - Mud & Unburnt Brick Wall	Rural	471,468	83.9										
	Urban	21,861	3.9										
	Total	493,329	87.8			M	L				M		
A2 - Stone Wall not packed with mortar	Rural	518	0.1										
	Urban	395	0.1										
	Total	913	0.2			M	L				L		
Total - Category - A		494,242	88.0										
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	28,345	5.0										
	Urban	33,325	5.9										
	Total	61,670	10.9			L	VL				L		
Total - Category - B		61,670	11.0										
C1 - Concrete Wall	Rural	267	-										
	Urban	440	0.1										
	Total	707	0.1			VL	VL				VL		
C2 - Wood wall	Rural	412	0.1										
	Urban	55	-										
	Total	467	0.1			VL	VL				M		
Total - Category - C		1,174	0.2										
X - Other Materials	Rural	3,589	0.6										
	Urban	1,131	0.2										
	Total	4,720	0.8			VL	VL				M		
Total - Category - X		4,720	0.8										
TOTAL HOUSES*		561,806											

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
				Area in %				Area in %					
WALL												100	
A1 - Mud & Unburnt Brick Wall	Rural	181,008	83.9										
	Urban	9,615	4.5										
	Total	190,623	88.4								L		M
A2 - Stone Wall not packed with mortar	Rural	357	0.2										
	Urban	75	-										
	Total	432	0.2								L		L
Total - Category - A		191,055	88.6										
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	14,624	6.8										
	Urban	8,595	4.0										
	Total	23,219	10.8								VL		L
Total - Category - B		23,219	10.8										
C1 - Concrete Wall	Rural	221	0.1										
	Urban	140	0.1										
	Total	361	0.2								VL		VL
C2 - Wood wall	Rural	111	0.1										
	Urban	9	-										
	Total	120	0.1								VL		M
Total - Category - C		481	0.2										
X - Other Materials	Rural	777	0.4										
	Urban	129	0.1										
	Total	906	0.5								VL		M
Total - Category - X		906	0.4										
TOTAL HOUSES*		215,661											

ROOF													
R1 - Light Weight Sloping Roof	Rural	75,063	13.4										
	Urban	10,195	1.8										
	Total	85,258	15.2			L	VL				H		
R2 - Heavy Weight Sloping Roof	Rural	412,204	73.4										
	Urban	22,248	4.0										
	Total	434,452	77.4			L	VL				L		
R3 - Flat Roof	Rural	17,332	3.1										
	Urban	24,764	4.4										
	Total	42,096	7.5										
TOTAL HOUSES*		561,806											

ROOF													
R1 - Light Weight Sloping Roof	Rural	9,007	4.2										
	Urban	2,231	1.0										
	Total	11,238	5.2								VL		H
R2 - Heavy Weight Sloping Roof	Rural	179,187	83.1										
	Urban	10,629	4.9										
	Total	189,816	88.0								VL		L
R3 - Flat Roof	Rural	8,904	4.1										
	Urban	5,703	2.6										
	Total	14,607	6.7										
TOTAL HOUSES*		215,661											

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 496 mm

Housing Category : Wall Types

Category - A : Buildings in field-stone, rural structures, unburnt brick houses, clay houses

Category - B : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone

Category - C : Reinforced building, well built wooden structures

Category - X : Other materials not covered in A,B,C. These are generally light.

Notes : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.

2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building

3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

Category - R1 - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)

Category - R2 - Heavy Weight (Tiles, Stone/Slate)

Category - R3 - Flat Roof (Brick, Concrete)

EQ Zone V : Very High Damage Risk Zone (MSK > IX)

EQ Zone IV : High Damage Risk Zone (MSK VIII)

EQ Zone III : Moderate Damage Risk Zone (MSK VII)

EQ Zone II : Low Damage Risk Zone (MSK < VI)

Level of Risk : VH = Very High; H = High;

M = Moderate; L = Low; VL = Very Low

* Total No.of Houses excluding Vacant/Locked Houses

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 567 mm

Housing Category : Wall Types

Category - A : Buildings in field-stone, rural structures, unburnt brick houses, clay houses

Category - B : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone

Category - C : Reinforced building, well built wooden structures

Category - X : Other materials not covered in A,B,C. These are generally light.

Notes : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.

2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building

3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

Category - R1 - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)

Category - R2 - Heavy Weight (Tiles, Stone/Slate)

Category - R3 - Flat Roof (Brick, Concrete)

EQ Zone V : Very High Damage Risk Zone (MSK > IX)

EQ Zone IV : High Damage Risk Zone (MSK VIII)

EQ Zone III : Moderate Damage Risk Zone (MSK VII)

EQ Zone II : Low Damage Risk Zone (MSK < VI)

Level of Risk : VH = Very High; H = High;

M = Moderate; L = Low; VL = Very Low

* Total No.of Houses excluding Vacant/Locked Houses

**Distribution of Houses by Predominant Materials of Roof and Wall
and Level of Damage Risk**

Table No. : CT 04

State : CHHATTISGARH

RAIGARH

Wall / Roof		Census Houses		Level of Risk under										Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s							
				V	IV	III	II	55 & 50	47	44 & 39	33				
				Area in %				Area in %							
WALL						41.2	58.8							100	
A1 - Mud & Unburnt Brick Wall	Rural	259,028	64.7												
	Urban	22,792	5.7												
	Total	281,820	70.4												
A2 - Stone Wall not packed with mortar	Rural	10,906	2.7												
	Urban	475	0.1												
	Total	11,381	2.8												
Total - Category - A		293,201	73.2												
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	65,071	16.2												
	Urban	35,775	8.9												
	Total	100,846	25.1												
Total - Category - B		100,846	25.2												
C1 - Concrete Wall	Rural	1,020	0.3												
	Urban	544	0.1												
	Total	1,564	0.4												
C2 - Wood wall	Rural	555	0.1												
	Urban	69	-												
	Total	624	0.1												
Total - Category - C		2,188	0.5												
X - Other Materials	Rural	3,283	0.8												
	Urban	970	0.2												
	Total	4,253	1.0												
Total - Category - X		4,253	1.1												
TOTAL HOUSES*		400,488													
ROOF															
R1 - Light Weight Sloping Roof	Rural	28,535	7.1												
	Urban	11,436	2.9												
	Total	39,971	10.0												
R2 - Heavy Weight Sloping Roof	Rural	272,220	68.0												
	Urban	25,819	6.4												
	Total	298,039	74.4												
R3 - Flat Roof	Rural	39,108	9.8												
	Urban	23,370	5.8												
	Total	62,478	15.6												
TOTAL HOUSES*		400,488													

Probable Maximum Precipitation at a Station of the district in 24 hrs is 520 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)

- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
 Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
 * Total No. of Houses excluding Vacant/Locked Houses

**Distribution of Houses by Predominant Materials of Roof and Wall
and Level of Damage Risk**

Table No. : CT 05

State : CHHATTISGARH

KORBA

Wall / Roof		Census Houses		Level of Risk under										Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s							
				V	IV	III	II	55 & 50	47	44 & 39	33				
				Area in %				Area in %							
WALL						51.2	48.8							100	
A1 - Mud & Unburnt Brick Wall	Rural	148,930	48.6												
	Urban	32,309	10.5												
	Total	181,239	59.1												
A2 - Stone Wall not packed with mortar	Rural	777	0.3												
	Urban	331	0.1												
	Total	1,108	0.4												
Total - Category - A		182,347	59.5												
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	42,933	14.0												
	Urban	74,833	24.4												
	Total	117,766	38.4												
Total - Category - B		117,766	38.4												
C1 - Concrete Wall	Rural	822	0.3												
	Urban	1,131	0.4												
	Total	1,953	0.7												
C2 - Wood wall	Rural	713	0.2												
	Urban	89	-												
	Total	802	0.2												
Total - Category - C		2,755	0.9												
X - Other Materials	Rural	2,010	0.7												
	Urban	1,441	0.5												
	Total	3,451	1.2												
Total - Category - X		3,451	1.1												
TOTAL HOUSES*		306,319													
ROOF															
R1 - Light Weight Sloping Roof	Rural	22,417	7.3												
	Urban	32,345	10.6												
	Total	54,762	17.9												
R2 - Heavy Weight Sloping Roof	Rural	158,137	51.6												
	Urban	34,383	11.2												
	Total	192,520	62.8												
R3 - Flat Roof	Rural	15,631	5.1												
	Urban	43,406	14.2												
	Total	59,037	19.3												
TOTAL HOUSES*		306,319													

Probable Maximum Precipitation at a Station of the district in 24 hrs is 440 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)

- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
 Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
 * Total No. of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : CT 18

State : CHHATTISGARH

BIJAPUR

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
				Area in %				Area in %					
						11.4	88.6					100	
WALL													
A1 - Mud & Unburnt Brick Wall	Rural	31,864	58.6										
	Urban	4,287	7.9										
	Total	36,151	66.5			M	L				M		
A2 - Stone Wall not packed with mortar	Rural	66	0.1										
	Urban	22	-										
	Total	88	0.1			M	L				L		
Total - Category - A		36,239	66.6										
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	3,008	5.5										
	Urban	2,108	3.9										
	Total	5,116	9.4			L	VL				L		
Total - Category - B		5,116	9.4										
C1 - Concrete Wall	Rural	48	0.1										
	Urban	11	-										
	Total	59	0.1			VL	VL				VL		
C2 - Wood wall	Rural	7,739	14.2										
	Urban	149	0.3										
	Total	7,888	14.5			VL	VL				M		
Total - Category - C		7,947	14.6										
X - Other Materials	Rural	4,946	9.1										
	Urban	139	0.3										
	Total	5,085	9.4			VL	VL				M		
Total - Category - X		5,085	9.3										
TOTAL HOUSES*		54,387											
ROOF													
R1 - Light Weight Sloping Roof	Rural	14,863	27.3										
	Urban	2,352	4.3										
	Total	17,215	31.6			L	VL				H		
R2 - Heavy Weight Sloping Roof	Rural	31,523	58.0										
	Urban	3,406	6.3										
	Total	34,929	64.3			L	VL				L		
R3 - Flat Roof	Rural	1,285	2.4										
	Urban	958	1.8										
	Total	2,243	4.2										
TOTAL HOUSES*		54,387											

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. **695 mm**

Housing Category : Wall Types

Category - A : Buildings in field-stone, rural structures, unburnt brick houses, clay houses

Category - B : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone

Category - C : Reinforced building, well built wooden structures

Category - X : Other materials not covered in A,B,C. These are generally light.

Notes : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.

2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building

3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

Category - R1 - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)

Category - R2 - Heavy Weight (Tiles, Stone/Slate)

Category - R3 - Flat Roof (Brick, Concrete)

EQ Zone V : Very High Damage Risk Zone (MSK > IX)

EQ Zone IV : High Damage Risk Zone (MSK VIII)

EQ Zone III : Moderate Damage Risk Zone (MSK VII)

EQ Zone II : Low Damage Risk Zone (MSK < VI)

Level of Risk : VH = Very High; H = High;

M = Moderate; L = Low; VL = Very Low

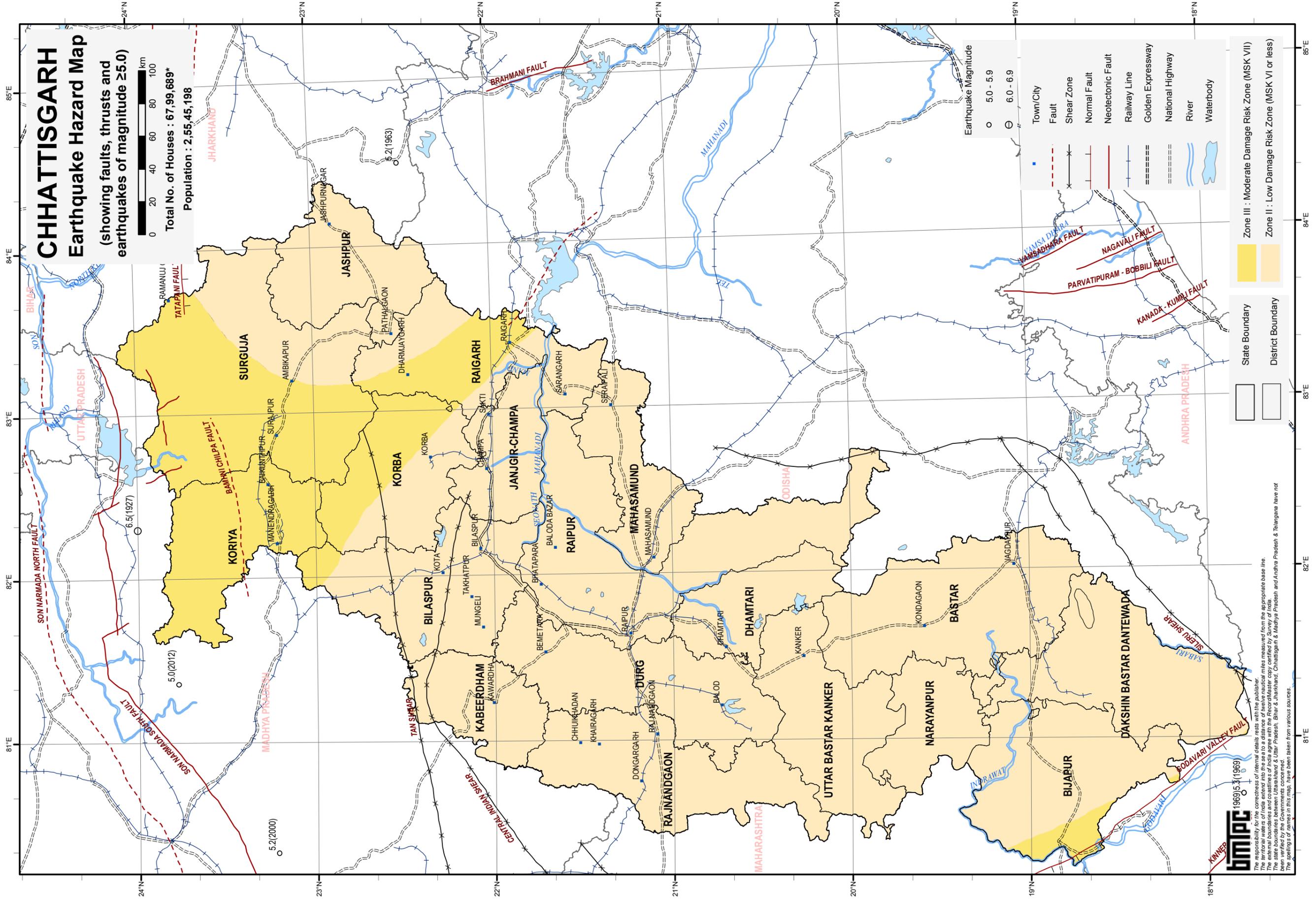
* Total No.of Houses excluding Vacant/Locked Houses

CHHATTISGARH

Earthquake Hazard Map

(showing faults, thrusts and earthquakes of magnitude ≥ 5.0)

Total No. of Houses : 67,99,689*
Population : 2,55,45,198



Earthquake Magnitude	
○	5.0 - 5.9
⊖	6.0 - 6.9

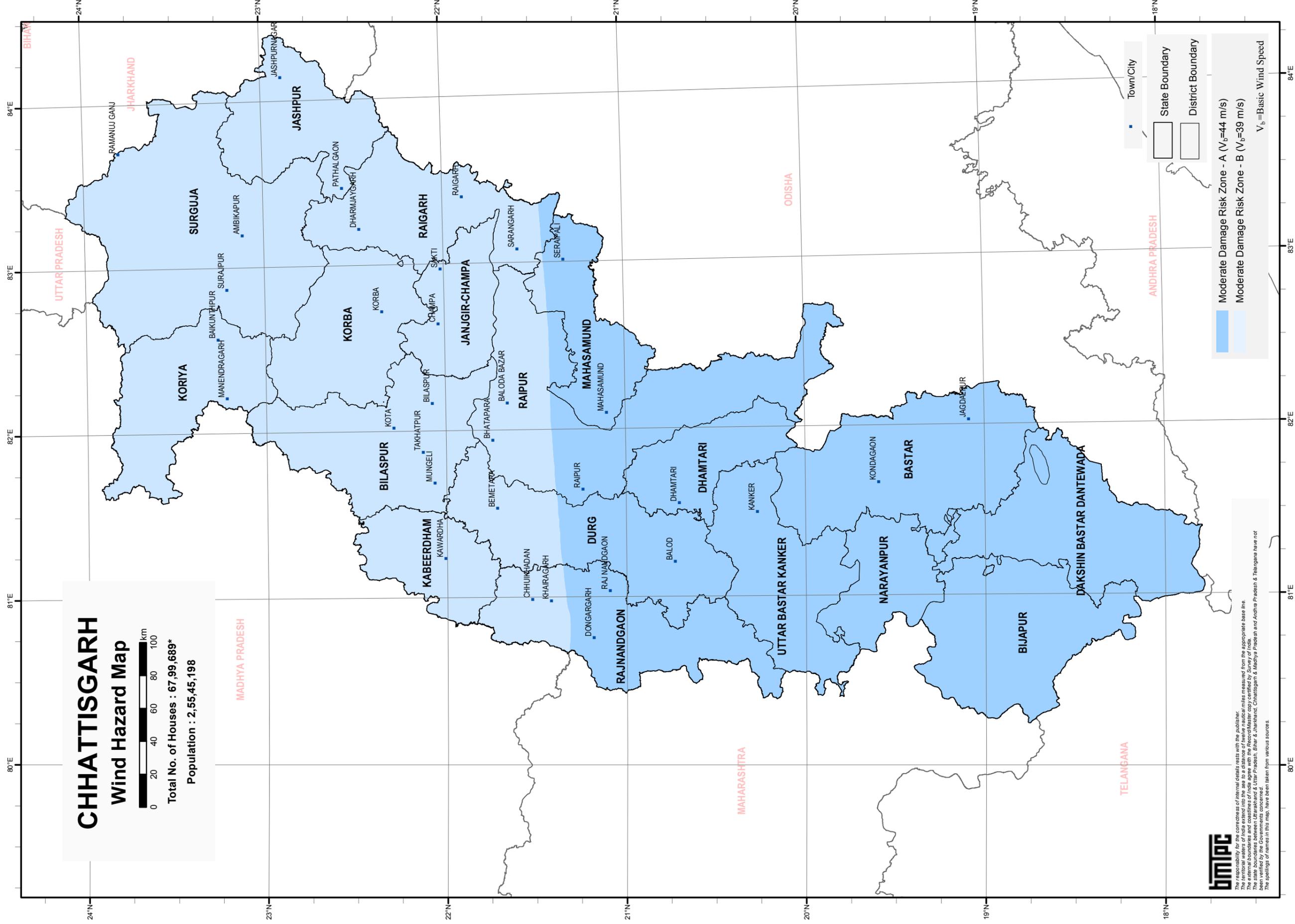
■	Town/City
- - -	Fault
✕	Shear Zone
—	Normal Fault
—	Neotectonic Fault
—	Railway Line
—	Golden Expressway
—	National Highway
—	River
—	Waterbody

—	State Boundary
- - -	District Boundary

■	Zone III : Moderate Damage Risk Zone (MSK VII)
■	Zone II : Low Damage Risk Zone (MSK VI or less)

BMPIC
1969/5.3 (1969)

The responsibility for the correctness of internal details rests with the publisher. The territorial waters of India extend into the sea to a distance of twelve nautical miles measured from the appropriate base line. The state boundaries between Uttar Pradesh & Bihar & Jharkhand, Chhattisgarh & Madhya Pradesh and Andhra Pradesh & Telangana have not been verified by the Governments concerned. The spellings of names in this map, have been taken from various sources.



BMTPC : Vulnerability Atlas - 3rd Edition; Peer Group, MoHUA; Map is Based on digitised data of SOI, GOI; Basic Wind Speed Map National Building Code 2016. Houses/Population as per Census 2011; *Houses including vacant & locked houses. Disclaimer: The maps are solely for thematic presentation.

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

GOA

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
				Area in %				Area in %					
STATE - GOA													
WALL													
A1 - Mud & Unburnt Brick Wall	Rural	24,948	5.6										
	Urban	18,157	4.1										
	Total	43,105	9.7			M					M		
A2 - Stone Wall not packed with mortar	Rural	24,150	5.4										
	Urban	25,825	5.8										
	Total	49,975	11.2			M					L		
Total - Category - A		93,080	21.0										
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	98,974	22.3										
	Urban	185,363	41.8										
	Total	284,337	64.1			L					L		
Total - Category - B		284,337	64.2										
C1 - Concrete Wall	Rural	6,446	1.5										
	Urban	33,864	7.6										
	Total	40,310	9.1			VL					VL		
C2 - Wood wall	Rural	2,201	0.5										
	Urban	2,785	0.6										
	Total	4,986	1.1			VL					M		
Total - Category - C		45,296	10.2										
X - Other Materials	Rural	10,461	2.4										
	Urban	9,979	2.3										
	Total	20,440	4.7			VL					M		
Total - Category - X		20,440	4.6										
TOTAL HOUSES*		443,153											

ROOF													
R1 - Light Weight Sloping Roof	Rural	22,333	5.0										
	Urban	33,492	7.6										
	Total	55,825	12.6			L					H		
R2 - Heavy Weight Sloping Roof	Rural	109,823	24.8										
	Urban	115,147	26.0										
	Total	224,970	50.8			L					L		
R3 - Flat Roof	Rural	35,024	7.9										
	Urban	127,334	28.7										
	Total	162,358	36.6										
TOTAL HOUSES*		443,153											

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures

Category - X : Other materials not covered in A,B,C. These are generally light.

- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)

EQ Zone V : Very High Damage Risk Zone (MSK > IX)

EQ Zone IV : High Damage Risk Zone (MSK VIII)

EQ Zone III : Moderate Damage Risk Zone (MSK VII)

EQ Zone II : Low Damage Risk Zone (MSK < VI)

Level of Risk : VH = Very High; H = High;

M = Moderate; L = Low; VL = Very Low

* Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : GO 01

State : GOA

NORTH GOA

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
				Area in %				Area in %					
STATE - GOA													
WALL													
A1 - Mud & Unburnt Brick Wall	Rural	15,323	6.2										
	Urban	11,074	4.5										
	Total	26,397	10.7			M					M		
A2 - Stone Wall not packed with mortar	Rural	14,600	5.9										
	Urban	15,077	6.1										
	Total	29,677	12.0			M					L		
Total - Category - A		56,074	22.6										
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	54,121	21.8										
	Urban	102,354	41.2										
	Total	156,475	63.0			L					L		
Total - Category - B		156,475	63.0										
C1 - Concrete Wall	Rural	3,537	1.4										
	Urban	17,440	7.0										
	Total	20,977	8.4			VL					VL		
C2 - Wood wall	Rural	1,114	0.4										
	Urban	1,266	0.5										
	Total	2,380	0.9			VL					M		
Total - Category - C		23,357	9.4										
X - Other Materials	Rural	5,975	2.4										
	Urban	6,413	2.6										
	Total	12,388	5.0			VL					M		
Total - Category - X		12,388	5.0										
TOTAL HOUSES*		248,294											

ROOF													
R1 - Light Weight Sloping Roof	Rural	12,617	5.1										
	Urban	19,259	7.8										
	Total	31,876	12.9			L					H		
R2 - Heavy Weight Sloping Roof	Rural	63,905	25.7										
	Urban	65,149	26.2										
	Total	129,054	51.9			L					L		
R3 - Flat Roof	Rural	18,148	7.3										
	Urban	69,216	27.9										
	Total	87,364	35.2										
TOTAL HOUSES*		248,294											

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 574 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures

Category - X : Other materials not covered in A,B,C. These are generally light.

- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)

EQ Zone V : Very High Damage Risk Zone (MSK > IX)

EQ Zone IV : High Damage Risk Zone (MSK VIII)

EQ Zone III : Moderate Damage Risk Zone (MSK VII)

EQ Zone II : Low Damage Risk Zone (MSK < VI)

Level of Risk : VH = Very High; H = High;

M = Moderate; L = Low; VL = Very Low

* Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : GO 02 State : GOA SOUTH GOA

Wall / Roof	Census Houses		Level of Risk under								Flood Prone Area in %	
	No. of Houses	%	EQ Zone				Wind Velocity m/s					
			V	IV	III	II	55 & 50	47	44 & 39	33		
			Area in %				Area in %					
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	9,625	4.9									
	Urban	7,083	3.6									
	Total	16,708	8.5			M					M	
A2 - Stone Wall not packed with mortar	Rural	9,550	4.9									
	Urban	10,748	5.5									
	Total	20,298	10.4			M					L	
Total - Category - A		37,006	19.0									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	44,853	23.0									
	Urban	83,009	42.6									
	Total	127,862	65.6			L					L	
Total - Category - B		127,862	65.6									
C1 - Concrete Wall	Rural	2,909	1.5									
	Urban	16,424	8.4									
	Total	19,333	9.9			VL					VL	
C2 - Wood wall	Rural	1,087	0.6									
	Urban	1,519	0.8									
	Total	2,606	1.4			VL					M	
Total - Category - C		21,939	11.3									
X - Other Materials	Rural	4,486	2.3									
	Urban	3,566	1.8									
	Total	8,052	4.1			VL					M	
Total - Category - X		8,052	4.1									
TOTAL HOUSES*		194,859										
ROOF												
R1 - Light Weight Sloping Roof	Rural	9,716	5.0									
	Urban	14,233	7.3									
	Total	23,949	12.3			L					H	
R2 - Heavy Weight Sloping Roof	Rural	45,918	23.6									
	Urban	49,998	25.7									
	Total	95,916	49.3			L					L	
R3 - Flat Roof	Rural	16,876	8.7									
	Urban	58,118	29.8									
	Total	74,994	38.5									
TOTAL HOUSES*		194,859										

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 574 mm

Housing Category : Wall Types

- Category - A :** Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B :** Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C :** Reinforced building, well built wooden structures
- Category - X :** Other materials not covered in A,B,C. These are generally light.

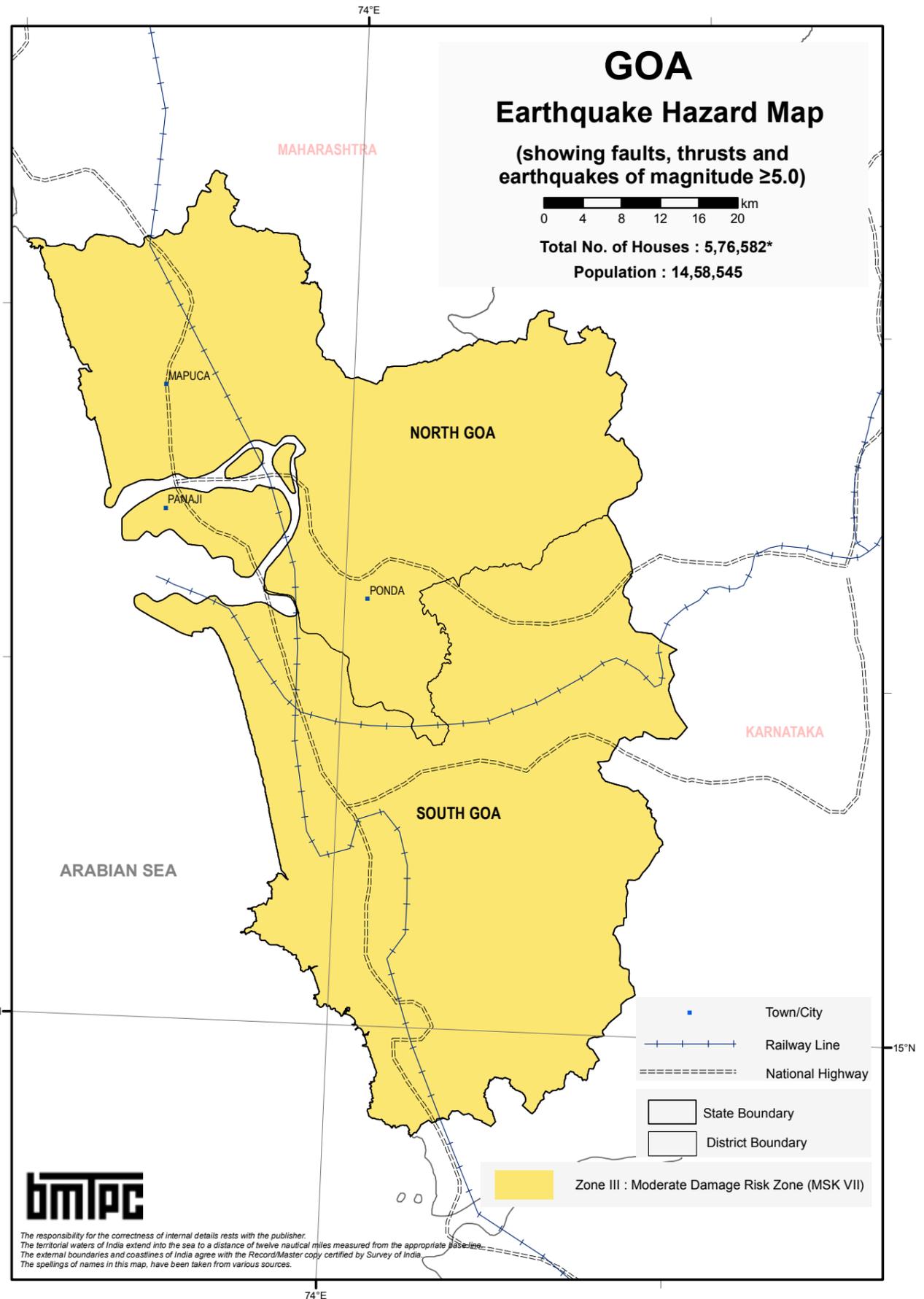
- Notes :**
- Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 - Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 - Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

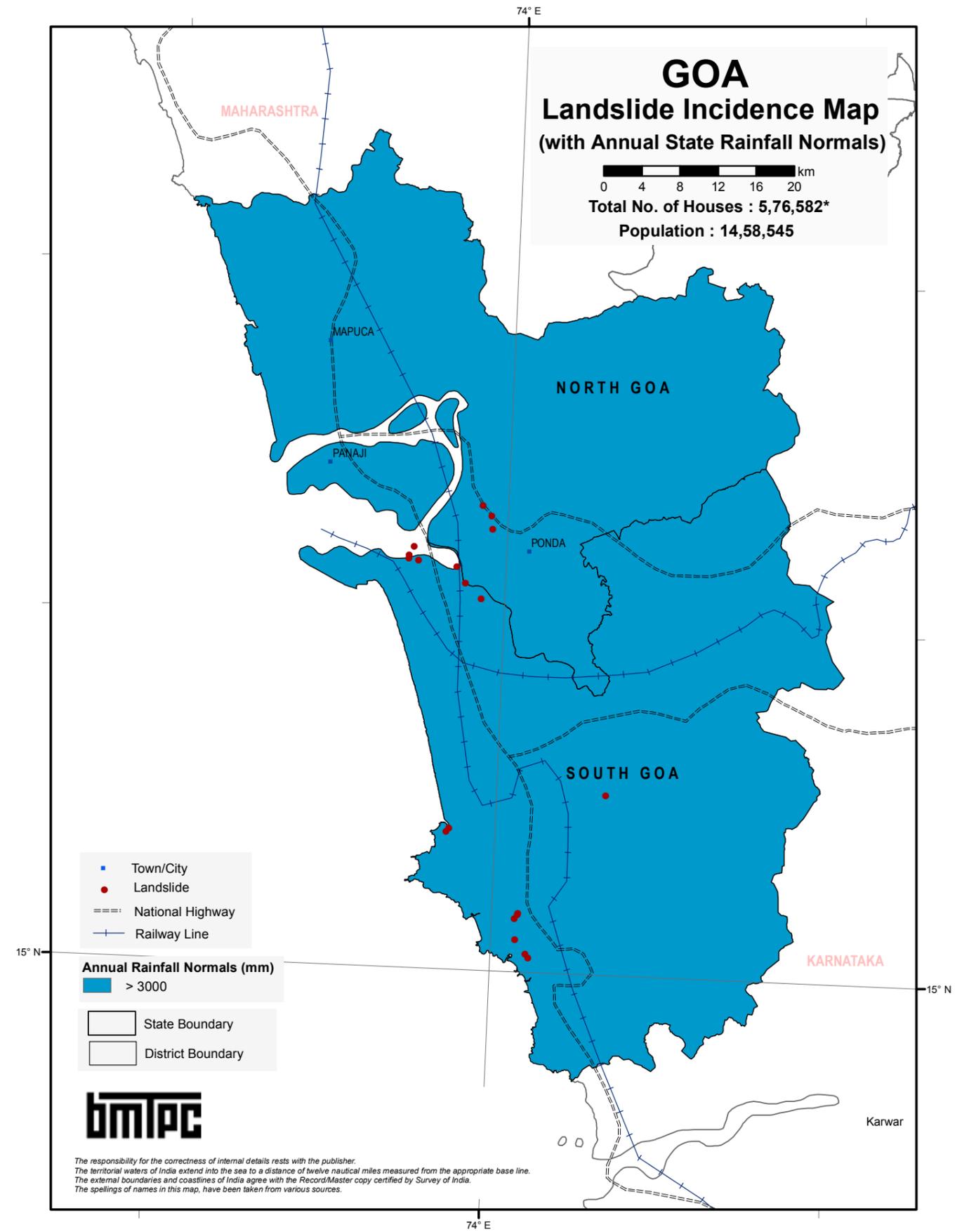
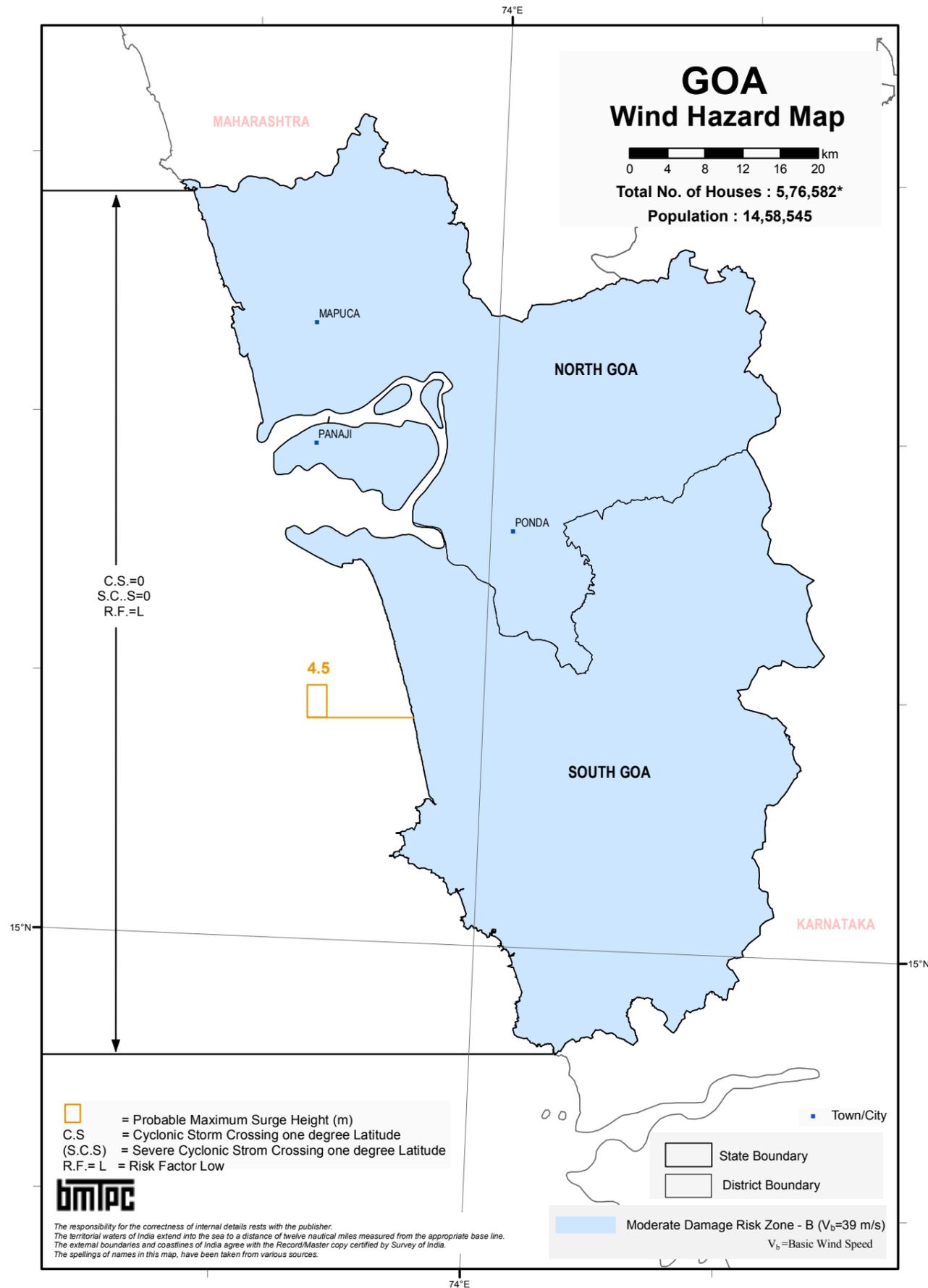
- Category - R1 -** Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2 -** Heavy Weight (Tiles, Stone/Slate)
- Category - R3 -** Flat Roof (Brick, Concrete)

- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low

* Total No. of Houses excluding Vacant/Locked Houses



BMTPC : Vulnerability Atlas - 3rd Edition : Peer Group, MoHUA, GOI; Map is Based on digitised data of SOI; Seismic Zones of India Map IS:1893 (Part I): 2002, BIS; Earthquake Epicentre from IMD; Seismotectonic Atlas of India and its Environs, GSI; Houses/Population as per Census 2011; *Houses including vacant & locked houses. Disclaimer: The maps are solely for thematic presentation.



BMTPC : Vulnerability Atlas - 3rd Edition; Peer Group, MoHUA; Map is Based on digitised data of SOI, GOI; Basic Wind Speed Map National Building Code 2016; Cyclone Data, 1891-2015, IMD, GOI. Houses/Population as per Census 2011; *Houses including vacant & locked houses. Disclaimer: The maps are solely for thematic presentation.

BMTPC: Vulnerability Atlas - 3rd Edition: Peer Group, MoHUA,GOI; Map is Based on digitised data of SOI; Landslide Incidence data GSI; Annual Rainfall data IMD. Houses/Population as per Census 2011; * Houses including vacant & locked houses. Disclaimer: The maps are solely for thematic presentation.

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

GUJARAT

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
STATE - GUJARAT		18.3	13.4	67.4	.9	26.7	27.3	46.0	7.9			
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	2,109,301	14.0									
	Urban	325,593	2.2									
	Total	2,434,894	16.2	<i>VH</i>	<i>H</i>	<i>M</i>	<i>L</i>	<i>VH</i>	<i>H</i>	<i>M</i>	<i>VH</i>	
A2 - Stone Wall not packed with mortar	Rural	334,416	2.2									
	Urban	75,550	0.5									
	Total	409,966	2.7	<i>VH</i>	<i>H</i>	<i>M</i>	<i>L</i>	<i>H</i>	<i>M</i>	<i>L</i>	<i>VH</i>	
Total - Category - A		2,844,860	18.9									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	4,639,127	30.8									
	Urban	6,090,218	40.4									
	Total	10,729,345	71.2	<i>H</i>	<i>M</i>	<i>L</i>	<i>VL</i>	<i>H</i>	<i>M</i>	<i>L</i>	<i>H/M</i>	
Total - Category - B		10,729,345	71.1									
C1 - Concrete Wall	Rural	268,370	1.8									
	Urban	310,817	2.1									
	Total	579,187	3.9	<i>M</i>	<i>L</i>	<i>VL</i>	<i>VL</i>	<i>L</i>	<i>VL</i>	<i>VL</i>	<i>L/VL</i>	
C2 - Wood wall	Rural	44,829	0.3									
	Urban	59,667	0.4									
	Total	104,496	0.7	<i>M</i>	<i>L</i>	<i>VL</i>	<i>VL</i>	<i>VH</i>	<i>H</i>	<i>M</i>	<i>H</i>	
Total - Category - C		683,683	4.5									
X - Other Materials	Rural	712,272	4.7									
	Urban	113,136	0.8									
	Total	825,408	5.5	<i>M</i>	<i>VL</i>	<i>VL</i>	<i>VL</i>	<i>VH</i>	<i>H</i>	<i>M</i>	<i>VH</i>	
Total - Category - X		825,408	5.5									
TOTAL HOUSES*		15,083,296										

ROOF											
R1 - Light Weight Sloping Roof	Rural	1,799,676	11.9								
	Urban	1,399,670	9.3								
	Total	3,199,346	21.2	<i>M</i>	<i>M</i>	<i>L</i>	<i>VL</i>	<i>VH</i>	<i>VH</i>	<i>H</i>	<i>VH</i>
R2 - Heavy Weight Sloping Roof	Rural	4,122,453	27.3								
	Urban	684,497	4.5								
	Total	4,806,950	31.8	<i>H</i>	<i>M</i>	<i>L</i>	<i>VL</i>	<i>H</i>	<i>M</i>	<i>L</i>	<i>H</i>
R3 - Flat Roof	Rural	2,186,186	14.5								
	Urban	4,890,814	32.4								
	Total	7,077,000	46.9	<i>Damage Risk as per that for the Wall supporting it</i>							
TOTAL HOUSES*		15,083,296									

Housing Category : Wall Types

Category - A : Buildings in field-stone, rural structures, unburnt brick houses, clay houses

Category - B : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone

Category - C : Reinforced building, well built wooden structures

Category - X : Other materials not covered in A,B,C. These are generally light.

Notes : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.

2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building

3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

Category - R1 - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)

Category - R2 - Heavy Weight (Tiles, Stone/Slate)

Category - R3 - Flat Roof (Brick, Concrete)

EQ Zone V : Very High Damage Risk Zone (MSK > IX)

EQ Zone IV : High Damage Risk Zone (MSK VIII)

EQ Zone III : Moderate Damage Risk Zone (MSK VII)

EQ Zone II : Low Damage Risk Zone (MSK < VI)

Level of Risk : VH = Very High; H = High;

M = Moderate; L = Low; VL = Very Low

* Total No. of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : GJ 01

State : GUJARAT

KACHCHH

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
		81.2	18.0	.8		34.6	65.4					
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	14,495	2.5									
	Urban	2,978	0.5									
	Total	17,473	3.0	<i>VH</i>	<i>H</i>	<i>M</i>		<i>VH</i>	<i>H</i>			
A2 - Stone Wall not packed with mortar	Rural	36,035	6.1									
	Urban	7,407	1.3									
	Total	43,442	7.4	<i>VH</i>	<i>H</i>	<i>M</i>		<i>H</i>	<i>M</i>			
Total - Category - A		60,915	10.4									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	212,509	36.2									
	Urban	148,340	25.3									
	Total	360,849	61.5	<i>H</i>	<i>M</i>	<i>L</i>		<i>H</i>	<i>M</i>			
Total - Category - B		360,849	61.5									
C1 - Concrete Wall	Rural	97,549	16.6									
	Urban	40,988	7.0									
	Total	138,537	23.6	<i>M</i>	<i>L</i>	<i>VL</i>		<i>L</i>	<i>VL</i>			
C2 - Wood wall	Rural	3,633	0.6									
	Urban	5,106	0.9									
	Total	8,739	1.5	<i>M</i>	<i>L</i>	<i>VL</i>		<i>VH</i>	<i>H</i>			
Total - Category - C		147,276	25.1									
X - Other Materials	Rural	12,245	2.1									
	Urban	5,666	1.0									
	Total	17,911	3.1	<i>M</i>	<i>VL</i>	<i>VL</i>		<i>VH</i>	<i>H</i>			
Total - Category - X		17,911	3.1									
TOTAL HOUSES*		586,951										

ROOF											
R1 - Light Weight Sloping Roof	Rural	61,183	10.4								
	Urban	47,099	8.0								
	Total	108,282	18.4	<i>M</i>	<i>M</i>	<i>L</i>		<i>VH</i>	<i>VH</i>		
R2 - Heavy Weight Sloping Roof	Rural	183,364	31.2								
	Urban	29,159	5.0								
	Total	212,523	36.2	<i>H</i>	<i>M</i>	<i>L</i>		<i>H</i>	<i>M</i>		
R3 - Flat Roof	Rural	131,919	22.5								
	Urban	134,227	22.9								
	Total	266,146	45.4	<i>Damage Risk as per that for the Wall supporting it</i>							
TOTAL HOUSES*		586,951									

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sq.km. is **963 mm**

Housing Category : Wall Types

Category - A : Buildings in field-stone, rural structures, unburnt brick houses, clay houses

Category - B : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone

Category - C : Reinforced building, well built wooden structures

Category - X : Other materials not covered in A,B,C. These are generally light.

Notes : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.

2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building

3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

Category - R1 - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)

Category - R2 - Heavy Weight (Tiles, Stone/Slate)

Category - R3 - Flat Roof (Brick, Concrete)

EQ Zone V : Very High Damage Risk Zone (MSK > IX)

EQ Zone IV : High Damage Risk Zone (MSK VIII)

EQ Zone III : Moderate Damage Risk Zone (MSK VII)

EQ Zone II : Low Damage Risk Zone (MSK < VI)

Level of Risk : VH = Very High; H = High;

M = Moderate; L = Low; VL = Very Low

* Total No. of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : GJ 02 State : GUJARAT BANAS KANTHA

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %		
		No. of Houses	%	EQ Zone				Wind Velocity m/s						
				V	IV	III	II	55 & 50	47	44 & 39	33			
				Area in %				Area in %						
					54.6	45.4				100			31.1	
WALL														
A1 - Mud & Unburnt Brick Wall	Rural	161,907	23.8											
	Urban	9,695	1.4											
	Total	171,602	25.2		H	M				H				VH
A2 - Stone Wall not packed with mortar	Rural	7,142	1.1											
	Urban	457	0.1											
	Total	7,599	1.2		H	M				M				VH
Total - Category - A		179,201	26.4											
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	364,599	53.6											
	Urban	98,676	14.5											
	Total	463,275	68.1		M	L				M				H/M
Total - Category - B		463,275	68.1											
C1 - Concrete Wall	Rural	7,199	1.1											
	Urban	2,898	0.4											
	Total	10,097	1.5		L	VL				VL				L/VL
C2 - Wood wall	Rural	2,195	0.3											
	Urban	190	-											
	Total	2,385	0.3		L	VL				H				H
Total - Category - C		12,482	1.8											
X - Other Materials	Rural	23,418	3.4											
	Urban	1,466	0.2											
	Total	24,884	3.6		VL	VL				H				VH
Total - Category - X		24,884	3.7											
TOTAL HOUSES*		679,842												

ROOF														
R1 - Light Weight Sloping Roof	Rural	163,198	24.0											
	Urban	30,735	4.5											
	Total	193,933	28.5		M	L				VH				VH
R2 - Heavy Weight Sloping Roof	Rural	295,685	43.5											
	Urban	12,247	1.8											
	Total	307,932	45.3		M	L				M				H
R3 - Flat Roof	Rural	107,577	15.8											
	Urban	70,400	10.4											
	Total	177,977	26.2											
TOTAL HOUSES*		679,842												

Probable Maximum Precipitation at a Station of the district in 24 hrs is 720 mm

Housing Category : Wall Types

Category - A : Buildings in field-stone, rural structures, unburnt brick houses, clay houses

Category - B : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone

Category - C : Reinforced building, well built wooden structures

Category - X : Other materials not covered in A,B,C. These are generally light.

Notes : 1. Flood prone area includes that protected area which may have more severe

damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.

2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building

3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

Category - R1 - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)

Category - R2 - Heavy Weight (Tiles, Stone/Slate)

Category - R3 - Flat Roof (Brick, Concrete)

EQ Zone V : Very High Damage Risk Zone (MSK > IX)

EQ Zone IV : High Damage Risk Zone (MSK VIII)

EQ Zone III : Moderate Damage Risk Zone (MSK VII)

EQ Zone II : Low Damage Risk Zone (MSK < VI)

Level of Risk : VH = Very High; H = High;

M = Moderate; L = Low; VL = Very Low

* Total No. of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : GJ 03 State : GUJARAT PATAN

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %		
		No. of Houses	%	EQ Zone				Wind Velocity m/s						
				V	IV	III	II	55 & 50	47	44 & 39	33			
				Area in %				Area in %						
					60.8	39.2				100			31.6	
WALL														
A1 - Mud & Unburnt Brick Wall	Rural	54,057	16.4											
	Urban	7,206	2.2											
	Total	61,263	18.6		H	M				H				VH
A2 - Stone Wall not packed with mortar	Rural	4,066	1.2											
	Urban	378	0.1											
	Total	4,444	1.3		H	M				M				VH
Total - Category - A		65,707	19.9											
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	176,544	53.6											
	Urban	70,853	21.5											
	Total	247,397	75.1		M	L				M				H/M
Total - Category - B		247,397	75.1											
C1 - Concrete Wall	Rural	4,343	1.3											
	Urban	1,322	0.4											
	Total	5,665	1.7		L	VL				VL				L/VL
C2 - Wood wall	Rural	864	0.3											
	Urban	174	0.1											
	Total	1,038	0.4		L	VL				H				H
Total - Category - C		6,703	2.0											
X - Other Materials	Rural	8,576	2.6											
	Urban	1,159	0.4											
	Total	9,735	3.0		VL	VL				H				VH
Total - Category - X		9,735	3.0											
TOTAL HOUSES*		329,542												

ROOF														
R1 - Light Weight Sloping Roof	Rural	98,291	29.8											
	Urban	25,793	7.8											
	Total	124,084	37.6		M	L				VH				VH
R2 - Heavy Weight Sloping Roof	Rural	100,190	30.4											
	Urban	6,408	1.9											
	Total	106,598	32.3		M	L				M				H
R3 - Flat Roof	Rural	49,969	15.2											
	Urban	48,891	14.8											
	Total	98,860	30.0											
TOTAL HOUSES*		329,542												

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sq.km. is 505 mm

Housing Category : Wall Types

Category - A : Buildings in field-stone, rural structures, unburnt brick houses, clay houses

Category - B : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone

Category - C : Reinforced building, well built wooden structures

Category - X : Other materials not covered in A,B,C. These are generally light.

Notes : 1. Flood prone area includes that protected area which may have more severe

damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.

2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building

3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

Category - R1 - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)

Category - R2 - Heavy Weight (Tiles, Stone/Slate)

Category - R3 - Flat Roof (Brick, Concrete)

EQ Zone V : Very High Damage Risk Zone (MSK > IX)

EQ Zone IV : High Damage Risk Zone (MSK VIII)

EQ Zone III : Moderate Damage Risk Zone (MSK VII)

EQ Zone II : Low Damage Risk Zone (MSK < VI)

Level of Risk : VH = Very High; H = High;

M = Moderate; L = Low; VL = Very Low

* Total No. of Houses excluding Vacant/Locked Houses

**Distribution of Houses by Predominant Materials of Roof and Wall
and Level of Damage Risk**

Table No. : GJ 06 State : GUJARAT GANDHINAGAR

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %				
		No. of Houses	%	EQ Zone				Wind Velocity m/s								
				V	IV	III	II	55 & 50	47	44 & 39	33					
				Area in %				Area in %								
						100						100			13.6	
WALL																
A1 - Mud & Unburnt Brick Wall	Rural	47,315	13.5													
	Urban	16,310	4.7													
	Total	63,625	18.2												M	M
A2 - Stone Wall not packed with mortar	Rural	1,604	0.5													
	Urban	471	0.1													
	Total	2,075	0.6												M	L
Total - Category - A		65,700	18.8													
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	130,266	37.2													
	Urban	136,922	39.1													
	Total	267,188	76.3												L	L
Total - Category - B		267,188	76.3													
C1 - Concrete Wall	Rural	5,053	1.4													
	Urban	4,057	1.2													
	Total	9,110	2.6												VL	VL
C2 - Wood wall	Rural	495	0.1													
	Urban	320	0.1													
	Total	815	0.2												VL	M
Total - Category - C		9,925	2.8													
X - Other Materials	Rural	4,579	1.3													
	Urban	2,763	0.8													
	Total	7,342	2.1												VL	M
Total - Category - X		7,342	2.1													
TOTAL HOUSES*		350,155														
ROOF																
R1 - Light Weight Sloping Roof	Rural	85,575	24.4													
	Urban	42,265	12.1													
	Total	127,840	36.5												L	H
R2 - Heavy Weight Sloping Roof	Rural	28,207	8.1													
	Urban	6,257	1.8													
	Total	34,464	9.9												L	L
R3 - Flat Roof	Rural	75,530	21.6													
	Urban	112,321	32.1													
	Total	187,851	53.7													
TOTAL HOUSES*		350,155														

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sq.km. is 552 mm

Housing Category : Wall Types

- Category - A :** Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B :** Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C :** Reinforced building, well built wooden structures
- Category - X :** Other materials not covered in A,B,C. These are generally light.
- Notes :** 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1 - Light Weight** (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2 - Heavy Weight** (Tiles, Stone/Slate)
- Category - R3 - Flat Roof** (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

**Distribution of Houses by Predominant Materials of Roof and Wall
and Level of Damage Risk**

Table No. : GJ 07 State : GUJARAT AHMADABAD

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %							
		No. of Houses	%	EQ Zone				Wind Velocity m/s											
				V	IV	III	II	55 & 50	47	44 & 39	33								
				Area in %				Area in %											
						100									19.6	5.0	75.4		13.8
WALL																			
A1 - Mud & Unburnt Brick Wall	Rural	111,414	5.8																
	Urban	63,007	3.3																
	Total	174,421	9.1												M	VH	H	M	VH
A2 - Stone Wall not packed with mortar	Rural	2,095	0.1																
	Urban	5,397	0.3																
	Total	7,492	0.4												M	H	M	L	VH
Total - Category - A		181,913	9.5																
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	178,421	9.3																
	Urban	1,490,401	78.0																
	Total	1,668,822	87.3												L	H	M	L	H/M
Total - Category - B		1,668,822	87.3																
C1 - Concrete Wall	Rural	3,183	0.2																
	Urban	36,216	1.9																
	Total	39,399	2.1												VL	L	VL	VL	L/VL
C2 - Wood wall	Rural	739	-																
	Urban	2,125	0.1																
	Total	2,864	0.1												VL	VH	H	M	H
Total - Category - C		42,263	2.2																
X - Other Materials	Rural	5,975	0.3																
	Urban	12,915	0.7																
	Total	18,890	1.0												VL	VH	H	M	VH
Total - Category - X		18,890	1.0																
TOTAL HOUSES*		1,911,888																	
ROOF																			
R1 - Light Weight Sloping Roof	Rural	88,500	4.6																
	Urban	375,667	19.6																
	Total	464,167	24.2												L	VH	VH	H	VH
R2 - Heavy Weight Sloping Roof	Rural	149,572	7.8																
	Urban	61,686	3.2																
	Total	211,258	11.0												L	H	M	L	H
R3 - Flat Roof	Rural	63,755	3.3																
	Urban	1,172,708	61.3																
	Total	1,236,463	64.6																
TOTAL HOUSES*		1,911,888																	

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sq.km. is 552 mm

Housing Category : Wall Types

- Category - A :** Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B :** Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C :** Reinforced building, well built wooden structures
- Category - X :** Other materials not covered in A,B,C. These are generally light.
- Notes :** 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1 - Light Weight** (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2 - Heavy Weight** (Tiles, Stone/Slate)
- Category - R3 - Flat Roof** (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : GJ 08 State : GUJARAT SURENDRANAGAR

Table No. : GJ 09 State : GUJARAT RAJKOT

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
				12.3	87.7			6.5	22.2	71.3		.2
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	66,760	15.3									
	Urban	7,690	1.8									
	Total	74,450	17.1		H	M		VH	H	M		VH
A2 - Stone Wall not packed with mortar	Rural	41,410	9.5									
	Urban	7,422	1.7									
	Total	48,832	11.2		H	M		H	M	L		VH
Total - Category - A		123,282	28.2									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	181,853	41.6									
	Urban	117,422	26.9									
	Total	299,275	68.5		M	L		H	M	L		H/M
Total - Category - B		299,275	68.4									
C1 - Concrete Wall	Rural	2,744	0.6									
	Urban	2,372	0.5									
	Total	5,116	1.1		L	VL		L	VL	VL		L/VL
C2 - Wood wall	Rural	1,384	0.3									
	Urban	505	0.1									
	Total	1,889	0.4		L	VL		VH	H	M		H
Total - Category - C		7,005	1.6									
X - Other Materials	Rural	5,641	1.3									
	Urban	2,085	0.5									
	Total	7,726	1.8		VL	VL		VH	H	M		VH
Total - Category - X		7,726	1.8									
TOTAL HOUSES*		437,288										

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
				16.5	83.5			42.3		57.7		
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	44,893	4.4									
	Urban	22,286	2.2									
	Total	67,179	6.6		H	M		VH		M		
A2 - Stone Wall not packed with mortar	Rural	28,719	2.8									
	Urban	10,281	1.0									
	Total	39,000	3.8		H	M		H		L		
Total - Category - A		106,179	10.3									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	315,158	30.6									
	Urban	545,289	52.9									
	Total	860,447	83.5		M	L		H		L		
Total - Category - B		860,447	83.4									
C1 - Concrete Wall	Rural	12,133	1.2									
	Urban	40,605	3.9									
	Total	52,738	5.1		L	VL		L		VL		
C2 - Wood wall	Rural	1,377	0.1									
	Urban	768	0.1									
	Total	2,145	0.2		L	VL		VH		M		
Total - Category - C		54,883	5.3									
X - Other Materials	Rural	4,599	0.4									
	Urban	5,421	0.5									
	Total	10,020	0.9		VL	VL		VH		M		
Total - Category - X		10,020	1.0									
TOTAL HOUSES*		1,031,529										

ROOF												
R1 - Light Weight Sloping Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	V	IV	III	II	55 & 50	47	44 & 39	33	
R1 - Light Weight Sloping Roof	Rural	22,366	5.1									
	Urban	11,956	2.7									
	Total	34,322	7.8		M	L		VH	VH	H		VH
R2 - Heavy Weight Sloping Roof	Rural	191,480	43.8									
	Urban	34,602	7.9									
	Total	226,082	51.7		M	L		H	M	L		H
R3 - Flat Roof	Rural	85,946	19.7									
	Urban	90,938	20.8									
	Total	176,884	40.5									
TOTAL HOUSES*		437,288										

ROOF												
R1 - Light Weight Sloping Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	V	IV	III	II	55 & 50	47	44 & 39	33	
R1 - Light Weight Sloping Roof	Rural	25,619	2.5									
	Urban	52,063	5.0									
	Total	77,682	7.5		M	L		VH		H		
R2 - Heavy Weight Sloping Roof	Rural	175,251	17.0									
	Urban	85,750	8.3									
	Total	261,001	25.3		M	L		H		L		
R3 - Flat Roof	Rural	206,009	20.0									
	Urban	486,837	47.2									
	Total	692,846	67.2									
TOTAL HOUSES*		1,031,529										

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sq.km. is **552 mm**

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sq.km. is **883 mm**

Housing Category : Wall Types

Category - A : Buildings in field-stone, rural structures, unburnt brick houses, clay houses

Category - B : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone

Category - C : Reinforced building, well built wooden structures

Category - X : Other materials not covered in A,B,C. These are generally light.

Notes : 1. Flood prone area includes that protected area which may have more severe

damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.

2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building

3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

Category - R1 - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)

Category - R2 - Heavy Weight (Tiles, Stone/Slate)

Category - R3 - Flat Roof (Brick, Concrete)

EQ Zone V : Very High Damage Risk Zone (MSK > IX)

EQ Zone IV : High Damage Risk Zone (MSK VIII)

EQ Zone III : Moderate Damage Risk Zone (MSK VII)

EQ Zone II : Low Damage Risk Zone (MSK < VI)

Level of Risk : VH = Very High; H = High;

M = Moderate; L = Low; VL = Very Low

* Total No.of Houses excluding Vacant/Locked Houses

Housing Category : Wall Types

Category - A : Buildings in field-stone, rural structures, unburnt brick houses, clay houses

Category - B : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone

Category - C : Reinforced building, well built wooden structures

Category - X : Other materials not covered in A,B,C. These are generally light.

Notes : 1. Flood prone area includes that protected area which may have more severe

damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.

2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building

3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

Category - R1 - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)

Category - R2 - Heavy Weight (Tiles, Stone/Slate)

Category - R3 - Flat Roof (Brick, Concrete)

EQ Zone V : Very High Damage Risk Zone (MSK > IX)

EQ Zone IV : High Damage Risk Zone (MSK VIII)

EQ Zone III : Moderate Damage Risk Zone (MSK VII)

EQ Zone II : Low Damage Risk Zone (MSK < VI)

Level of Risk : VH = Very High; H = High;

M = Moderate; L = Low; VL = Very Low

* Total No.of Houses excluding Vacant/Locked Houses

**Distribution of Houses by Predominant Materials of Roof and Wall
and Level of Damage Risk**

Table No. : GJ 10 State : GUJARAT JAMNAGAR

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
WALL					42.9	57.1			99.7		.3	
A1 - Mud & Unburnt Brick Wall	Rural	25,748	4.6									
	Urban	8,265	1.5									
	Total	34,013	6.1	H	M			VH		M		
A2 - Stone Wall not packed with mortar	Rural	25,200	4.5									
	Urban	6,077	1.1									
	Total	31,277	5.6	H	M			H		L		
Total - Category - A		65,290	11.7									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	234,614	41.9									
	Urban	220,119	39.4									
	Total	454,733	81.3	M	L			H		L		
Total - Category - B		454,733	81.3									
C1 - Concrete Wall	Rural	10,938	2.0									
	Urban	14,027	2.5									
	Total	24,965	4.5	L	VL			L		VL		
C2 - Wood wall	Rural	1,643	0.3									
	Urban	1,734	0.3									
	Total	3,377	0.6	L	VL			VH		M		
Total - Category - C		28,342	5.1									
X - Other Materials	Rural	6,250	1.1									
	Urban	4,668	0.8									
	Total	10,918	1.9	VL	VL			VH		M		
Total - Category - X		10,918	2.0									
TOTAL HOUSES*		559,283										

ROOF												
R1 - Light Weight Sloping Roof	Rural	25,870	4.6									
	Urban	28,361	5.1									
	Total	54,231	9.7	M	L			VH		H		
R2 - Heavy Weight Sloping Roof	Rural	154,993	27.7									
	Urban	57,612	10.3									
	Total	212,605	38.0	M	L			H		L		
R3 - Flat Roof	Rural	123,530	22.1									
	Urban	168,917	30.2									
	Total	292,447	52.3	Damage Risk as per that for the Wall supporting it								
TOTAL HOUSES*		559,283										

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sq.km. is **928 mm**

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

**Distribution of Houses by Predominant Materials of Roof and Wall
and Level of Damage Risk**

Table No. : GJ 11 State : GUJARAT PORBANDAR

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	2,410	1.5									
	Urban	439	0.3									
	Total	2,849	1.8					M		VH		
A2 - Stone Wall not packed with mortar	Rural	14,062	8.7									
	Urban	4,445	2.8									
	Total	18,507	11.5					M		H		
Total - Category - A		21,356	13.3									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	63,388	39.4									
	Urban	67,218	41.7									
	Total	130,606	81.1					L		H		
Total - Category - B		130,606	81.1									
C1 - Concrete Wall	Rural	2,953	1.8									
	Urban	3,938	2.4									
	Total	6,891	4.2							VL		L
C2 - Wood wall	Rural	328	0.2									
	Urban	181	0.1									
	Total	509	0.3							VL		VH
Total - Category - C		7,400	4.6									
X - Other Materials	Rural	952	0.6									
	Urban	759	0.5									
	Total	1,711	1.1							VL		VH
Total - Category - X		1,711	1.1									
TOTAL HOUSES*		161,073										

ROOF												
R1 - Light Weight Sloping Roof	Rural	5,735	3.6									
	Urban	3,589	2.2									
	Total	9,324	5.8					L		VH		
R2 - Heavy Weight Sloping Roof	Rural	55,299	34.3									
	Urban	34,378	21.3									
	Total	89,677	55.6					L		H		
R3 - Flat Roof	Rural	23,059	14.3									
	Urban	39,013	24.2									
	Total	62,072	38.5	Damage Risk as per that for the Wall supporting it								
TOTAL HOUSES*		161,073										

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sq.km. is **888 mm**

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

**Distribution of Houses by Predominant Materials of Roof and Wall
and Level of Damage Risk**

Table No. : GJ 14 State : GUJARAT BHAVNAGAR

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
				Area in %				Area in %					
						100				64.6		35.4	
WALL													
A1 - Mud & Unburnt Brick Wall	Rural	104,279	15.8										
	Urban	24,598	3.7										
	Total	128,877	19.5			M				VH		M	
A2 - Stone Wall not packed with mortar	Rural	19,912	3.0										
	Urban	3,224	0.5										
	Total	23,136	3.5			M				H		L	
Total - Category - A		152,013	23.0										
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	213,484	32.3										
	Urban	258,415	39.1										
	Total	471,899	71.4			L				H		L	
Total - Category - B		471,899	71.3										
C1 - Concrete Wall	Rural	5,543	0.8										
	Urban	15,981	2.4										
	Total	21,524	3.2			VL				L		VL	
C2 - Wood wall	Rural	1,693	0.3										
	Urban	5,621	0.8										
	Total	7,314	1.1			VL				VH		M	
Total - Category - C		28,838	4.4										
X - Other Materials	Rural	5,735	0.9										
	Urban	3,230	0.5										
	Total	8,965	1.4			VL				VH		M	
Total - Category - X		8,965	1.4										
TOTAL HOUSES*		661,715											
ROOF													
R1 - Light Weight Sloping Roof	Rural	22,419	3.4										
	Urban	43,041	6.5										
	Total	65,460	9.9			L				VH		H	
R2 - Heavy Weight Sloping Roof	Rural	214,497	32.4										
	Urban	66,025	10.0										
	Total	280,522	42.4			L				H		L	
R3 - Flat Roof	Rural	113,730	17.2										
	Urban	202,003	30.5										
	Total	315,733	47.7										
TOTAL HOUSES*		661,715											

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sq.km. is **883 mm**

Housing Category : Wall Types

- Category - A :** Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B :** Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C :** Reinforced building, well built wooden structures
- Category - X :** Other materials not covered in A,B,C. These are generally light.
- Notes :** 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1 - Light Weight** (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2 - Heavy Weight** (Tiles, Stone/Slate)
- Category - R3 - Flat Roof** (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
EQ Zone IV : High Damage Risk Zone (MSK VIII)
EQ Zone III : Moderate Damage Risk Zone (MSK VII)
EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

**Distribution of Houses by Predominant Materials of Roof and Wall
and Level of Damage Risk**

Table No. : GJ 15 State : GUJARAT ANAND

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
				Area in %				Area in %					
						100				.5		99.5	
WALL													
A1 - Mud & Unburnt Brick Wall	Rural	139,668	26.5										
	Urban	25,575	4.9										
	Total	165,243	31.4			M				VH		M	VH
A2 - Stone Wall not packed with mortar	Rural	1,571	0.3										
	Urban	1,503	0.3										
	Total	3,074	0.6			M				H		L	VH
Total - Category - A		168,317	31.9										
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	190,256	36.1										
	Urban	130,345	24.7										
	Total	320,601	60.8			L				H		L	H/M
Total - Category - B		320,601	60.8										
C1 - Concrete Wall	Rural	10,766	2.0										
	Urban	10,170	1.9										
	Total	20,936	3.9			VL				L		VL	L/VL
C2 - Wood wall	Rural	1,827	0.3										
	Urban	989	0.2										
	Total	2,816	0.5			VL				VH		M	H
Total - Category - C		23,752	4.5										
X - Other Materials	Rural	10,719	2.0										
	Urban	3,652	0.7										
	Total	14,371	2.7			VL				VH		M	VH
Total - Category - X		14,371	2.7										
TOTAL HOUSES*		527,041											
ROOF													
R1 - Light Weight Sloping Roof	Rural	100,997	19.2										
	Urban	45,544	8.6										
	Total	146,541	27.8			L				VH		H	VH
R2 - Heavy Weight Sloping Roof	Rural	137,333	26.1										
	Urban	19,010	3.6										
	Total	156,343	29.7			L				H		L	H
R3 - Flat Roof	Rural	116,477	22.1										
	Urban	107,680	20.4										
	Total	224,157	42.5										
TOTAL HOUSES*		527,041											

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sq.km. is **552 mm**

Housing Category : Wall Types

- Category - A :** Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B :** Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C :** Reinforced building, well built wooden structures
- Category - X :** Other materials not covered in A,B,C. These are generally light.
- Notes :** 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1 - Light Weight** (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2 - Heavy Weight** (Tiles, Stone/Slate)
- Category - R3 - Flat Roof** (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
EQ Zone IV : High Damage Risk Zone (MSK VIII)
EQ Zone III : Moderate Damage Risk Zone (MSK VII)
EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : GJ 16 State : GUJARAT KHEDA

Table No. : GJ 17 State : GUJARAT PANCH MAHALS

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %		
		No. of Houses	%	EQ Zone				Wind Velocity m/s						
				V	IV	III	II	55 & 50	47	44 & 39	33			
				Area in %				Area in %						
						100					100			29.2
WALL														
A1 - Mud & Unburnt Brick Wall	Rural	180,003	33.2											
	Urban	17,832	3.3											
	Total	197,835	36.5				M				M			VH
A2 - Stone Wall not packed with mortar	Rural	2,164	0.4											
	Urban	639	0.1											
	Total	2,803	0.5				M				L			VH
Total - Category - A		200,638	37.0											
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	194,988	36.0											
	Urban	106,812	19.7											
	Total	301,800	55.7				L				L			H/M
Total - Category - B		301,800	55.7											
C1 - Concrete Wall	Rural	10,693	2.0											
	Urban	6,118	1.1											
	Total	16,811	3.1				VL				VL			L/VL
C2 - Wood wall	Rural	1,776	0.3											
	Urban	786	0.1											
	Total	2,562	0.4				VL				M			H
Total - Category - C		19,373	3.6											
X - Other Materials	Rural	17,718	3.3											
	Urban	2,377	0.4											
	Total	20,095	3.7				VL				M			VH
Total - Category - X		20,095	3.7											
TOTAL HOUSES*		541,906												

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %									
		No. of Houses	%	EQ Zone				Wind Velocity m/s													
				V	IV	III	II	55 & 50	47	44 & 39	33										
				Area in %				Area in %													
															96.5	3.5			100		12.8
WALL																					
A1 - Mud & Unburnt Brick Wall	Rural	230,657	45.2																		
	Urban	8,148	1.6																		
	Total	238,805	46.8												M	L			M		VH
A2 - Stone Wall not packed with mortar	Rural	12,149	2.4																		
	Urban	439	0.1																		
	Total	12,588	2.5												M	L			L		VH
Total - Category - A		251,393	49.3																		
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	152,280	29.9																		
	Urban	74,091	14.5																		
	Total	226,371	44.4												L	VL			L		H/M
Total - Category - B		226,371	44.4																		
C1 - Concrete Wall	Rural	3,109	0.6																		
	Urban	1,894	0.4																		
	Total	5,003	1.0												VL	VL			VL		L/VL
C2 - Wood wall	Rural	2,453	0.5																		
	Urban	156	-																		
	Total	2,609	0.5												VL	VL			M		H
Total - Category - C		7,612	1.5																		
X - Other Materials	Rural	22,986	4.5																		
	Urban	1,574	0.3																		
	Total	24,560	4.8												VL	VL			M		VH
Total - Category - X		24,560	4.8																		
TOTAL HOUSES*		509,936																			

ROOF														
R1 - Light Weight Sloping Roof	Rural	122,603	22.6											
	Urban	38,127	7.0											
	Total	160,730	29.6				L				H			VH
R2 - Heavy Weight Sloping Roof	Rural	177,423	32.7											
	Urban	15,015	2.8											
	Total	192,438	35.5				L				L			H
R3 - Flat Roof	Rural	107,316	19.8											
	Urban	81,422	15.0											
	Total	188,738	34.8											
TOTAL HOUSES*		541,906												

ROOF														
R1 - Light Weight Sloping Roof	Rural	51,627	10.1											
	Urban	12,423	2.4											
	Total	64,050	12.5				L	VL			H			VH
R2 - Heavy Weight Sloping Roof	Rural	297,931	58.4											
	Urban	10,760	2.1											
	Total	308,691	60.5				L	VL			L			H
R3 - Flat Roof	Rural	74,076	14.5											
	Urban	63,119	12.4											
	Total	137,195	26.9											
TOTAL HOUSES*		509,936												

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sq.km. is 552 mm

Housing Category : Wall Types

Category - A : Buildings in field-stone, rural structures, unburnt brick houses, clay houses

Category - B : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone

Category - C : Reinforced building, well built wooden structures

Category - X : Other materials not covered in A,B,C. These are generally light.

Notes : 1. Flood prone area includes that protected area which may have more severe

damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.

2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building

3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

Category - R1 - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)

Category - R2 - Heavy Weight (Tiles, Stone/Slate)

Category - R3 - Flat Roof (Brick, Concrete)

EQ Zone V : Very High Damage Risk Zone (MSK > IX)

EQ Zone IV : High Damage Risk Zone (MSK VIII)

EQ Zone III : Moderate Damage Risk Zone (MSK VII)

EQ Zone II : Low Damage Risk Zone (MSK < VI)

Level of Risk : VH = Very High; H = High;

M = Moderate; L = Low; VL = Very Low

* Total No.of Houses excluding Vacant/Locked Houses

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sq.km. is 541 mm

Housing Category : Wall Types

Category - A : Buildings in field-stone, rural structures, unburnt brick houses, clay houses

Category - B : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone

Category - C : Reinforced building, well built wooden structures

Category - X : Other materials not covered in A,B,C. These are generally light.

Notes : 1. Flood prone area includes that protected area which may have more severe

damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.

2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building

3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

Category - R1 - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)

Category - R2 - Heavy Weight (Tiles, Stone/Slate)

Category - R3 - Flat Roof (Brick, Concrete)

EQ Zone V : Very High Damage Risk Zone (MSK > IX)

EQ Zone IV : High Damage Risk Zone (MSK VIII)

EQ Zone III : Moderate Damage Risk Zone (MSK VII)

EQ Zone II : Low Damage Risk Zone (MSK < VI)

Level of Risk : VH = Very High; H = High;

M = Moderate; L = Low; VL = Very Low

* Total No.of Houses excluding Vacant/Locked Houses

**Distribution of Houses by Predominant Materials of Roof and Wall
and Level of Damage Risk**

Table No. : GJ 18

State : GUJARAT

DOHAD

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
				Area in %				Area in %					
WALL						58.3	41.7					100	
A1 - Mud & Unburnt Brick Wall	Rural	194,319	54.2										
	Urban	6,820	1.9										
	Total	201,139	56.1			M	L				M		
A2 - Stone Wall not packed with mortar	Rural	18,998	5.3										
	Urban	824	0.2										
	Total	19,822	5.5			M	L				L		
Total - Category - A		220,961	61.6										
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	83,301	23.2										
	Urban	34,493	9.6										
	Total	117,794	32.8			L	VL				L		
Total - Category - B		117,794	32.9										
C1 - Concrete Wall	Rural	1,056	0.3										
	Urban	1,040	0.3										
	Total	2,096	0.6			VL	VL				VL		
C2 - Wood wall	Rural	4,207	1.2										
	Urban	112	-										
	Total	4,319	1.2			VL	VL				M		
Total - Category - C		6,415	1.8										
X - Other Materials	Rural	12,512	3.5										
	Urban	890	0.2										
	Total	13,402	3.7			VL	VL				M		
Total - Category - X		13,402	3.7										
TOTAL HOUSES*		358,572											

ROOF													
R1 - Light Weight Sloping Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
R1 - Light Weight Sloping Roof	Rural	11,503	3.2										
	Urban	4,885	1.4										
	Total	16,388	4.6			L	VL				H		
R2 - Heavy Weight Sloping Roof	Rural	272,558	76.0										
	Urban	12,012	3.3										
	Total	284,570	79.3			L	VL				L		
R3 - Flat Roof	Rural	30,332	8.5										
	Urban	27,282	7.6										
	Total	57,614	16.1										
<i>Damage Risk as per that for the Wall supporting it</i>													
TOTAL HOUSES*		358,572											

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sq.km. is **541 mm**

Housing Category : Wall Types

- Category - A :** Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B :** Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C :** Reinforced building, well built wooden structures
- Category - X :** Other materials not covered in A,B,C. These are generally light.
- Notes :** 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1 - Light Weight** (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2 - Heavy Weight** (Tiles, Stone/Slate)
- Category - R3 - Flat Roof** (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
EQ Zone IV : High Damage Risk Zone (MSK VIII)
EQ Zone III : Moderate Damage Risk Zone (MSK VII)
EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

**Distribution of Houses by Predominant Materials of Roof and Wall
and Level of Damage Risk**

Table No. : GJ 19

State : GUJARAT

VADODARA

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
				Area in %				Area in %					
WALL						100							17.7
A1 - Mud & Unburnt Brick Wall	Rural	157,044	14.9										
	Urban	25,018	2.4										
	Total	182,062	17.3			M					M		VH
A2 - Stone Wall not packed with mortar	Rural	3,048	0.3										
	Urban	1,400	0.1										
	Total	4,448	0.4			M					L		VH
Total - Category - A		186,510	17.7										
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	247,761	23.6										
	Urban	505,473	48.1										
	Total	753,234	71.7			L					L		H/M
Total - Category - B		753,234	71.7										
C1 - Concrete Wall	Rural	11,018	1.0										
	Urban	24,154	2.3										
	Total	35,172	3.3			VL					VL		L/VL
C2 - Wood wall	Rural	2,959	0.3										
	Urban	1,876	0.2										
	Total	4,835	0.5			VL					M		H
Total - Category - C		40,007	3.8										
X - Other Materials	Rural	62,116	5.9										
	Urban	9,294	0.9										
	Total	71,410	6.8			VL					M		VH
Total - Category - X		71,410	6.8										
TOTAL HOUSES*		1,051,161											

ROOF													
R1 - Light Weight Sloping Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
R1 - Light Weight Sloping Roof	Rural	218,513	20.8										
	Urban	122,902	11.7										
	Total	341,415	32.5			L					H		VH
R2 - Heavy Weight Sloping Roof	Rural	157,321	15.0										
	Urban	18,216	1.7										
	Total	175,537	16.7			L					L		H
R3 - Flat Roof	Rural	108,112	10.3										
	Urban	426,097	40.5										
	Total	534,209	50.8										
<i>Damage Risk as per that for the Wall supporting it</i>													
TOTAL HOUSES*		1,051,161											

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sq.km. is **552 mm**

Housing Category : Wall Types

- Category - A :** Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B :** Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C :** Reinforced building, well built wooden structures
- Category - X :** Other materials not covered in A,B,C. These are generally light.
- Notes :** 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1 - Light Weight** (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2 - Heavy Weight** (Tiles, Stone/Slate)
- Category - R3 - Flat Roof** (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
EQ Zone IV : High Damage Risk Zone (MSK VIII)
EQ Zone III : Moderate Damage Risk Zone (MSK VII)
EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

**Distribution of Houses by Predominant Materials of Roof and Wall
and Level of Damage Risk**

Table No. : GJ 22 State : GUJARAT THE DANGS

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %		
		No. of Houses	%	EQ Zone				Wind Velocity m/s						
				V	IV	III	II	55 & 50	47	44 & 39	33			
				Area in %				Area in %						
						100					100		1.9	
WALL														
A1 - Mud & Unburnt Brick Wall	Rural	7,475	13.4											
	Urban	188	0.3											
	Total	7,663	13.7											
A2 - Stone Wall not packed with mortar	Rural	125	0.2											
	Urban	52	0.1											
	Total	177	0.3											
Total - Category - A		7,840	14.1											
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	7,400	13.3											
	Urban	3,401	6.1											
	Total	10,801	19.4											
Total - Category - B		10,801	19.4											
C1 - Concrete Wall	Rural	201	0.4											
	Urban	63	0.1											
	Total	264	0.5											
C2 - Wood wall	Rural	303	0.5											
	Urban	44	0.1											
	Total	347	0.6											
Total - Category - C		611	1.1											
X - Other Materials	Rural	33,929	61.0											
	Urban	2,455	4.4											
	Total	36,384	65.4											
Total - Category - X		36,384	65.4											
TOTAL HOUSES*		55,636												
ROOF														
R1 - Light Weight Sloping Roof	Rural	4,124	7.4											
	Urban	2,315	4.2											
	Total	6,439	11.6											
R2 - Heavy Weight Sloping Roof	Rural	44,867	80.6											
	Urban	2,718	4.9											
	Total	47,585	85.5											
R3 - Flat Roof	Rural	442	0.8											
	Urban	1,170	2.1											
	Total	1,612	2.9											
TOTAL HOUSES*		55,636												

Probable Maximum Precipitation at a Station of the district in one day for areal extent of 1000 sq.km. is 1112 mm

Housing Category : Wall Types

- Category - A :** Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B :** Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C :** Reinforced building, well built wooden structures
- Category - X :** Other materials not covered in A,B,C. These are generally light.
- Notes :** 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1 - Light Weight** (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2 - Heavy Weight** (Tiles, Stone/Slate)
- Category - R3 - Flat Roof** (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
EQ Zone IV : High Damage Risk Zone (MSK VIII)
EQ Zone III : Moderate Damage Risk Zone (MSK VII)
EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

**Distribution of Houses by Predominant Materials of Roof and Wall
and Level of Damage Risk**

Table No. : GJ 23 State : GUJARAT NAVSARI

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %		
		No. of Houses	%	EQ Zone				Wind Velocity m/s						
				V	IV	III	II	55 & 50	47	44 & 39	33			
				Area in %				Area in %						
						100							11.3	
WALL														
A1 - Mud & Unburnt Brick Wall	Rural	20,477	5.8											
	Urban	2,364	0.7											
	Total	22,841	6.5											
A2 - Stone Wall not packed with mortar	Rural	1,426	0.4											
	Urban	555	0.2											
	Total	1,981	0.6											
Total - Category - A		24,822	7.1											
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	143,576	40.9											
	Urban	96,357	27.5											
	Total	239,933	68.4											
Total - Category - B		239,933	68.4											
C1 - Concrete Wall	Rural	5,515	1.6											
	Urban	6,539	1.9											
	Total	12,054	3.5											
C2 - Wood wall	Rural	4,060	1.2											
	Urban	3,998	1.1											
	Total	8,058	2.3											
Total - Category - C		20,112	5.7											
X - Other Materials	Rural	62,671	17.9											
	Urban	3,189	0.9											
	Total	65,860	18.8											
Total - Category - X		65,860	18.8											
TOTAL HOUSES*		350,727												
ROOF														
R1 - Light Weight Sloping Roof	Rural	53,153	15.2											
	Urban	28,796	8.2											
	Total	81,949	23.4											
R2 - Heavy Weight Sloping Roof	Rural	143,317	40.9											
	Urban	14,131	4.0											
	Total	157,448	44.9											
R3 - Flat Roof	Rural	41,255	11.8											
	Urban	70,075	20.0											
	Total	111,330	31.8											
TOTAL HOUSES*		350,727												

Probable Maximum Precipitation at a Station of the district in one day for areal extent of 1000 sq.km. is 1112 mm

Housing Category : Wall Types

- Category - A :** Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B :** Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C :** Reinforced building, well built wooden structures
- Category - X :** Other materials not covered in A,B,C. These are generally light.
- Notes :** 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1 - Light Weight** (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2 - Heavy Weight** (Tiles, Stone/Slate)
- Category - R3 - Flat Roof** (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
EQ Zone IV : High Damage Risk Zone (MSK VIII)
EQ Zone III : Moderate Damage Risk Zone (MSK VII)
EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : GJ 24 State : GUJARAT VALSAD

Table No. : GJ 25 State : GUJARAT SURAT

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %			
		No. of Houses	%	EQ Zone				Wind Velocity m/s							
				V	IV	III	II	55 & 50	47	44 & 39	33				
				Area in %				Area in %							
					100						100			.6	
WALL															
A1 - Mud & Unburnt Brick Wall	Rural	36,394	8.4												
	Urban	7,105	1.6												
	Total	43,499	10.0				M					M			VH
A2 - Stone Wall not packed with mortar	Rural	1,316	0.3												
	Urban	1,175	0.3												
	Total	2,491	0.6				M				L				VH
Total - Category - A		45,990	10.6												
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	125,260	28.9												
	Urban	153,518	35.4												
	Total	278,778	64.3				L				L				H/M
Total - Category - B		278,778	64.3												
C1 - Concrete Wall	Rural	6,894	1.6												
	Urban	17,463	4.0												
	Total	24,357	5.6				VL				VL				L/VL
C2 - Wood wall	Rural	1,989	0.5												
	Urban	1,444	0.3												
	Total	3,433	0.8				VL				M				H
Total - Category - C		27,790	6.4												
X - Other Materials	Rural	71,693	16.5												
	Urban	9,530	2.2												
	Total	81,223	18.7				VL				M				VH
Total - Category - X		81,223	18.7												
TOTAL HOUSES*		433,781													

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %			
		No. of Houses	%	EQ Zone				Wind Velocity m/s							
				V	IV	III	II	55 & 50	47	44 & 39	33				
				Area in %				Area in %							
					100									32.3	
WALL															
A1 - Mud & Unburnt Brick Wall	Rural	31,127	1.9												
	Urban	17,941	1.1												
	Total	49,068	3.0				M				M				VH
A2 - Stone Wall not packed with mortar	Rural	1,224	0.1												
	Urban	2,736	0.2												
	Total	3,960	0.3				M				L				VH
Total - Category - A		53,028	3.3												
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	181,553	11.3												
	Urban	1,168,710	72.7												
	Total	1,350,263	84.0				L				L				H/M
Total - Category - B		1,350,263	84.0												
C1 - Concrete Wall	Rural	18,925	1.2												
	Urban	49,485	3.1												
	Total	68,410	4.3				VL				VL				L/VL
C2 - Wood wall	Rural	1,661	0.1												
	Urban	30,607	1.9												
	Total	32,268	2.0				VL				M				H
Total - Category - C		100,678	6.3												
X - Other Materials	Rural	80,342	5.0												
	Urban	23,520	1.5												
	Total	103,862	6.5				VL				M				VH
Total - Category - X		103,862	6.5												
TOTAL HOUSES*		1,607,831													

ROOF															
R1 - Light Weight Sloping Roof		Census Houses		Level of Risk under								Flood Prone Area in %			
		No. of Houses	%	EQ Zone				Wind Velocity m/s							
				V	IV	III	II	55 & 50	47	44 & 39	33				
R1 - Light Weight Sloping Roof	Rural	69,518	16.0												
	Urban	70,744	16.3												
	Total	140,262	32.3				L				H				VH
R2 - Heavy Weight Sloping Roof	Rural	141,573	32.6												
	Urban	20,316	4.7												
	Total	161,889	37.3				L				L				H
R3 - Flat Roof	Rural	32,455	7.5												
	Urban	99,175	22.9												
	Total	131,630	30.4												
<i>Damage Risk as per that for the Wall supporting it</i>															
TOTAL HOUSES*		433,781													

ROOF															
R1 - Light Weight Sloping Roof		Census Houses		Level of Risk under								Flood Prone Area in %			
		No. of Houses	%	EQ Zone				Wind Velocity m/s							
				V	IV	III	II	55 & 50	47	44 & 39	33				
R1 - Light Weight Sloping Roof	Rural	101,524	6.3												
	Urban	284,882	17.7												
	Total	386,406	24.0				L				H				VH
R2 - Heavy Weight Sloping Roof	Rural	143,198	8.9												
	Urban	42,926	2.7												
	Total	186,124	11.6				L				L				H
R3 - Flat Roof	Rural	70,110	4.4												
	Urban	965,191	60.0												
	Total	1,035,301	64.4												
<i>Damage Risk as per that for the Wall supporting it</i>															
TOTAL HOUSES*		1,607,831													

Probable Maximum Precipitation at a Station of the district in one day for areal extent of 1000 sq.km. is 1112 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
- 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
- 3. Source of Housing Data : Census of Housing, GOI, 2001

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)

- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

Probable Maximum Precipitation at a Station of the district in one day for areal extent of 1000 sq.km. is 1112 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
- 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
- 3. Source of Housing Data : Census of Housing, GOI, 2011

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : GJ 26

State : GUJARAT

TAPI

Wall / Roof		Census Houses		Level of Risk under							Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39		33
				Area in %				Area in %				
		100				100				7.6		
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	13,361	6.6									
	Urban	1,699	0.8									
	Total	15,060	7.4			M			M		VH	
A2 - Stone Wall not packed with mortar	Rural	367	0.2									
	Urban	127	0.1									
	Total	494	0.3			M			L		VH	
Total - Category - A		15,554	7.7									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	54,275	26.8									
	Urban	14,155	7.0									
	Total	68,430	33.8			L			L		H/M	
Total - Category - B		68,430	33.8									
C1 - Concrete Wall	Rural	2,854	1.4									
	Urban	1,730	0.9									
	Total	4,584	2.3			VL			VL		L/VL	
C2 - Wood wall	Rural	653	0.3									
	Urban	211	0.1									
	Total	864	0.4			VL			M		H	
Total - Category - C		5,448	2.7									
X - Other Materials	Rural	109,473	54.1									
	Urban	3,555	1.8									
	Total	113,028	55.9			VL			M		VH	
Total - Category - X		113,028	55.8									
TOTAL HOUSES*		202,460										
ROOF												
R1 - Light Weight Sloping Roof	Rural	30,289	15.0									
	Urban	7,664	3.8									
	Total	37,953	18.8			L			H		VH	
R2 - Heavy Weight Sloping Roof	Rural	140,586	69.4									
	Urban	4,568	2.3									
	Total	145,154	71.7			L			L		H	
R3 - Flat Roof	Rural	10,108	5.0									
	Urban	9,245	4.6									
	Total	19,353	9.6									
TOTAL HOUSES*		202,460										

Probable Maximum Precipitation at a Station of the district in one day for areal extent of 1000 sq.km. is **1112 mm**

Housing Category : Wall Types

Category - A : Buildings in field-stone, rural structures, unburnt brick houses, clay houses

Category - B : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone

Category - C : Reinforced building, well built wooden structures

Category - X : Other materials not covered in A,B,C. These are generally light.

Notes : 1. Flood prone area includes that protected area which may have more severe

damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.

2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building

3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

Category - R1 - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)

Category - R2 - Heavy Weight (Tiles, Stone/Slate)

Category - R3 - Flat Roof (Brick, Concrete)

EQ Zone V : Very High Damage Risk Zone (MSK > IX)

EQ Zone IV : High Damage Risk Zone (MSK VIII)

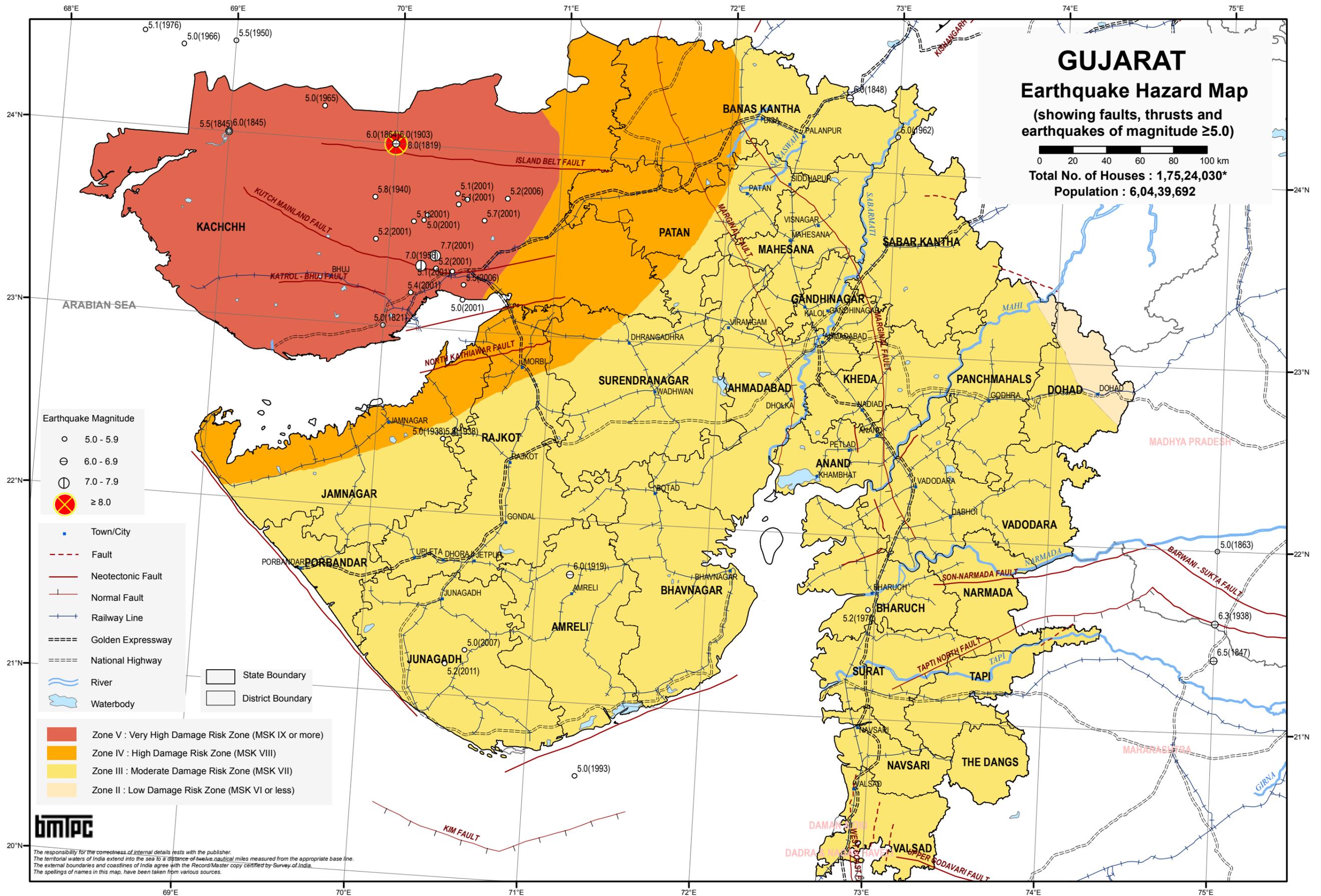
EQ Zone III : Moderate Damage Risk Zone (MSK VII)

EQ Zone II : Low Damage Risk Zone (MSK < VI)

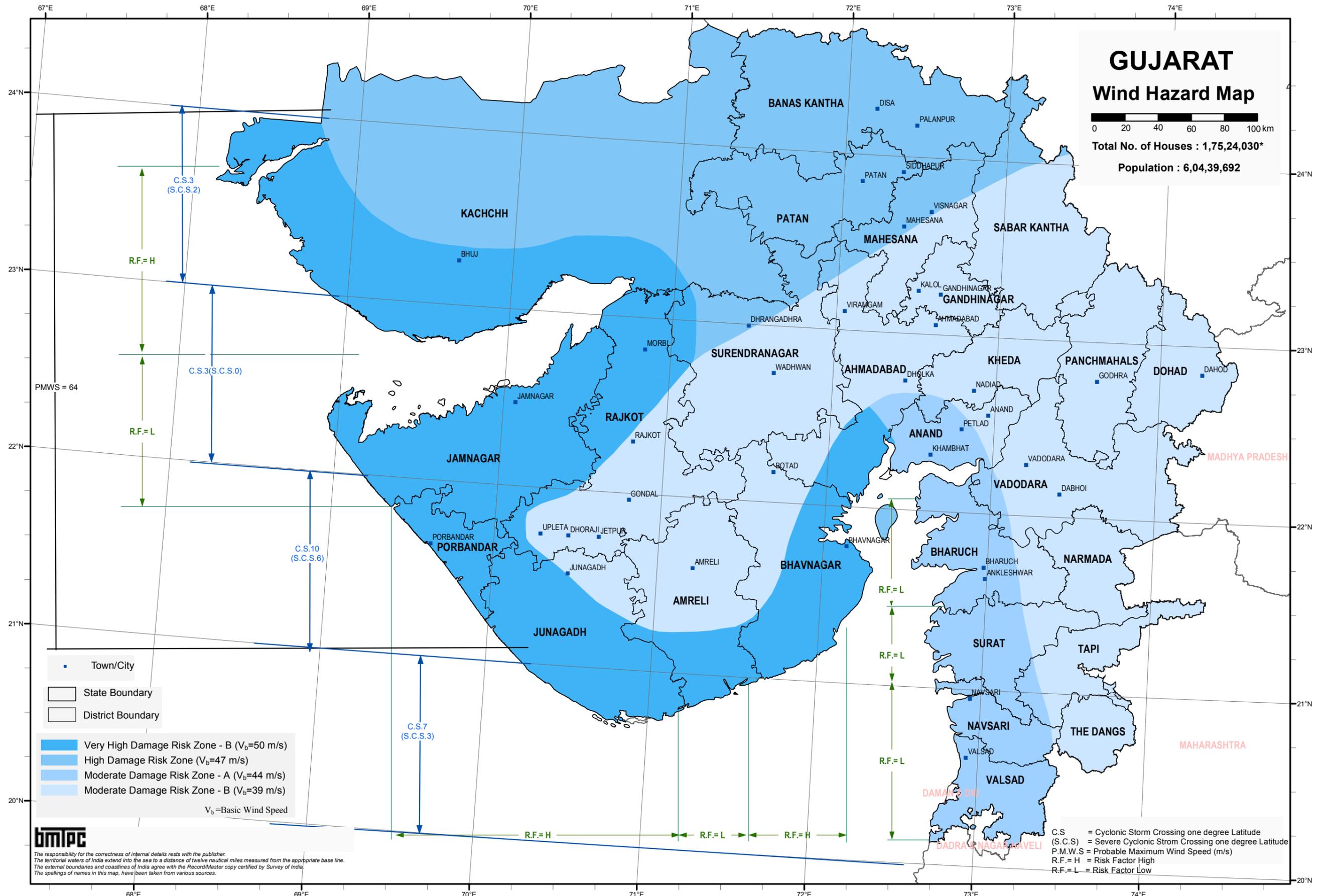
Level of Risk : VH = Very High; H = High;

M = Moderate; L = Low; VL = Very Low

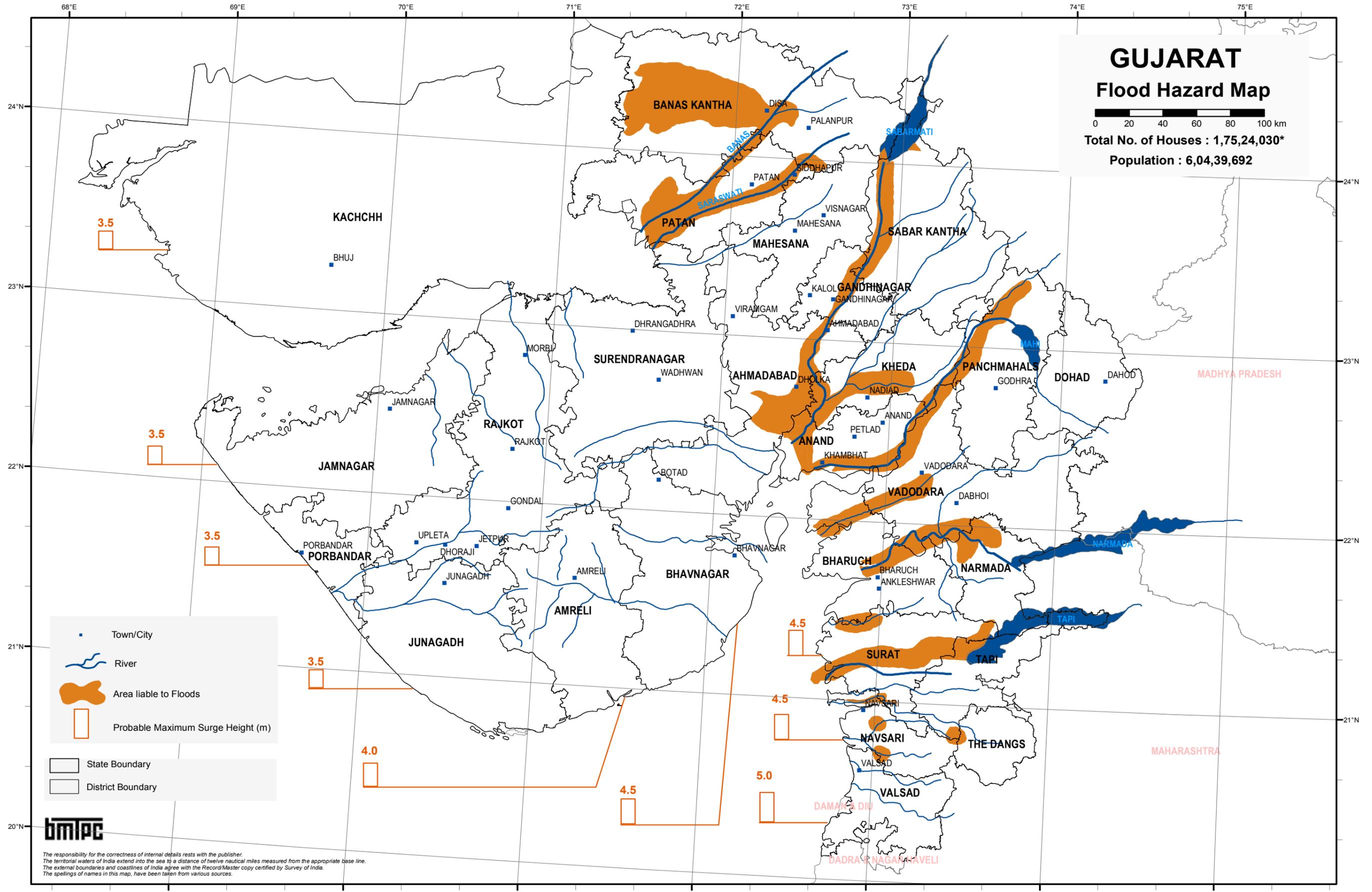
* Total No. of Houses excluding Vacant/Locked Houses



BMTPC : Vulnerability Atlas - 3rd Edition : Peer Group, MoHUA, GOI; Map is Based on digitised data of SOI; Seismic Zones of India Map IS: 1893 (Part I) - 2002, BIS; Earthquake Epicentre from IMD; Seismotectonic Atlas of India and its Environs, GSI; Houses/Population as per Census 2011; *Houses including vacant & locked houses. Disclaimer: The maps are solely for thematic presentation.



BMTPC : Vulnerability Atlas - 3rd Edition; Peer Group, MoHUA; Map is Based on digitised data of SOI, GOI; Basic Wind Speed Map National Building Code 2016; Cyclone Data, 1891-2015, IMD, GOI. Houses/Population as per Census 2011; *Houses including vacant & locked houses. Disclaimer: The maps are solely for thematic presentation.



The responsibility for the correctness of internal details rests with the publisher.
The territorial waters of India extend into the sea to a distance of twelve nautical miles measured from the appropriate base line.
The external boundaries and coastlines of India agree with the Record/Master copy certified by Survey of India.
The spellings of names in this map, have been taken from various sources.

BMTPC : Vulnerability Atlas - 3rd Edition; Peer Group, MoHUA; Map is Based on digitised data of SOI, GOI; Census of India 2011; Flood Atlas (1987), Task Force Report (2004), C.W.C., G.O.I. Houses/Population as per Census 2011; * Houses including vacant & locked houses.
Disclaimer: The maps are solely for thematic presentation.

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

HARYANA

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
STATE - HARYANA				39.4	40.9	19.7	36.6	62.4	1.0		26.8	
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	191,640	3.0									
	Urban	75,905	1.2									
	Total	267,545	4.2	H	M	L	VH	H	M		VH	
A2 - Stone Wall not packed with mortar	Rural	53,756	0.8									
	Urban	45,299	0.7									
	Total	99,055	1.5	H	M	L	H	M	L		VH	
Total - Category - A		366,600	5.7									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	3,769,849	58.6									
	Urban	2,099,457	32.6									
	Total	5,869,306	91.2	M	L	VL	H	M	L		H/M	
Total - Category - B		5,869,306	91.2									
C1 - Concrete Wall	Rural	42,989	0.7									
	Urban	72,553	1.1									
	Total	115,542	1.8	L	VL	VL	L	VL	VL		L/VL	
C2 - Wood wall	Rural	4,165	0.1									
	Urban	3,821	0.1									
	Total	7,986	0.2	L	VL	VL	VH	H	M		H	
Total - Category - C		123,528	1.9									
X - Other Materials	Rural	45,939	0.7									
	Urban	29,713	0.5									
	Total	75,652	1.2	VL	VL	VL	VH	H	M		VH	
Total - Category - X		75,652	1.2									
TOTAL HOUSES*		6,435,086										
ROOF												
R1 - Light Weight Sloping Roof	Rural	1,311,448	20.4									
	Urban	298,094	4.6									
	Total	1,609,542	25.0	M	L	VL	VH	VH	H		VH	
R2 - Heavy Weight Sloping Roof	Rural	1,352,032	21.0									
	Urban	486,988	7.6									
	Total	1,839,020	28.6	M	L	VL	H	M	L		H	
R3 - Flat Roof	Rural	1,444,858	22.5									
	Urban	1,541,666	24.0									
	Total	2,986,524	46.5	Damage Risk as per that for the Wall supporting it								
TOTAL HOUSES*		6,435,086										

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
EQ Zone IV : High Damage Risk Zone (MSK VIII)
EQ Zone III : Moderate Damage Risk Zone (MSK VII)
EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : HR 01

State : HARYANA

PANCHKULA

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %		
		No. of Houses	%	EQ Zone				Wind Velocity m/s						
				V	IV	III	II	55 & 50	47	44 & 39	33			
				Area in %				Area in %						
				100						66.6		33.4		67.4
WALL														
A1 - Mud & Unburnt Brick Wall	Rural	1,928	1.3											
	Urban	4,012	2.7											
	Total	5,940	4.0	H			VH		M		VH			
A2 - Stone Wall not packed with mortar	Rural	1,250	0.9											
	Urban	962	0.7											
	Total	2,212	1.6	H			H		L		VH			
Total - Category - A		8,152	5.6											
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	58,010	39.7											
	Urban	72,655	49.8											
	Total	130,665	89.5	M			H		L		H/M			
Total - Category - B		130,665	89.5											
C1 - Concrete Wall	Rural	1,283	0.9											
	Urban	2,927	2.0											
	Total	4,210	2.9	L			L		VL		L/VL			
C2 - Wood wall	Rural	94	0.1											
	Urban	113	0.1											
	Total	207	0.2	L			VH		M		H			
Total - Category - C		4,417	3.0											
X - Other Materials	Rural	1,683	1.2											
	Urban	1,115	0.8											
	Total	2,798	2.0	VL			VH		M		VH			
Total - Category - X		2,798	1.9											
TOTAL HOUSES*		146,032												
ROOF														
R1 - Light Weight Sloping Roof	Rural	17,124	11.7											
	Urban	11,859	8.1											
	Total	28,983	19.8	M			VH		H		VH			
R2 - Heavy Weight Sloping Roof	Rural	1,473	1.0											
	Urban	3,069	2.1											
	Total	4,542	3.1	M			H		L		H			
R3 - Flat Roof	Rural	45,651	31.3											
	Urban	66,856	45.8											
	Total	112,507	77.1	Damage Risk as per that for the Wall supporting it										
TOTAL HOUSES*		146,032												

Probable Maximum Precipitation at a Station of the district in 24 hrs is 600 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
EQ Zone IV : High Damage Risk Zone (MSK VIII)
EQ Zone III : Moderate Damage Risk Zone (MSK VII)
EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : HR 02 State : HARYANA AMBALA

Table No. : HR 03 State : HARYANA YAMUNANAGAR

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %			
		No. of Houses	%	EQ Zone				Wind Velocity m/s							
				V	IV	III	II	55 & 50	47	44 & 39	33				
				Area in %				Area in %							
				89.3	10.7					100				75.7	
WALL															
A1 - Mud & Unburnt Brick Wall	Rural	6,981	2.4												
	Urban	4,307	1.5												
	Total	11,288	3.9		H	M				VH					VH
A2 - Stone Wall not packed with mortar	Rural	1,882	0.6												
	Urban	2,704	0.9												
	Total	4,586	1.5		H	M				H					VH
Total - Category - A		15,874	5.5												
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	147,044	50.8												
	Urban	111,650	38.6												
	Total	258,694	89.4		M	L				H					H/M
Total - Category - B		258,694	89.3												
C1 - Concrete Wall	Rural	4,716	1.6												
	Urban	5,856	2.0												
	Total	10,572	3.6		L	VL				L					L/VL
C2 - Wood wall	Rural	181	0.1												
	Urban	292	0.1												
	Total	473	0.2		L	VL				VH					H
Total - Category - C		11,045	3.8												
X - Other Materials	Rural	2,509	0.9												
	Urban	1,453	0.5												
	Total	3,962	1.4		VL	VL				VH					VH
Total - Category - X		3,962	1.4												
TOTAL HOUSES*		289,575													

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %				
		No. of Houses	%	EQ Zone				Wind Velocity m/s								
				V	IV	III	II	55 & 50	47	44 & 39	33					
				Area in %				Area in %								
WALL																
A1 - Mud & Unburnt Brick Wall	Rural	12,458	3.8													
	Urban	3,754	1.1													
	Total	16,212	4.9		H					VH		M			VH	
A2 - Stone Wall not packed with mortar	Rural	1,465	0.4													
	Urban	1,551	0.5													
	Total	3,016	0.9		H					H		L			VH	
Total - Category - A		19,228	5.8													
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	179,011	54.0													
	Urban	117,573	35.5													
	Total	296,584	89.5		M					H		L			H/M	
Total - Category - B		296,584	89.5													
C1 - Concrete Wall	Rural	3,971	1.2													
	Urban	4,543	1.4													
	Total	8,514	2.6		L					L		VL			L/VL	
C2 - Wood wall	Rural	192	0.1													
	Urban	193	0.1													
	Total	385	0.2		L					VH		M			H	
Total - Category - C		8,899	2.7													
X - Other Materials	Rural	5,471	1.7													
	Urban	1,368	0.4													
	Total	6,839	2.1		VL					VH		M			VH	
Total - Category - X		6,839	2.1													
TOTAL HOUSES*		331,550														

ROOF															
R1 - Light Weight Sloping Roof	Rural	49,939	17.2												
	Urban	13,638	4.7												
	Total	63,577	21.9		M	L				VH					VH
R2 - Heavy Weight Sloping Roof	Rural	30,123	10.4												
	Urban	9,303	3.2												
	Total	39,426	13.6		M	L				H					H
R3 - Flat Roof	Rural	83,251	28.7												
	Urban	103,321	35.7												
	Total	186,572	64.4												
TOTAL HOUSES*		289,575													

ROOF															
R1 - Light Weight Sloping Roof	Rural	61,824	18.6												
	Urban	14,029	4.2												
	Total	75,853	22.8		M					VH		H			VH
R2 - Heavy Weight Sloping Roof	Rural	19,403	5.9												
	Urban	5,297	1.6												
	Total	24,700	7.5		M					H		L			H
R3 - Flat Roof	Rural	121,341	36.6												
	Urban	109,656	33.1												
	Total	230,997	69.7												
TOTAL HOUSES*		331,550													

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 520 mm

Probable Maximum Precipitation at a Station of the district in 24 hrs is 520 mm

Housing Category : Wall Types

- Category - A :** Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B :** Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C :** Reinforced building, well built wooden structures
- Category - X :** Other materials not covered in A,B,C. These are generally light.

- Notes :** 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
- 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
- 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1 - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)**
- Category - R2 - Heavy Weight (Tiles, Stone/Slate)**
- Category - R3 - Flat Roof (Brick, Concrete)**

- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

Housing Category : Wall Types

- Category - A :** Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B :** Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C :** Reinforced building, well built wooden structures
- Category - X :** Other materials not covered in A,B,C. These are generally light.

- Notes :** 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
- 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
- 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1 - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)**
- Category - R2 - Heavy Weight (Tiles, Stone/Slate)**
- Category - R3 - Flat Roof (Brick, Concrete)**

- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : HR 06 State : HARYANA KARNAL

Table No. : HR 07 State : HARYANA PANIPAT

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %			
		No. of Houses	%	EQ Zone				Wind Velocity m/s							
				V	IV	III	II	55 & 50	47	44 & 39	33				
				Area in %				Area in %							
				28.2	71.8					100				61.2	
WALL															
A1 - Mud & Unburnt Brick Wall	Rural	10,930	2.7												
	Urban	2,942	0.7												
	Total	13,872	3.4		H	M				VH					VH
A2 - Stone Wall not packed with mortar	Rural	2,681	0.7												
	Urban	1,652	0.4												
	Total	4,333	1.1		H	M				H					VH
Total - Category - A		18,205	4.6												
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	254,220	63.7												
	Urban	115,438	28.9												
	Total	369,658	92.6		M	L				H					H/M
Total - Category - B		369,658	92.7												
C1 - Concrete Wall	Rural	4,557	1.1												
	Urban	2,345	0.6												
	Total	6,902	1.7		L	VL				L					L/VL
C2 - Wood wall	Rural	264	0.1												
	Urban	169	-												
	Total	433	0.1		L	VL				VH					H
Total - Category - C		7,335	1.8												
X - Other Materials	Rural	2,715	0.7												
	Urban	912	0.2												
	Total	3,627	0.9		VL	VL				VH					VH
Total - Category - X		3,627	0.9												
TOTAL HOUSES*		398,825													

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %			
		No. of Houses	%	EQ Zone				Wind Velocity m/s							
				V	IV	III	II	55 & 50	47	44 & 39	33				
				Area in %				Area in %							
				59.1	40.9					100					35.3
WALL															
A1 - Mud & Unburnt Brick Wall	Rural	5,521	1.9												
	Urban	3,266	1.1												
	Total	8,787	3.0		H	M				VH					VH
A2 - Stone Wall not packed with mortar	Rural	1,413	0.5												
	Urban	2,546	0.9												
	Total	3,959	1.4		H	M				H					VH
Total - Category - A		12,746	4.3												
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	148,420	50.1												
	Urban	126,101	42.6												
	Total	274,521	92.7		M	L				H					H/M
Total - Category - B		274,521	92.7												
C1 - Concrete Wall	Rural	1,556	0.5												
	Urban	4,174	1.4												
	Total	5,730	1.9		L	VL				L					L/VL
C2 - Wood wall	Rural	101	-												
	Urban	556	0.2												
	Total	657	0.2		L	VL				VH					H
Total - Category - C		6,387	2.2												
X - Other Materials	Rural	1,057	0.4												
	Urban	1,286	0.4												
	Total	2,343	0.8		VL	VL				VH					VH
Total - Category - X		2,343	0.8												
TOTAL HOUSES*		295,997													

ROOF		Rural	Urban	Total	Level of Risk under				Flood Prone Area in %
					V	IV	III	II	
R1 - Light Weight Sloping Roof	Rural	86,242	21.6						
	Urban	15,319	3.8						
	Total	101,561	25.4		M	L			VH
R2 - Heavy Weight Sloping Roof	Rural	61,916	15.5						
	Urban	7,085	1.8						
	Total	69,001	17.3		M	L			H
R3 - Flat Roof	Rural	127,209	31.9						
	Urban	101,054	25.3						
	Total	228,263	57.2						
TOTAL HOUSES*		398,825							

ROOF		Rural	Urban	Total	Level of Risk under				Flood Prone Area in %
					V	IV	III	II	
R1 - Light Weight Sloping Roof	Rural	46,829	15.8						
	Urban	21,315	7.2						
	Total	68,144	23.0		M	L			VH
R2 - Heavy Weight Sloping Roof	Rural	52,929	17.9						
	Urban	15,819	5.3						
	Total	68,748	23.2		M	L			H
R3 - Flat Roof	Rural	58,310	19.7						
	Urban	100,795	34.1						
	Total	159,105	53.8						
TOTAL HOUSES*		295,997							

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 520 mm

Housing Category : Wall Types

- Category - A :** Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B :** Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C :** Reinforced building, well built wooden structures
- Category - X :** Other materials not covered in A,B,C. These are generally light.

- Notes :** 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
- 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
- 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1 - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)**
- Category - R2 - Heavy Weight (Tiles, Stone/Slate)**
- Category - R3 - Flat Roof (Brick, Concrete)**

- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 548 mm

Housing Category : Wall Types

- Category - A :** Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B :** Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C :** Reinforced building, well built wooden structures
- Category - X :** Other materials not covered in A,B,C. These are generally light.

- Notes :** 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
- 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
- 3. Source of Housing Data : Census of Housing, GOI, 2001

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : HR 08 State : HARYANA SONIPAT

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
		80.7	19.3					99.3	.7			38.2
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	6,181	1.6									
	Urban	2,352	0.6									
	Total	8,533	2.2		H	M			VH	H		VH
A2 - Stone Wall not packed with mortar	Rural	2,681	0.7									
	Urban	1,794	0.5									
	Total	4,475	1.2		H	M			H	M		VH
Total - Category - A		13,008	3.5									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	244,244	65.0									
	Urban	111,705	29.7									
	Total	355,949	94.7		M	L			H	M		H/M
Total - Category - B		355,949	94.7									
C1 - Concrete Wall	Rural	1,651	0.4									
	Urban	2,666	0.7									
	Total	4,317	1.1		L	VL			L	VL		L/VL
C2 - Wood wall	Rural	191	0.1									
	Urban	196	0.1									
	Total	387	0.2		L	VL			VH	H		H
Total - Category - C		4,704	1.3									
X - Other Materials	Rural	1,479	0.4									
	Urban	816	0.2									
	Total	2,295	0.6		VL	VL			VH	H		VH
Total - Category - X		2,295	0.6									
TOTAL HOUSES*		375,956										
ROOF												
R1 - Light Weight Sloping Roof	Rural	73,523	19.6									
	Urban	14,024	3.7									
	Total	87,547	23.3		M	L			VH	VH		VH
R2 - Heavy Weight Sloping Roof	Rural	93,280	24.8									
	Urban	32,142	8.5									
	Total	125,422	33.3		M	L			H	M		H
R3 - Flat Roof	Rural	89,624	23.8									
	Urban	73,363	19.5									
	Total	162,987	43.3									
TOTAL HOUSES*		375,956										

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 725 mm

Housing Category : Wall Types

Category - A : Buildings in field-stone, rural structures, unburnt brick houses, clay houses

Category - B : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone

Category - C : Reinforced building, well built wooden structures

Category - X : Other materials not covered in A,B,C. These are generally light.

Notes : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.

2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building

3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

Category - R1 - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)

Category - R2 - Heavy Weight (Tiles, Stone/Slate)

Category - R3 - Flat Roof (Brick, Concrete)

EQ Zone V : Very High Damage Risk Zone (MSK > IX)

EQ Zone IV : High Damage Risk Zone (MSK VIII)

EQ Zone III : Moderate Damage Risk Zone (MSK VII)

EQ Zone II : Low Damage Risk Zone (MSK < VI)

Level of Risk : VH = Very High; H = High;

M = Moderate; L = Low; VL = Very Low

* Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : HR 09 State : HARYANA JIND

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
				Area in %				Area in %					
WALL													
A1 - Mud & Unburnt Brick Wall	Rural	6,029	1.8										
	Urban	2,123	0.6										
	Total	8,152	2.4						M		VH	H	VH
A2 - Stone Wall not packed with mortar	Rural	2,076	0.6										
	Urban	1,741	0.5										
	Total	3,817	1.1						M		H	M	VH
Total - Category - A		11,969	3.5										
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	247,093	72.4										
	Urban	73,993	21.7										
	Total	321,086	94.1						L		H	M	H/M
Total - Category - B		321,086	94.1										
C1 - Concrete Wall	Rural	2,127	0.6										
	Urban	2,304	0.7										
	Total	4,431	1.3							VL		L	VL
C2 - Wood wall	Rural	141	-										
	Urban	73	-										
	Total	214	-							VL		VH	H
Total - Category - C		4,645	1.4										
X - Other Materials	Rural	2,625	0.8										
	Urban	1,010	0.3										
	Total	3,635	1.1							VL		VH	H
Total - Category - X		3,635	1.1										
TOTAL HOUSES*		341,335											
ROOF													
R1 - Light Weight Sloping Roof	Rural	170,038	49.8										
	Urban	22,566	6.6										
	Total	192,604	56.4							L		VH	VH
R2 - Heavy Weight Sloping Roof	Rural	17,761	5.2										
	Urban	4,853	1.4										
	Total	22,614	6.6							L		H	M
R3 - Flat Roof	Rural	72,292	21.2										
	Urban	53,825	15.8										
	Total	126,117	37.0										
TOTAL HOUSES*		341,335											

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 528 mm

Housing Category : Wall Types

Category - A : Buildings in field-stone, rural structures, unburnt brick houses, clay houses

Category - B : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone

Category - C : Reinforced building, well built wooden structures

Category - X : Other materials not covered in A,B,C. These are generally light.

Notes : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.

2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building

3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

Category - R1 - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)

Category - R2 - Heavy Weight (Tiles, Stone/Slate)

Category - R3 - Flat Roof (Brick, Concrete)

EQ Zone V : Very High Damage Risk Zone (MSK > IX)

EQ Zone IV : High Damage Risk Zone (MSK VIII)

EQ Zone III : Moderate Damage Risk Zone (MSK VII)

EQ Zone II : Low Damage Risk Zone (MSK < VI)

Level of Risk : VH = Very High; H = High;

M = Moderate; L = Low; VL = Very Low

* Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : HR 10 State : HARYANA FATEHABAD

Table No. : HR 11 State : HARYANA SIRSA

Wall / Roof	Census Houses		Level of Risk under								Flood Prone Area in %	
	No. of Houses	%	EQ Zone				Wind Velocity m/s					
			V	IV	III	II	55 & 50	47	44 & 39	33		
			Area in %				Area in %					
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	11,197	4.6									
	Urban	1,952	0.8									
	Total	13,149	5.4		M	L	VH	H				VH
A2 - Stone Wall not packed with mortar	Rural	1,097	0.5									
	Urban	800	0.3									
	Total	1,897	0.8		M	L	H	M				VH
Total - Category - A		15,046	6.2									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	175,733	72.5									
	Urban	46,222	19.1									
	Total	221,955	91.6		L	VL	H	M				H/M
Total - Category - B		221,955	91.5									
C1 - Concrete Wall	Rural	1,847	0.8									
	Urban	692	0.3									
	Total	2,539	1.1		VL	VL	L	VL				L/VL
C2 - Wood wall	Rural	94	-									
	Urban	30	-									
	Total	124	-		VL	VL	VH	H				H
Total - Category - C		2,663	1.1									
X - Other Materials	Rural	2,344	1.0									
	Urban	496	0.2									
	Total	2,840	1.2		VL	VL	VH	H				VH
Total - Category - X		2,840	1.2									
TOTAL HOUSES*		242,504										

Wall / Roof	Census Houses		Level of Risk under								Flood Prone Area in %	
	No. of Houses	%	EQ Zone				Wind Velocity m/s					
			V	IV	III	II	55 & 50	47	44 & 39	33		
			Area in %				Area in %					
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	29,022	9.1									
	Urban	3,090	1.0									
	Total	32,112	10.1		M	L		H				
A2 - Stone Wall not packed with mortar	Rural	1,421	0.4									
	Urban	1,904	0.6									
	Total	3,325	1.0		M	L		M				
Total - Category - A		35,437	11.1									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	197,367	62.1									
	Urban	75,169	23.6									
	Total	272,536	85.7		L	VL		M				
Total - Category - B		272,536	85.7									
C1 - Concrete Wall	Rural	1,116	0.4									
	Urban	3,441	1.1									
	Total	4,557	1.5		VL	VL		VL				
C2 - Wood wall	Rural	159	-									
	Urban	74	-									
	Total	233	-		VL	VL		H				
Total - Category - C		4,790	1.5									
X - Other Materials	Rural	4,116	1.3									
	Urban	1,128	0.4									
	Total	5,244	1.7		VL	VL		H				
Total - Category - X		5,244	1.6									
TOTAL HOUSES*		318,007										

ROOF	Rural	Urban	%	Level of Risk under								
				V	IV	III	II	55 & 50	47	44 & 39	33	
R1 - Light Weight Sloping Roof	70,437	8,543	29.0									
	Total	78,980	32.5		L	VL	VH	VH				VH
R2 - Heavy Weight Sloping Roof	13,594	2,071	5.6									
	Total	15,665	6.5		L	VL	H	M				H
R3 - Flat Roof	108,281	39,578	44.7									
	Total	147,859	61.0									
TOTAL HOUSES*		242,504										

ROOF	Rural	Urban	%	Level of Risk under								
				V	IV	III	II	55 & 50	47	44 & 39	33	
R1 - Light Weight Sloping Roof	59,615	9,111	18.7									
	Total	68,726	21.6		L	VL		VH				
R2 - Heavy Weight Sloping Roof	26,221	2,972	8.2									
	Total	29,193	9.1		L	VL		M				
R3 - Flat Roof	147,365	72,723	46.3									
	Total	220,088	69.2									
TOTAL HOUSES*		318,007										

Probable Maximum Precipitation at a Station of the district in 24 hrs is 280 mm

Probable Maximum Precipitation at a Station of the district in 24 hrs is 300 mm

Housing Category : Wall Types

- Category - A :** Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B :** Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C :** Reinforced building, well built wooden structures
- Category - X :** Other materials not covered in A,B,C. These are generally light.

- Notes :** 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
- 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
- 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1 -** Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2 -** Heavy Weight (Tiles, Stone/Slate)
- Category - R3 -** Flat Roof (Brick, Concrete)

- EQ Zone V :** Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV :** High Damage Risk Zone (MSK VIII)
- EQ Zone III :** Moderate Damage Risk Zone (MSK VII)
- EQ Zone II :** Low Damage Risk Zone (MSK < VI)
- Level of Risk :** VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

Housing Category : Wall Types

- Category - A :** Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B :** Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C :** Reinforced building, well built wooden structures
- Category - X :** Other materials not covered in A,B,C. These are generally light.

- Notes :** 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
- 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
- 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1 -** Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2 -** Heavy Weight (Tiles, Stone/Slate)
- Category - R3 -** Flat Roof (Brick, Concrete)

- EQ Zone V :** Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV :** High Damage Risk Zone (MSK VIII)
- EQ Zone III :** Moderate Damage Risk Zone (MSK VII)
- EQ Zone II :** Low Damage Risk Zone (MSK < VI)
- Level of Risk :** VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : HR 14 State : HARYANA ROHTAK

Table No. : HR 15 State : HARYANA JHAJJAR

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
				53.9	46.1			10.1	89.9			13.1
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	4,273	1.5									
	Urban	1,972	0.7									
	Total	6,245	2.2		H	M			VH	H		VH
A2 - Stone Wall not packed with mortar	Rural	1,918	0.7									
	Urban	1,498	0.5									
	Total	3,416	1.2		H	M			H	M		VH
Total - Category - A		9,661	3.5									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	151,365	54.9									
	Urban	109,583	39.7									
	Total	260,948	94.6		M	L			H	M		H/M
Total - Category - B		260,948	94.6									
C1 - Concrete Wall	Rural	1,126	0.4									
	Urban	2,442	0.9									
	Total	3,568	1.3		L	VL			L	VL		L/VL
C2 - Wood wall	Rural	156	0.1									
	Urban	80	-									
	Total	236	0.1		L	VL			VH	H		H
Total - Category - C		3,804	1.4									
X - Other Materials	Rural	842	0.3									
	Urban	539	0.2									
	Total	1,381	0.5		VL	VL			VH	H		VH
Total - Category - X		1,381	0.5									
TOTAL HOUSES*		275,794										

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %									
		No. of Houses	%	EQ Zone				Wind Velocity m/s													
				V	IV	III	II	55 & 50	47	44 & 39	33										
				Area in %				Area in %													
													100			2.5	97.5			33.0	
WALL																					
A1 - Mud & Unburnt Brick Wall	Rural	4,841	1.9																		
	Urban	1,795	0.7																		
	Total	6,636	2.6																		VH
A2 - Stone Wall not packed with mortar	Rural	2,922	1.1																		
	Urban	2,530	1.0																		
	Total	5,452	2.1																		VH
Total - Category - A		12,088	4.7																		
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	177,141	69.2																		
	Urban	59,671	23.3																		
	Total	236,812	92.5																		H/M
Total - Category - B		236,812	92.5																		
C1 - Concrete Wall	Rural	2,145	0.8																		
	Urban	2,702	1.1																		
	Total	4,847	1.9																		L/VL
C2 - Wood wall	Rural	160	0.1																		
	Urban	53	-																		
	Total	213	0.1																		H
Total - Category - C		5,060	2.0																		
X - Other Materials	Rural	1,224	0.5																		
	Urban	697	0.3																		
	Total	1,921	0.8																		VH
Total - Category - X		1,921	0.8																		
TOTAL HOUSES*		255,881																			

ROOF												
R1 - Light Weight Sloping Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
R1 - Light Weight Sloping Roof	Rural	61,925	22.5									
	Urban	12,065	4.4									
	Total	73,990	26.9			M	L			VH	VH	
R2 - Heavy Weight Sloping Roof	Rural	52,914	19.2									
	Urban	32,804	11.9									
	Total	85,718	31.1			M	L			H	M	
R3 - Flat Roof	Rural	44,841	16.3									
	Urban	71,245	25.8									
	Total	116,086	42.1									
TOTAL HOUSES*		275,794										

ROOF												
R1 - Light Weight Sloping Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
R1 - Light Weight Sloping Roof	Rural	31,791	12.4									
	Urban	6,612	2.6									
	Total	38,403	15.0			M				VH	VH	
R2 - Heavy Weight Sloping Roof	Rural	108,866	42.5									
	Urban	33,259	13.0									
	Total	142,125	55.5			M				H	M	
R3 - Flat Roof	Rural	47,776	18.7									
	Urban	27,577	10.8									
	Total	75,353	29.5									
TOTAL HOUSES*		255,881										

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 537 mm

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 537 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
- 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
- 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)

- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
- 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
- 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)

- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : HR 16 State : HARYANA MAHENDRAGARH

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
				Area in %				Area in %					
				20.3	79.7					100			
WALL													
A1 - Mud & Unburnt Brick Wall	Rural	5,493	2.3										
	Urban	741	0.3										
	Total	6,234	2.6			H	M			H			
A2 - Stone Wall not packed with mortar	Rural	5,520	2.3										
	Urban	670	0.3										
	Total	6,190	2.6			H	M			M			
Total - Category - A		12,424	5.2										
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	187,176	78.4										
	Urban	35,892	15.0										
	Total	223,068	93.4			M	L			M			
Total - Category - B		223,068	93.4										
C1 - Concrete Wall	Rural	538	0.2										
	Urban	180	0.1										
	Total	718	0.3			L	VL			VL			
C2 - Wood wall	Rural	546	0.2										
	Urban	209	0.1										
	Total	755	0.3			L	VL			H			
Total - Category - C		1,473	0.6										
X - Other Materials	Rural	1,353	0.6										
	Urban	430	0.2										
	Total	1,783	0.8			VL	VL			H			
Total - Category - X		1,783	0.7										
TOTAL HOUSES*		238,748											
ROOF													
R1 - Light Weight Sloping Roof	Rural	26,241	11.0										
	Urban	3,876	1.6										
	Total	30,117	12.6			M	L			VH			
R2 - Heavy Weight Sloping Roof	Rural	131,744	55.2										
	Urban	18,813	7.9										
	Total	150,557	63.1			M	L			M			
R3 - Flat Roof	Rural	42,641	17.9										
	Urban	15,433	6.5										
	Total	58,074	24.4										
TOTAL HOUSES*		238,748											

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 739 mm

Housing Category : Wall Types

Category - A : Buildings in field-stone, rural structures, unburnt brick houses, clay houses

Category - B : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone

Category - C : Reinforced building, well built wooden structures

Category - X : Other materials not covered in A,B,C. These are generally light.

Notes : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.

2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building

3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

Category - R1 - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)

Category - R2 - Heavy Weight (Tiles, Stone/Slate)

Category - R3 - Flat Roof (Brick, Concrete)

EQ Zone V : Very High Damage Risk Zone (MSK > IX)

EQ Zone IV : High Damage Risk Zone (MSK VIII)

EQ Zone III : Moderate Damage Risk Zone (MSK VII)

EQ Zone II : Low Damage Risk Zone (MSK < VI)

Level of Risk : VH = Very High; H = High;

M = Moderate; L = Low; VL = Very Low

* Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : HR 17 State : HARYANA REWARI

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
				Area in %				Area in %					
WALL													
A1 - Mud & Unburnt Brick Wall	Rural	4,008	1.7										
	Urban	717	0.3										
	Total	4,725	2.0			H				H			VH
A2 - Stone Wall not packed with mortar	Rural	4,061	1.7										
	Urban	619	0.3										
	Total	4,680	2.0			H				M			VH
Total - Category - A		9,405	3.9										
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	168,291	70.5										
	Urban	57,374	24.0										
	Total	225,665	94.5			M				M			H/M
Total - Category - B		225,665	94.5										
C1 - Concrete Wall	Rural	754	0.3										
	Urban	596	0.2										
	Total	1,350	0.5			L				VL			L/VL
C2 - Wood wall	Rural	241	0.1										
	Urban	63	-										
	Total	304	0.1			L				H			H
Total - Category - C		1,654	0.7										
X - Other Materials	Rural	1,560	0.7										
	Urban	578	0.2										
	Total	2,138	0.9			VL				H			VH
Total - Category - X		2,138	0.9										
TOTAL HOUSES*		238,862											
ROOF													
R1 - Light Weight Sloping Roof	Rural	26,380	11.0										
	Urban	3,975	1.7										
	Total	30,355	12.7			M				VH			VH
R2 - Heavy Weight Sloping Roof	Rural	118,017	49.4										
	Urban	33,311	13.9										
	Total	151,328	63.3			M				M			H
R3 - Flat Roof	Rural	34,518	14.5										
	Urban	22,661	9.5										
	Total	57,179	24.0										
TOTAL HOUSES*		238,862											

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 732 mm

Housing Category : Wall Types

Category - A : Buildings in field-stone, rural structures, unburnt brick houses, clay houses

Category - B : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone

Category - C : Reinforced building, well built wooden structures

Category - X : Other materials not covered in A,B,C. These are generally light.

Notes : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.

2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building

3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

Category - R1 - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)

Category - R2 - Heavy Weight (Tiles, Stone/Slate)

Category - R3 - Flat Roof (Brick, Concrete)

EQ Zone V : Very High Damage Risk Zone (MSK > IX)

EQ Zone IV : High Damage Risk Zone (MSK VIII)

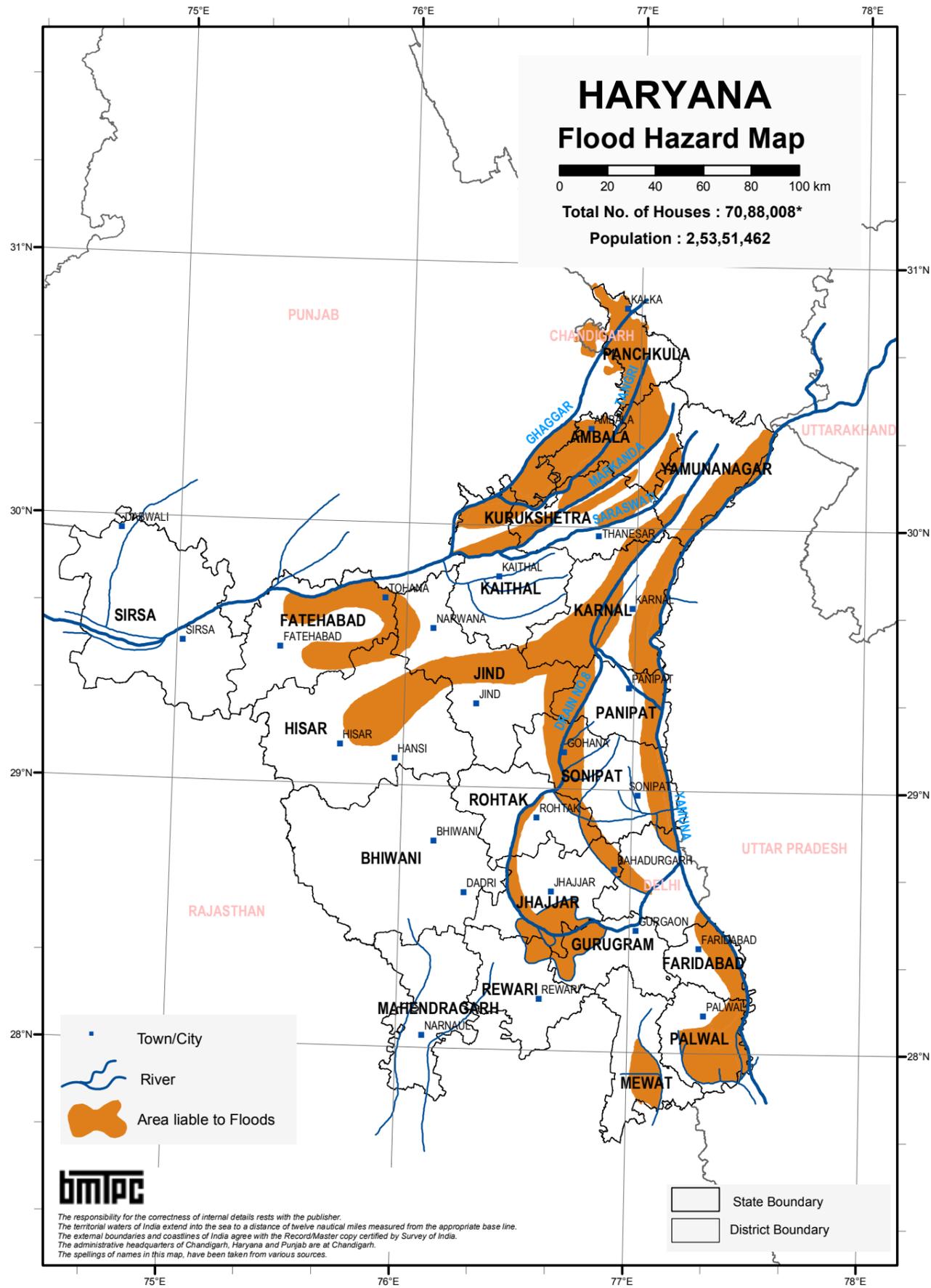
EQ Zone III : Moderate Damage Risk Zone (MSK VII)

EQ Zone II : Low Damage Risk Zone (MSK < VI)

Level of Risk : VH = Very High; H = High;

M = Moderate; L = Low; VL = Very Low

* Total No.of Houses excluding Vacant/Locked Houses



BMTPC : Vulnerability Atlas - 3rd Edition; Peer Group, MoHUA; Map is Based on digitised data of SOI, GOI; Census of India 2011; Flood Atlas (1987), Task Force Report (2004), C.W.C., G.O.I. Houses/Population as per Census 2011; * Houses including vacant & locked houses. Disclaimer: The maps are solely for thematic representation

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

HIMACHAL PRADESH

Wall / Roof		Census Houses		Level of Risk under										Flood Prone Area in %						
		No. of Houses	%	EQ Zone				Wind Velocity m/s				Area in %	Area in %		Area in %					
				V	IV	III	II	55 & 50	47	44 & 39	33									
				Area in %				Area in %												
STATE - HIMACHAL PRADESH												35.3	64.7				1.1		98.9	
WALL																				
A1 - Mud & Unburnt Brick Wall	Rural	518,775	20.1																	
	Urban	12,709	0.5																	
	Total	531,484	20.6	VH	H					VH		M								
A2 - Stone Wall not packed with mortar	Rural	275,229	10.7																	
	Urban	5,362	0.2																	
	Total	280,591	10.9	VH	H					H		L								
Total - Category - A		812,075	31.5																	
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	1,430,444	55.5																	
	Urban	229,507	8.9																	
	Total	1,659,951	64.4	H	M					H		L								
Total - Category - B		1,659,951	64.4																	
C1 - Concrete Wall	Rural	18,189	0.7																	
	Urban	4,130	0.2																	
	Total	22,319	0.9	M	L					L		VL								
C2 - Wood wall	Rural	37,745	1.5																	
	Urban	2,911	0.1																	
	Total	40,656	1.6	M	L					VH		M								
Total - Category - C		62,975	2.4																	
X - Other Materials	Rural	34,780	1.4																	
	Urban	6,166	0.2																	
	Total	40,946	1.6	M	VL					VH		M								
Total - Category - X		40,946	1.6																	
TOTAL HOUSES*		2,575,947																		

ROOF											
R1 - Light Weight Sloping Roof	Rural	459,928	17.9								
	Urban	72,940	2.8								
	Total	532,868	20.7	M	M				VH		H
R2 - Heavy Weight Sloping Roof	Rural	1,032,745	40.1								
	Urban	19,199	0.7								
	Total	1,051,944	40.8	H	M				H		L
R3 - Flat Roof	Rural	822,489	31.9								
	Urban	168,646	6.5								
	Total	991,135	38.4	<i>Damage Risk as per that for the Wall supporting it</i>							
TOTAL HOUSES*		2,575,947									

Housing Category : Wall Types

Category - A : Buildings in field-stone, rural structures, unburnt brick houses, clay houses

Category - B : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone

Category - C : Reinforced building, well built wooden structures

Category - X : Other materials not covered in A,B,C. These are generally light.

Notes : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.

2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building

3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

Category - R1 - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)

Category - R2 - Heavy Weight (Tiles, Stone/Slate)

Category - R3 - Flat Roof (Brick, Concrete)

EQ Zone V : Very High Damage Risk Zone (MSK > IX)

EQ Zone IV : High Damage Risk Zone (MSK VIII)

EQ Zone III : Moderate Damage Risk Zone (MSK VII)

EQ Zone II : Low Damage Risk Zone (MSK < VI)

Level of Risk : VH = Very High; H = High;

M = Moderate; L = Low; VL = Very Low

* Total No. of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : HP 01

State : HIMACHAL PRADESH

CHAMBA

Wall / Roof		Census Houses		Level of Risk under										Flood Prone Area in %										
		No. of Houses	%	EQ Zone				Wind Velocity m/s				Area in %	Area in %		Area in %									
				V	IV	III	II	55 & 50	47	44 & 39	33													
				Area in %				Area in %																
STATE - HIMACHAL PRADESH												60.9	39.1											
WALL																								
A1 - Mud & Unburnt Brick Wall	Rural	15,016	8.6																					
	Urban	318	0.2																					
	Total	15,334	8.8	VH	H														M					
A2 - Stone Wall not packed with mortar	Rural	43,994	25.1																					
	Urban	569	0.3																					
	Total	44,563	25.4	VH	H														L					
Total - Category - A		59,897	34.1																					
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	100,955	57.5																					
	Urban	10,310	5.9																					
	Total	111,265	63.4	H	M														L					
Total - Category - B		111,265	63.4																					
C1 - Concrete Wall	Rural	409	0.2																					
	Urban	27	-																					
	Total	436	0.2	M	L														VL					
C2 - Wood wall	Rural	2,055	1.2																					
	Urban	260	0.1																					
	Total	2,315	1.3	M	L														M					
Total - Category - C		2,751	1.6																					
X - Other Materials	Rural	1,519	0.9																					
	Urban	164	0.1																					
	Total	1,683	1.0	M	VL														M					
Total - Category - X		1,683	1.0																					
TOTAL HOUSES*		175,596																						

ROOF											
R1 - Light Weight Sloping Roof	Rural	61,240	34.9								
	Urban	3,513	2.0								
	Total	64,753	36.9	M	M						H
R2 - Heavy Weight Sloping Roof	Rural	72,449	41.3								
	Urban	2,306	1.3								
	Total	74,755	42.6	H	M						L
R3 - Flat Roof	Rural	30,259	17.2								
	Urban	5,829	3.3								
	Total	36,088	20.5	<i>Damage Risk as per that for the Wall supporting it</i>							
TOTAL HOUSES*		175,596									

Probable Maximum Precipitation at a Station of the district in 24 hrs is 680 mm

Housing Category : Wall Types

Category - A : Buildings in field-stone, rural structures, unburnt brick houses, clay houses

Category - B : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone

Category - C : Reinforced building, well built wooden structures

Category - X : Other materials not covered in A,B,C. These are generally light.

Notes : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.

2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building

3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

Category - R1 - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)

Category - R2 - Heavy Weight (Tiles, Stone/Slate)

Category - R3 - Flat Roof (Brick, Concrete)

EQ Zone V : Very High Damage Risk Zone (MSK > IX)

EQ Zone IV : High Damage Risk Zone (MSK VIII)

EQ Zone III : Moderate Damage Risk Zone (MSK VII)

EQ Zone II : Low Damage Risk Zone (MSK < VI)

Level of Risk : VH = Very High; H = High;

M = Moderate; L = Low; VL = Very Low

* Total No. of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : HP 02 State : HIMACHAL PRADESH KANGRA

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
		96.9	3.1								100	
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	238,911	42.9									
	Urban	3,484	0.6									
	Total	242,395	43.5	VH	H					M		
A2 - Stone Wall not packed with mortar	Rural	8,829	1.6									
	Urban	735	0.1									
	Total	9,564	1.7	VH	H					L		
Total - Category - A		251,959	45.2									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	266,729	47.9									
	Urban	27,421	4.9									
	Total	294,150	52.8	H	M					L		
Total - Category - B		294,150	52.8									
C1 - Concrete Wall	Rural	1,578	0.3									
	Urban	273	-									
	Total	1,851	0.3	M	L					VL		
C2 - Wood wall	Rural	1,551	0.3									
	Urban	227	-									
	Total	1,778	0.3	M	L					M		
Total - Category - C		3,629	0.7									
X - Other Materials	Rural	6,209	1.1									
	Urban	912	0.2									
	Total	7,121	1.3	M	VL					M		
Total - Category - X		7,121	1.3									
TOTAL HOUSES*		556,859										

ROOF												
R1 - Light Weight Sloping Roof	Rural	31,558	5.7									
	Urban	6,243	1.1									
	Total	37,801	6.8	M	M					H		
R2 - Heavy Weight Sloping Roof	Rural	283,848	51.0									
	Urban	5,063	0.9									
	Total	288,911	51.9	H	M					L		
R3 - Flat Roof	Rural	208,401	37.4									
	Urban	21,746	3.9									
	Total	230,147	41.3	<i>Damage Risk as per that for the Wall supporting it</i>								
TOTAL HOUSES*		556,859										

Probable Maximum Precipitation at a Station of the district in 24 hrs is 680 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes :**
1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
 - Category - R2** - Heavy Weight (Tiles, Stone/Slate)
 - Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)

- Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
 * Total No. of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : HP 03 State : HIMACHAL PRADESH LAHUL & SPITI

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %		
		No. of Houses	%	EQ Zone				Wind Velocity m/s						
				V	IV	III	II	55 & 50	47	44 & 39	33			
				Area in %				Area in %						
		4.1	95.9								1.9		98.1	
WALL														
A1 - Mud & Unburnt Brick Wall	Rural	5,149	34.5											
	Urban	-	-											
	Total	5,149	34.5	VH	H					VH	M			
A2 - Stone Wall not packed with mortar	Rural	3,981	26.6											
	Urban	-	-											
	Total	3,981	26.6	VH	H					H	L			
Total - Category - A		9,130	61.1											
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	5,542	37.1											
	Urban	-	-											
	Total	5,542	37.1	H	M					H	L			
Total - Category - B		5,542	37.1											
C1 - Concrete Wall	Rural	74	0.5											
	Urban	-	-											
	Total	74	0.5	M	L					L	VL			
C2 - Wood wall	Rural	27	0.2											
	Urban	-	-											
	Total	27	0.2	M	L					VH	M			
Total - Category - C		101	0.7											
X - Other Materials	Rural	169	1.1											
	Urban	-	-											
	Total	169	1.1	M	VL					VH	M			
Total - Category - X		169	1.1											
TOTAL HOUSES*		14,942												

ROOF												
R1 - Light Weight Sloping Roof	Rural	12,467	83.4									
	Urban	-	-									
	Total	12,467	83.4	M	M					VH	H	
R2 - Heavy Weight Sloping Roof	Rural	111	0.7									
	Urban	-	-									
	Total	111	0.7	H	M					H	L	
R3 - Flat Roof	Rural	2,364	15.8									
	Urban	-	-									
	Total	2,364	15.8	<i>Damage Risk as per that for the Wall supporting it</i>								
TOTAL HOUSES*		14,942										

Probable Maximum Precipitation at a Station of the district in 24 hrs is 360 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes :**
1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
 - Category - R2** - Heavy Weight (Tiles, Stone/Slate)
 - Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)

- Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
 * Total No. of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : HP 04 State : HIMACHAL PRADESH KULLU

Table No. : HP 05 State : HIMACHAL PRADESH MANDI

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
				Area in %				Area in %					
WALL				60.1	39.9							100	
A1 - Mud & Unburnt Brick Wall	Rural	4,004	2.4										
	Urban	564	0.3										
	Total	4,568	2.7	VH	H						M		
A2 - Stone Wall not packed with mortar	Rural	39,177	23.9										
	Urban	760	0.5										
	Total	39,937	24.4	VH	H						L		
Total - Category - A		44,505	27.2										
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	90,364	55.2										
	Urban	14,347	8.8										
	Total	104,711	64.0	H	M						L		
Total - Category - B		104,711	63.9										
C1 - Concrete Wall	Rural	2,292	1.4										
	Urban	1,024	0.6										
	Total	3,316	2.0	M	L						VL		
C2 - Wood wall	Rural	7,986	4.9										
	Urban	675	0.4										
	Total	8,661	5.3	M	L						M		
Total - Category - C		11,977	7.3										
X - Other Materials	Rural	2,277	1.4										
	Urban	349	0.2										
	Total	2,626	1.6	M	VL						M		
Total - Category - X		2,626	1.6										
TOTAL HOUSES*		163,819											

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %		
		No. of Houses	%	EQ Zone				Wind Velocity m/s						
				V	IV	III	II	55 & 50	47	44 & 39	33			
				Area in %				Area in %						
WALL				93.6	6.4								100	
A1 - Mud & Unburnt Brick Wall	Rural	57,119	13.6											
	Urban	1,856	0.4											
	Total	58,975	14.0	VH	H						M			
A2 - Stone Wall not packed with mortar	Rural	88,521	21.1											
	Urban	904	0.2											
	Total	89,425	21.3	VH	H						L			
Total - Category - A		148,400	35.4											
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	235,665	56.3											
	Urban	22,383	5.3											
	Total	258,048	61.6	H	M						L			
Total - Category - B		258,048	61.6											
C1 - Concrete Wall	Rural	3,292	0.8											
	Urban	326	0.1											
	Total	3,618	0.9	M	L						VL			
C2 - Wood wall	Rural	4,902	1.2											
	Urban	159	-											
	Total	5,061	1.2	M	L						M			
Total - Category - C		8,679	2.1											
X - Other Materials	Rural	3,221	0.8											
	Urban	491	0.1											
	Total	3,712	0.9	M	VL						M			
Total - Category - X		3,712	0.9											
TOTAL HOUSES*		418,839												

ROOF										
R1 - Light Weight Sloping Roof	Rural	35,202	21.5							
	Urban	3,773	2.3							
	Total	38,975	23.8	M	M					H
R2 - Heavy Weight Sloping Roof	Rural	86,692	52.9							
	Urban	2,287	1.4							
	Total	88,979	54.3	H	M					L
R3 - Flat Roof	Rural	24,206	14.8							
	Urban	11,659	7.1							
	Total	35,865	21.9	<i>Damage Risk as per that for the Wall supporting it</i>						
TOTAL HOUSES*		163,819								

ROOF										
R1 - Light Weight Sloping Roof	Rural	30,190	7.2							
	Urban	4,087	1.0							
	Total	34,277	8.2	M	M					H
R2 - Heavy Weight Sloping Roof	Rural	249,588	59.6							
	Urban	3,283	0.8							
	Total	252,871	60.4	H	M					L
R3 - Flat Roof	Rural	112,942	27.0							
	Urban	18,749	4.5							
	Total	131,691	31.5	<i>Damage Risk as per that for the Wall supporting it</i>						
TOTAL HOUSES*		418,839								

Probable Maximum Precipitation at a Station of the district in 24 hrs is 400 mm

Probable Maximum Precipitation at a Station of the district in 24 hrs is 600 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
- 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
- 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low

* Total No.of Houses excluding Vacant/Locked Houses

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
- 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
- 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low

* Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : HP 06 State : HIMACHAL PRADESH HAMIRPUR

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
		100								100		
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	77,759	41.5									
	Urban	1,570	0.8									
	Total	79,329	42.3	VH						M		
A2 - Stone Wall not packed with mortar	Rural	2,705	1.4									
	Urban	147	0.1									
	Total	2,852	1.5	VH						L		
Total - Category - A		82,181	43.9									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	91,179	48.7									
	Urban	10,613	5.7									
	Total	101,792	54.4	H						L		
Total - Category - B		101,792	54.4									
C1 - Concrete Wall	Rural	851	0.5									
	Urban	24	-									
	Total	875	0.5	M						VL		
C2 - Wood wall	Rural	371	0.2									
	Urban	45	-									
	Total	416	0.2	M						M		
Total - Category - C		1,291	0.7									
X - Other Materials	Rural	1,715	0.9									
	Urban	217	0.1									
	Total	1,932	1.0	M						M		
Total - Category - X		1,932	1.0									
TOTAL HOUSES*		187,196										

ROOF											
R1 - Light Weight Sloping Roof	Rural	7,604	4.1								
	Urban	779	0.4								
	Total	8,383	4.5	M						H	
R2 - Heavy Weight Sloping Roof	Rural	101,370	54.2								
	Urban	2,276	1.2								
	Total	103,646	55.4	H						L	
R3 - Flat Roof	Rural	65,606	35.0								
	Urban	9,561	5.1								
	Total	75,167	40.1								
TOTAL HOUSES*		187,196									

Probable Maximum Precipitation at a Station of the district in 24 hrs is 520 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)

- Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
 * Total No. of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : HP 07 State : HIMACHAL PRADESH UNA

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
		51.6	48.4							12.7		87.3
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	29,139	16.4									
	Urban	478	0.3									
	Total	29,617	16.7	VH	H					VH	M	
A2 - Stone Wall not packed with mortar	Rural	1,843	1.0									
	Urban	89	0.1									
	Total	1,932	1.1	VH	H					H	L	
Total - Category - A		31,549	17.7									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	123,997	69.7									
	Urban	15,347	8.6									
	Total	139,344	78.3	H	M					H	L	
Total - Category - B		139,344	78.4									
C1 - Concrete Wall	Rural	867	0.5									
	Urban	567	0.3									
	Total	1,434	0.8	M	L					L	VL	
C2 - Wood wall	Rural	352	0.2									
	Urban	47	-									
	Total	399	0.2	M	L					VH	M	
Total - Category - C		1,833	1.0									
X - Other Materials	Rural	4,529	2.5									
	Urban	579	0.3									
	Total	5,108	2.8	M	VL					VH	M	
Total - Category - X		5,108	2.9									
TOTAL HOUSES*		177,834										

ROOF											
R1 - Light Weight Sloping Roof	Rural	28,861	16.2								
	Urban	2,297	1.3								
	Total	31,158	17.5	M	M					VH	H
R2 - Heavy Weight Sloping Roof	Rural	31,051	17.5								
	Urban	489	0.3								
	Total	31,540	17.8	H	M					H	L
R3 - Flat Roof	Rural	100,815	56.7								
	Urban	14,321	8.1								
	Total	115,136	64.8								
TOTAL HOUSES*		177,834									

Probable Maximum Precipitation at a Station of the district in 24 hrs is 440 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)

- Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
 * Total No. of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : HP 08 State : HIMACHAL PRADESH BILASPUR

Table No. : HP 09 State : HIMACHAL PRADESH SOLAN

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
		48.9	51.1							100		
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	32,275	21.8									
	Urban	470	0.3									
	Total	32,745	22.1	VH	H					M		
A2 - Stone Wall not packed with mortar	Rural	8,841	6.0									
	Urban	93	0.1									
	Total	8,934	6.1	VH	H					L		
Total - Category - A		41,679	28.1									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	94,235	63.6									
	Urban	8,776	5.9									
	Total	103,011	69.5	H	M					L		
Total - Category - B		103,011	69.5									
C1 - Concrete Wall	Rural	680	0.5									
	Urban	296	0.2									
	Total	976	0.7	M	L					VL		
C2 - Wood wall	Rural	371	0.3									
	Urban	112	0.1									
	Total	483	0.4	M	L					M		
Total - Category - C		1,459	1.0									
X - Other Materials	Rural	1,720	1.2									
	Urban	248	0.2									
	Total	1,968	1.4	M	VL					M		
Total - Category - X		1,968	1.3									
TOTAL HOUSES*		148,117										

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
		3.1	96.9							3.1	96.9	
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	29,392	14.0									
	Urban	951	0.5									
	Total	30,343	14.5	VH	H					VH	M	
A2 - Stone Wall not packed with mortar	Rural	8,370	4.0									
	Urban	282	0.1									
	Total	8,652	4.1	VH	H					H	L	
Total - Category - A		38,995	18.6									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	124,879	59.7									
	Urban	36,630	17.5									
	Total	161,509	77.2	H	M					H	L	
Total - Category - B		161,509	77.2									
C1 - Concrete Wall	Rural	2,285	1.1									
	Urban	419	0.2									
	Total	2,704	1.3	M	L					L	VL	
C2 - Wood wall	Rural	443	0.2									
	Urban	356	0.2									
	Total	799	0.4	M	L					VH	M	
Total - Category - C		3,503	1.7									
X - Other Materials	Rural	4,366	2.1									
	Urban	918	0.4									
	Total	5,284	2.5	M	VL					VH	M	
Total - Category - X		5,284	2.5									
TOTAL HOUSES*		209,291										

ROOF											
R1 - Light Weight Sloping Roof	Rural	21,095	14.2								
	Urban	876	0.6								
	Total	21,971	14.8	M	M					H	
R2 - Heavy Weight Sloping Roof	Rural	56,031	37.8								
	Urban	804	0.5								
	Total	56,835	38.3	H	M					L	
R3 - Flat Roof	Rural	60,996	41.2								
	Urban	8,315	5.6								
	Total	69,311	46.8	<i>Damage Risk as per that for the Wall supporting it</i>							
TOTAL HOUSES*		148,117									

ROOF											
R1 - Light Weight Sloping Roof	Rural	59,538	28.4								
	Urban	5,709	2.7								
	Total	65,247	31.1	M	M					VH	H
R2 - Heavy Weight Sloping Roof	Rural	10,060	4.8								
	Urban	416	0.2								
	Total	10,476	5.0	H	M					H	L
R3 - Flat Roof	Rural	100,137	47.8								
	Urban	33,431	16.0								
	Total	133,568	63.8	<i>Damage Risk as per that for the Wall supporting it</i>							
TOTAL HOUSES*		209,291									

Probable Maximum Precipitation at a Station of the district in 24 hrs is 520 mm

Probable Maximum Precipitation at a Station of the district in 24 hrs is 600 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes :**
- Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 - Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 - Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low

* Total No.of Houses excluding Vacant/Locked Houses

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes :**
- Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 - Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 - Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low

* Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : HP 10 State : HIMACHAL PRADESH SIRMAUR

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %		
		No. of Houses	%	EQ Zone				Wind Velocity m/s						
				V	IV	III	II	55 & 50	47	44 & 39	33			
				Area in %				Area in %						
WALL														
A1 - Mud & Unburnt Brick Wall	Rural	8,346	4.7											
	Urban	1,090	0.6											
	Total	9,436	5.3		H			VH		M				
A2 - Stone Wall not packed with mortar	Rural	27,715	15.7											
	Urban	481	0.3											
	Total	28,196	16.0		H			H		L				
Total - Category - A		37,632	21.3											
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	114,448	64.9											
	Urban	16,187	9.2											
	Total	130,635	74.1		M			H		L				
Total - Category - B		130,635	74.0											
C1 - Concrete Wall	Rural	1,307	0.7											
	Urban	521	0.3											
	Total	1,828	1.0		L			L		VL				
C2 - Wood wall	Rural	1,444	0.8											
	Urban	42	-											
	Total	1,486	0.8		L			VH		M				
Total - Category - C		3,314	1.9											
X - Other Materials	Rural	4,682	2.7											
	Urban	179	0.1											
	Total	4,861	2.8		VL			VH		M				
Total - Category - X		4,861	2.8											
TOTAL HOUSES*		176,442												

ROOF														
R1 - Light Weight Sloping Roof	Rural	41,749	23.7											
	Urban	1,327	0.8											
	Total	43,076	24.5		M			VH		H				
R2 - Heavy Weight Sloping Roof	Rural	45,136	25.6											
	Urban	222	0.1											
	Total	45,358	25.7		M			H		L				
R3 - Flat Roof	Rural	71,057	40.3											
	Urban	16,951	9.6											
	Total	88,008	49.9											
TOTAL HOUSES*		176,442												

Probable Maximum Precipitation at a Station of the district in 24 hrs is **680 mm**

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes :**
1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)

- Level of Risk : VH = Very High; H = High;
M = Moderate; L = Low; VL = Very Low
* Total No. of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : HP 11 State : HIMACHAL PRADESH SHIMLA

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %		
		No. of Houses	%	EQ Zone				Wind Velocity m/s						
				V	IV	III	II	55 & 50	47	44 & 39	33			
				Area in %				Area in %						
WALL														
A1 - Mud & Unburnt Brick Wall	Rural	20,676	6.6											
	Urban	1,928	0.6											
	Total	22,604	7.2		VH			H					M	
A2 - Stone Wall not packed with mortar	Rural	33,602	10.8											
	Urban	1,302	0.4											
	Total	34,904	11.2		VH			H					L	
Total - Category - A		57,508	18.5											
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	161,434	51.9											
	Urban	67,493	21.7											
	Total	228,927	73.6		H			M					L	
Total - Category - B		228,927	73.6											
C1 - Concrete Wall	Rural	2,904	0.9											
	Urban	653	0.2											
	Total	3,557	1.1		M			L					VL	
C2 - Wood wall	Rural	15,268	4.9											
	Urban	988	0.3											
	Total	16,256	5.2		M			L					M	
Total - Category - C		19,813	6.4											
X - Other Materials	Rural	2,867	0.9											
	Urban	2,109	0.7											
	Total	4,976	1.6		M			VL					M	
Total - Category - X		4,976	1.6											
TOTAL HOUSES*		311,224												

ROOF														
R1 - Light Weight Sloping Roof	Rural	104,251	33.5											
	Urban	44,336	14.2											
	Total	148,587	47.7		M			M					H	
R2 - Heavy Weight Sloping Roof	Rural	92,090	29.6											
	Urban	2,053	0.7											
	Total	94,143	30.3		H			M					L	
R3 - Flat Roof	Rural	40,410	13.0											
	Urban	28,084	9.0											
	Total	68,494	22.0											
TOTAL HOUSES*		311,224												

Probable Maximum Precipitation at a Station of the district in 24 hrs is **720 mm**

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes :**
1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)

- Level of Risk : VH = Very High; H = High;
M = Moderate; L = Low; VL = Very Low
* Total No. of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : HP 12 State : HIMACHAL PRADESH KINNAUR

Wall / Roof		Census Houses		Level of Risk under					Flood Prone Area in %		
		No. of Houses	%	EQ Zone				Wind Velocity m/s			
				V	IV	III	II	55 & 50		47	44 & 39
				Area in %		Area in %					
				100				100			
WALL											
A1 - Mud & Unburnt Brick Wall	Rural	989	2.8								
	Urban	-	-								
	Total	989	2.8								
A2 - Stone Wall not packed with mortar	Rural	7,651	21.4								
	Urban	-	-								
	Total	7,651	21.4								
Total - Category - A		8,640	24.1								
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	21,017	58.7								
	Urban	-	-								
	Total	21,017	58.7								
Total - Category - B		21,017	58.7								
C1 - Concrete Wall	Rural	1,650	4.6								
	Urban	-	-								
	Total	1,650	4.6								
C2 - Wood wall	Rural	2,975	8.3								
	Urban	-	-								
	Total	2,975	8.3								
Total - Category - C		4,625	12.9								
X - Other Materials	Rural	1,506	4.2								
	Urban	-	-								
	Total	1,506	4.2								
Total - Category - X		1,506	4.2								
TOTAL HOUSES*		35,788									
ROOF											
R1 - Light Weight Sloping Roof	Rural	26,173	73.1								
	Urban	-	-								
	Total	26,173	73.1								
R2 - Heavy Weight Sloping Roof	Rural	4,319	12.1								
	Urban	-	-								
	Total	4,319	12.1								
R3 - Flat Roof	Rural	5,296	14.8								
	Urban	-	-								
	Total	5,296	14.8								
TOTAL HOUSES*		35,788									

Probable Maximum Precipitation at a Station of the district in 24 hrs is 720 mm

Housing Category : Wall Types

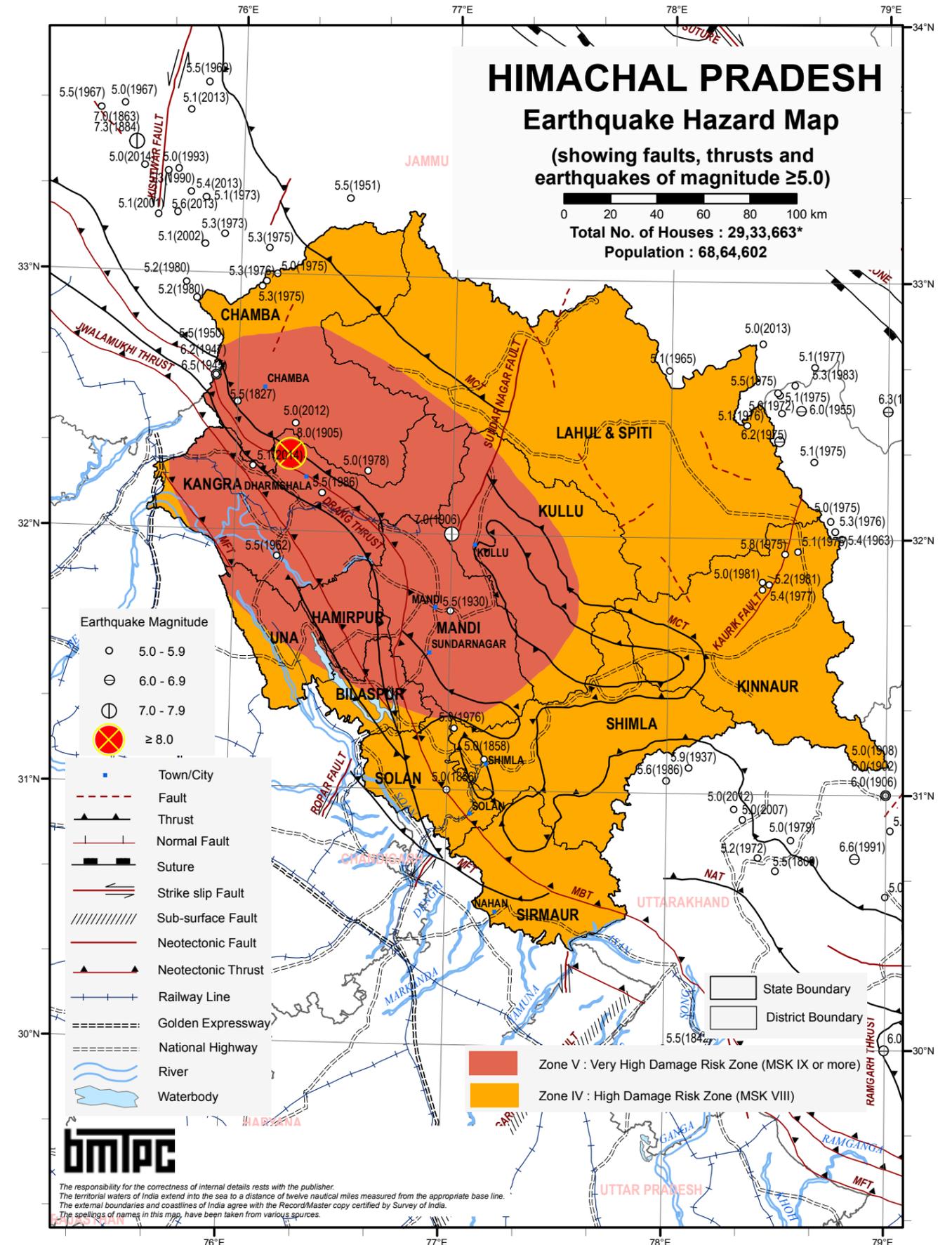
- Category - A :** Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B :** Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C :** Reinforced building, well built wooden structures
- Category - X :** Other materials not covered in A,B,C. These are generally light.

- Notes :**
1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

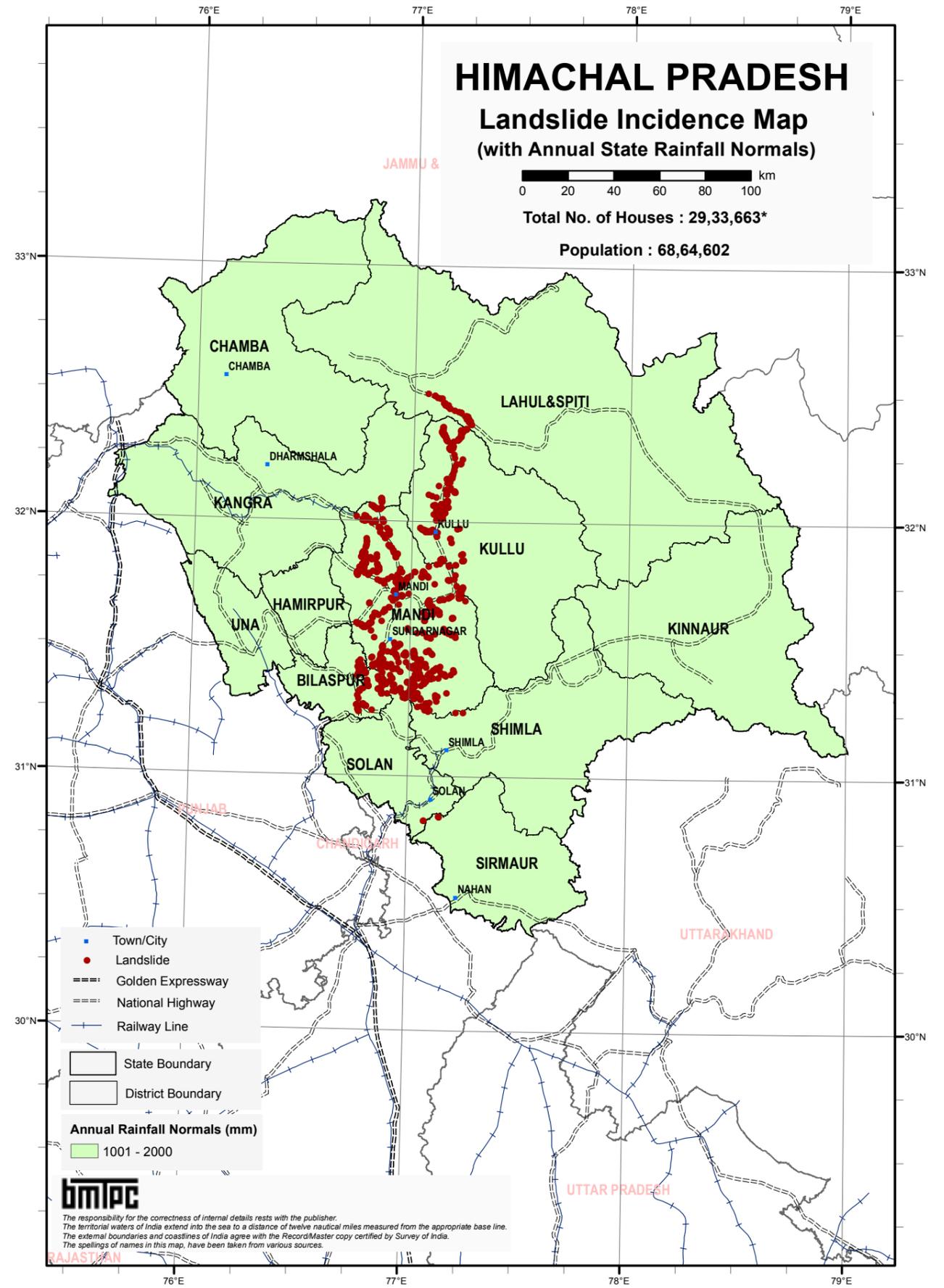
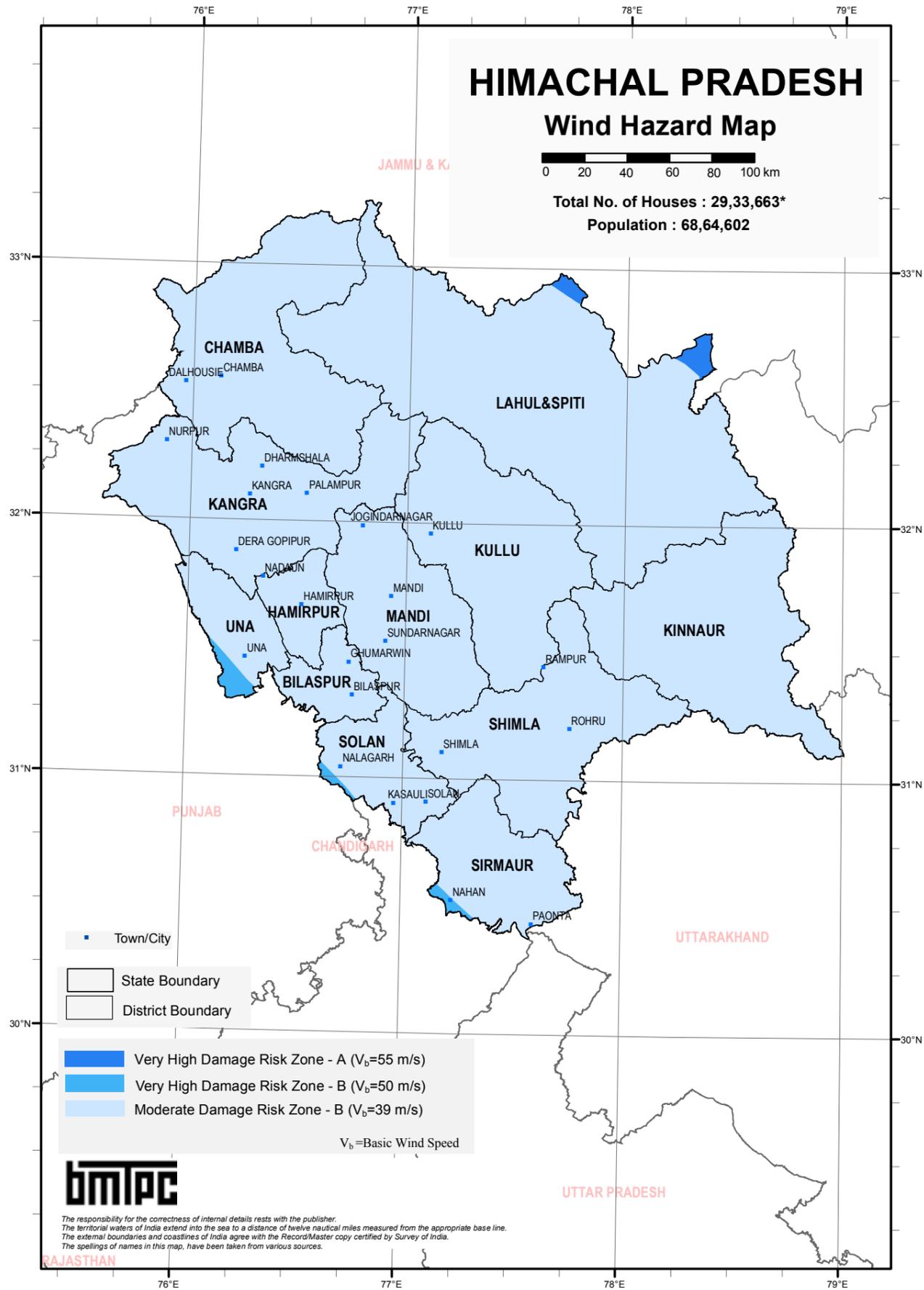
Housing Category : Roof Type

- Category - R1 -** Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2 -** Heavy Weight (Tiles, Stone/Slate)
- Category - R3 -** Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
- M = Moderate; L = Low; VL = Very Low

* Total No. of Houses excluding Vacant/Locked Houses



BMTPC : Vulnerability Atlas - 3rd Edition : Peer Group, MoHUA, GOI; Map is Based on digitised data of SOI; Seismic Zones of India Map IS:1893 (Part I): 2002, BIS; Earthquake Epicentre from IMD; Seismotectonic Atlas of India and its Environs, GSI; Houses/Population as per Census 2011; *Houses including vacant & locked houses. Disclaimer: The maps are solely for thematic presentation.



BMTPC : Vulnerability Atlas - 3rd Edition; Peer Group, MoHUA; Map is Based on digitised data of SOI, GOI; Basic Wind Speed Map National Building Code 2016. Houses/Population as per Census 2011; *Houses including vacant & locked houses. Disclaimer: The maps are solely for thematic presentation.

BMTPC: Vulnerability Atlas - 3rd Edition: Peer Group, MoHUA,GOI; Map is Based on digitised data of SOI; Landslide Incidence data GSI; Annual Rainfall data IMD. Houses/Population as per Census 2011; * Houses including vacant & locked houses. Disclaimer: The maps are solely for thematic presentation.

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

JAMMU & KASHMIR

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
				Area in %				Area in %					
STATE - JAMMU & KASHMIR				6.0	94.0					65.9		34.1	
WALL													
A1 - Mud & Unburnt Brick Wall	Rural	459,902	14.0										
	Urban	79,006	2.4										
	Total	538,908	16.4	VH	H					VH		M	
A2 - Stone Wall not packed with mortar	Rural	476,281	14.5										
	Urban	18,222	0.6										
	Total	494,503	15.1	VH	H					H		L	
Total - Category - A		1,033,411	31.5										
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	1,275,084	38.9										
	Urban	640,207	19.5										
	Total	1,915,291	58.4	H	M					H		L	
Total - Category - B		1,915,291	58.5										
C1 - Concrete Wall	Rural	30,113	0.9										
	Urban	37,899	1.2										
	Total	68,012	2.1	M	L					L		VL	
C2 - Wood wall	Rural	144,032	4.4										
	Urban	17,229	0.5										
	Total	161,261	4.9	M	L					VH		M	
Total - Category - C		229,273	7.0										
X - Other Materials	Rural	76,007	2.3										
	Urban	21,963	0.7										
	Total	97,970	3.0	M	VL					VH		M	
Total - Category - X		97,970	3.0										
TOTAL HOUSES*		3,275,945											
ROOF													
R1 - Light Weight Sloping Roof	Rural	1,991,974	60.8										
	Urban	467,995	14.3										
	Total	2,459,969	75.1	M	M					VH		H	
R2 - Heavy Weight Sloping Roof	Rural	53,752	1.6										
	Urban	19,995	0.6										
	Total	73,747	2.2	H	M					H		L	
R3 - Flat Roof	Rural	415,693	12.7										
	Urban	326,536	10.0										
	Total	742,229	22.7	<i>Damage Risk as per that for the Wall supporting it</i>									
TOTAL HOUSES*		3,275,945											

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
 - Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
 - Category - C** : Reinforced building, well built wooden structures
 - Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
 - Category - R2** - Heavy Weight (Tiles, Slate)
 - Category - R3** - Flat Roof (Brick, Stone, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : JK 01

State : JAMMU & KASHMIR

KUPWARA

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
				Area in %				Area in %					
				86.9	13.1							100	
WALL													
A1 - Mud & Unburnt Brick Wall	Rural	24,024	13.9										
	Urban	3,126	1.8										
	Total	27,150	15.7	VH	H							M	
A2 - Stone Wall not packed with mortar	Rural	9,915	5.7										
	Urban	1,809	1.0										
	Total	11,724	6.7	VH	H							L	
Total - Category - A		38,874	22.4										
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	60,972	35.2										
	Urban	13,970	8.1										
	Total	74,942	43.3	H	M							L	
Total - Category - B		74,942	43.2										
C1 - Concrete Wall	Rural	1,969	1.1										
	Urban	199	0.1										
	Total	2,168	1.2	M	L							VL	
C2 - Wood wall	Rural	49,970	28.8										
	Urban	1,913	1.1										
	Total	51,883	29.9	M	L							M	
Total - Category - C		54,051	31.2										
X - Other Materials	Rural	4,785	2.8										
	Urban	641	0.4										
	Total	5,426	3.2	M	VL							M	
Total - Category - X		5,426	3.1										
TOTAL HOUSES*		173,293											
ROOF													
R1 - Light Weight Sloping Roof	Rural	147,384	85.0										
	Urban	19,646	11.3										
	Total	167,030	96.3	M	M							H	
R2 - Heavy Weight Sloping Roof	Rural	2,434	1.4										
	Urban	287	0.2										
	Total	2,721	1.6	H	M							L	
R3 - Flat Roof	Rural	1,817	1.0										
	Urban	1,725	1.0										
	Total	3,542	2.0	<i>Damage Risk as per that for the Wall supporting it</i>									
TOTAL HOUSES*		173,293											

Probable Maximum Precipitation at a Station of the district in 24 hrs is 280 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
 - Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
 - Category - C** : Reinforced building, well built wooden structures
 - Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
 - Category - R2** - Heavy Weight (Tiles, Stone/Slate)
 - Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

**Distribution of Houses by Predominant Materials of Roof and Wall
and Level of Damage Risk**

Table No. : JK 02 State : JAMMU & KASHMIR BADGAM

Wall / Roof		Census Houses		Level of Risk under										Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				Area in %		
				V	IV	III	II	55 & 50	47	44 & 39	33			
				Area in %				Area in %						
WALL				59.6	40.4								100	
A1 - Mud & Unburnt Brick Wall	Rural	23,835	13.5											
	Urban	2,270	1.3											
	Total	26,105	14.8	VH	H								M	
A2 - Stone Wall not packed with mortar	Rural	1,028	0.6											
	Urban	352	0.2											
	Total	1,380	0.8	VH	H								L	
Total - Category - A		27,485	15.6											
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	104,867	59.5											
	Urban	18,680	10.6											
	Total	123,547	70.1	H	M								L	
Total - Category - B		123,547	70.1											
C1 - Concrete Wall	Rural	1,519	0.9											
	Urban	797	0.5											
	Total	2,316	1.4	M	L								VL	
C2 - Wood wall	Rural	12,078	6.9											
	Urban	402	0.2											
	Total	12,480	7.1	M	L								M	
Total - Category - C		14,796	8.4											
X - Other Materials	Rural	9,430	5.4											
	Urban	933	0.5											
	Total	10,363	5.9	M	VL								M	
Total - Category - X		10,363	5.9											
TOTAL HOUSES*		176,191												

ROOF														
R1 - Light Weight Sloping Roof	Rural	146,171	83.0											
	Urban	20,926	11.9											
	Total	167,097	94.9	M	M								H	
R2 - Heavy Weight Sloping Roof	Rural	2,329	1.3											
	Urban	347	0.2											
	Total	2,676	1.5	H	M								L	
R3 - Flat Roof	Rural	4,257	2.4											
	Urban	2,161	1.2											
	Total	6,418	3.6	<i>Damage Risk as per that for the Wall supporting it</i>										
TOTAL HOUSES*		176,191												

Probable Maximum Precipitation at a Station of the district in 24 hrs is 320 mm

Housing Category : Wall Types

- Category - A :** Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B :** Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C :** Reinforced building, well built wooden structures
- Category - X :** Other materials not covered in A,B,C. These are generally light.

- Notes :**
1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1 -** Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2 -** Heavy Weight (Tiles, Stone/Slate)
- Category - R3 -** Flat Roof (Brick, Concrete)

- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
 Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
 * Total No. of Houses excluding Vacant/Locked Houses

**Distribution of Houses by Predominant Materials of Roof and Wall
and Level of Damage Risk**

Table No. : JK 03 State : JAMMU & KASHMIR LEH(LADAKH)

Wall / Roof		Census Houses		Level of Risk under										Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				Area in %		
				V	IV	III	II	55 & 50	47	44 & 39	33			
				Area in %				Area in %						
WALL														
A1 - Mud & Unburnt Brick Wall	Rural	16,167	39.0											
	Urban	10,568	25.5											
	Total	26,735	64.5	H				VH					M	
A2 - Stone Wall not packed with mortar	Rural	7,963	19.2											
	Urban	787	1.9											
	Total	8,750	21.1	H				H					L	
Total - Category - A		35,485	85.7											
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	4,051	9.8											
	Urban	494	1.2											
	Total	4,545	11.0	M				H					L	
Total - Category - B		4,545	11.0											
C1 - Concrete Wall	Rural	107	0.3											
	Urban	165	0.4											
	Total	272	0.7	L				L					VL	
C2 - Wood wall	Rural	156	0.4											
	Urban	123	0.3											
	Total	279	0.7	L				VH					M	
Total - Category - C		551	1.3											
X - Other Materials	Rural	583	1.4											
	Urban	247	0.6											
	Total	830	2.0	VL				VH					M	
Total - Category - X		830	2.0											
TOTAL HOUSES*		41,411												

ROOF														
R1 - Light Weight Sloping Roof	Rural	28,426	68.6											
	Urban	9,510	23.0											
	Total	37,936	91.6	M				VH					H	
R2 - Heavy Weight Sloping Roof	Rural	291	0.7											
	Urban	711	1.7											
	Total	1,002	2.4	M				H					L	
R3 - Flat Roof	Rural	310	0.7											
	Urban	2,163	5.2											
	Total	2,473	5.9	<i>Damage Risk as per that for the Wall supporting it</i>										
TOTAL HOUSES*		41,411												

Probable Maximum Precipitation at a Station of the district in 24 hrs is 160 mm

Housing Category : Wall Types

- Category - A :** Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B :** Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C :** Reinforced building, well built wooden structures
- Category - X :** Other materials not covered in A,B,C. These are generally light.

- Notes :**
1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1 -** Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2 -** Heavy Weight (Tiles, Stone/Slate)
- Category - R3 -** Flat Roof (Brick, Concrete)

- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
 Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
 * Total No. of Houses excluding Vacant/Locked Houses

**Distribution of Houses by Predominant Materials of Roof and Wall
and Level of Damage Risk**

Table No. : JK 06 State : JAMMU & KASHMIR RAJOURI

Wall / Roof		Census Houses		Level of Risk under										Flood Prone Area in %		
		No. of Houses	%	EQ Zone				Wind Velocity m/s				Area in %				
				V	IV	III	II	55 & 50	47	44 & 39	33					
				Area in %				Area in %								
WALL																
A1 - Mud & Unburnt Brick Wall	Rural	3,814	2.0													
	Urban	157	0.1													
	Total	3,971	2.1													
A2 - Stone Wall not packed with mortar	Rural	92,232	48.1													
	Urban	388	0.2													
	Total	92,620	48.3													
Total - Category - A		96,591	50.4													
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	78,113	40.7													
	Urban	12,137	6.3													
	Total	90,250	47.0													
Total - Category - B		90,250	47.1													
C1 - Concrete Wall	Rural	2,720	1.4													
	Urban	301	0.2													
	Total	3,021	1.6													
C2 - Wood wall	Rural	647	0.3													
	Urban	20	-													
	Total	667	0.3													
Total - Category - C		3,688	1.9													
X - Other Materials	Rural	1,120	0.6													
	Urban	130	0.1													
	Total	1,250	0.7													
Total - Category - X		1,250	0.7													
TOTAL HOUSES*		191,779														

ROOF		Census Houses		Level of Risk under										Flood Prone Area in %		
		No. of Houses	%	EQ Zone				Wind Velocity m/s				Area in %				
				V	IV	III	II	55 & 50	47	44 & 39	33					
				Area in %				Area in %								
WALL																
R1 - Light Weight Sloping Roof	Rural	131,965	68.8													
	Urban	994	0.5													
	Total	132,959	69.3													
R2 - Heavy Weight Sloping Roof	Rural	1,337	0.7													
	Urban	79	-													
	Total	1,416	0.7													
R3 - Flat Roof	Rural	45,344	23.6													
	Urban	12,060	6.3													
	Total	57,404	29.9													
TOTAL HOUSES*		191,779														

Probable Maximum Precipitation at a Station of the district in 24 hrs is 520 mm

Housing Category : Wall Types

- Category - A :** Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B :** Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C :** Reinforced building, well built wooden structures
- Category - X :** Other materials not covered in A,B,C. These are generally light.

- Notes :**
1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1 -** Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2 -** Heavy Weight (Tiles, Stone/Slate)
- Category - R3 -** Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)

Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
* Total No. of Houses excluding Vacant/Locked Houses

**Distribution of Houses by Predominant Materials of Roof and Wall
and Level of Damage Risk**

Table No. : JK 07 State : JAMMU & KASHMIR KATHUA

Wall / Roof		Census Houses		Level of Risk under										Flood Prone Area in %		
		No. of Houses	%	EQ Zone				Wind Velocity m/s				Area in %				
				V	IV	III	II	55 & 50	47	44 & 39	33					
				Area in %				Area in %								
WALL																
A1 - Mud & Unburnt Brick Wall	Rural	35,228	18.0													
	Urban	1,338	0.7													
	Total	36,566	18.7													
A2 - Stone Wall not packed with mortar	Rural	28,567	14.6													
	Urban	114	0.1													
	Total	28,681	14.7													
Total - Category - A		65,247	33.3													
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	99,835	50.9													
	Urban	25,716	13.1													
	Total	125,551	64.0													
Total - Category - B		125,551	64.0													
C1 - Concrete Wall	Rural	774	0.4													
	Urban	200	0.1													
	Total	974	0.5													
C2 - Wood wall	Rural	392	0.2													
	Urban	93	-													
	Total	485	0.2													
Total - Category - C		1,459	0.7													
X - Other Materials	Rural	3,549	1.8													
	Urban	300	0.2													
	Total	3,849	2.0													
Total - Category - X		3,849	2.0													
TOTAL HOUSES*		196,106														

ROOF		Census Houses		Level of Risk under										Flood Prone Area in %		
		No. of Houses	%	EQ Zone				Wind Velocity m/s				Area in %				
				V	IV	III	II	55 & 50	47	44 & 39	33					
				Area in %				Area in %								
WALL																
R1 - Light Weight Sloping Roof	Rural	97,133	49.5													
	Urban	4,269	2.2													
	Total	101,402	51.7													
R2 - Heavy Weight Sloping Roof	Rural	3,256	1.7													
	Urban	273	0.1													
	Total	3,529	1.8													
R3 - Flat Roof	Rural	67,956	34.7													
	Urban	23,219	11.8													
	Total	91,175	46.5													
TOTAL HOUSES*		196,106														

Probable Maximum Precipitation at a Station of the district in 24 hrs is 400 mm

Housing Category : Wall Types

- Category - A :** Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B :** Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C :** Reinforced building, well built wooden structures
- Category - X :** Other materials not covered in A,B,C. These are generally light.

- Notes :**
1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1 -** Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2 -** Heavy Weight (Tiles, Stone/Slate)
- Category - R3 -** Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)

Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
* Total No. of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : JK 08 State : JAMMU & KASHMIR BARAMULA

Table No. : JK 09 State : JAMMU & KASHMIR BANDIPORE

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
				Area in %				Area in %					
		77.5	22.5									100	
WALL													
A1 - Mud & Unburnt Brick Wall	Rural	47,177	19.1										
	Urban	6,235	2.5										
	Total	53,412	21.6	VH	H							M	
A2 - Stone Wall not packed with mortar	Rural	17,946	7.3										
	Urban	1,860	0.8										
	Total	19,806	8.1	VH	H							L	
Total - Category - A		73,218	29.6										
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	109,450	44.3										
	Urban	33,567	13.6										
	Total	143,017	57.9	H	M							L	
Total - Category - B		143,017	57.9										
C1 - Concrete Wall	Rural	3,231	1.3										
	Urban	745	0.3										
	Total	3,976	1.6	M	L							VL	
C2 - Wood wall	Rural	10,460	4.2										
	Urban	816	0.3										
	Total	11,276	4.5	M	L							M	
Total - Category - C		15,252	6.2										
X - Other Materials	Rural	13,578	5.5										
	Urban	2,121	0.9										
	Total	15,699	6.4	M	VL							M	
Total - Category - X		15,699	6.4										
TOTAL HOUSES*		247,186											

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %		
		No. of Houses	%	EQ Zone				Wind Velocity m/s						
				V	IV	III	II	55 & 50	47	44 & 39	33			
				Area in %				Area in %						
		53.2	46.8										100	
WALL														
A1 - Mud & Unburnt Brick Wall	Rural	21,508	22.9											
	Urban	3,239	3.5											
	Total	24,747	26.4	VH	H							M		
A2 - Stone Wall not packed with mortar	Rural	3,520	3.8											
	Urban	560	0.6											
	Total	4,080	4.4	VH	H							L		
Total - Category - A		28,827	30.7											
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	37,898	40.4											
	Urban	10,904	11.6											
	Total	48,802	52.0	H	M							L		
Total - Category - B		48,802	52.0											
C1 - Concrete Wall	Rural	939	1.0											
	Urban	308	0.3											
	Total	1,247	1.3	M	L							VL		
C2 - Wood wall	Rural	8,898	9.5											
	Urban	357	0.4											
	Total	9,255	9.9	M	L							M		
Total - Category - C		10,502	11.2											
X - Other Materials	Rural	4,512	4.8											
	Urban	1,200	1.3											
	Total	5,712	6.1	M	VL							M		
Total - Category - X		5,712	6.1											
TOTAL HOUSES*		93,843												

ROOF													
R1 - Light Weight Sloping Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
		77.5	22.5										100
R1 - Light Weight Sloping Roof	Rural	188,938	76.4										
	Urban	38,997	15.8										
	Total	227,935	92.2	M	M							H	
R2 - Heavy Weight Sloping Roof	Rural	4,974	2.0										
	Urban	911	0.4										
	Total	5,885	2.4	H	M							L	
R3 - Flat Roof	Rural	7,930	3.2										
	Urban	5,436	2.2										
	Total	13,366	5.4	<i>Damage Risk as per that for the Wall supporting it</i>									
TOTAL HOUSES*		247,186											

ROOF													
R1 - Light Weight Sloping Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
		53.2	46.8										100
R1 - Light Weight Sloping Roof	Rural	74,246	79.1										
	Urban	14,860	15.8										
	Total	89,106	94.9	M	M							H	
R2 - Heavy Weight Sloping Roof	Rural	1,207	1.3										
	Urban	568	0.6										
	Total	1,775	1.9	H	M							L	
R3 - Flat Roof	Rural	1,822	1.9										
	Urban	1,140	1.2										
	Total	2,962	3.1	<i>Damage Risk as per that for the Wall supporting it</i>									
TOTAL HOUSES*		93,843											

Probable Maximum Precipitation at a Station of the district in 24 hrs is 300 mm

Probable Maximum Precipitation at a Station of the district in 24 hrs is 300 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;

M = Moderate; L = Low; VL = Very Low
 * Total No.of Houses excluding Vacant/Locked Houses

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
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- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;

M = Moderate; L = Low; VL = Very Low
 * Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : JK 10 State : JAMMU & KASHMIR SRINAGAR

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
		100								100		
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	656	0.3									
	Urban	14,763	6.2									
	Total	15,419	6.5	VH						M		
A2 - Stone Wall not packed with mortar	Rural	336	0.1									
	Urban	3,574	1.5									
	Total	3,910	1.6	VH						L		
Total - Category - A		19,329	8.1									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	3,010	1.3									
	Urban	189,242	79.2									
	Total	192,252	80.5	H						L		
Total - Category - B		192,252	80.5									
C1 - Concrete Wall	Rural	21	-									
	Urban	14,145	5.9									
	Total	14,166	5.9	M						VL		
C2 - Wood wall	Rural	188	0.1									
	Urban	5,455	2.3									
	Total	5,643	2.4	M						M		
Total - Category - C		19,809	8.3									
X - Other Materials	Rural	166	0.1									
	Urban	7,291	3.1									
	Total	7,457	3.2	M						M		
Total - Category - X		7,457	3.1									
TOTAL HOUSES*		238,847										

ROOF											
R1 - Light Weight Sloping Roof	Rural	4,127	1.7								
	Urban	209,990	87.9								
	Total	214,117	89.6	M						H	
R2 - Heavy Weight Sloping Roof	Rural	46	-								
	Urban	6,780	2.8								
	Total	6,826	2.8	H						L	
R3 - Flat Roof	Rural	204	0.1								
	Urban	17,700	7.4								
	Total	17,904	7.5								
<i>Damage Risk as per that for the Wall supporting it</i>											
TOTAL HOUSES*		238,847									

Probable Maximum Precipitation at a Station of the district in 24 hrs is 400 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)

- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
 * Total No. of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : JK 11 State : JAMMU & KASHMIR GANDERBAL

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
		71.1	28.9								100	
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	12,359	16.9									
	Urban	1,522	2.1									
	Total	13,881	19.0	VH	H					M		
A2 - Stone Wall not packed with mortar	Rural	6,542	9.0									
	Urban	111	0.2									
	Total	6,653	9.2	VH	H					L		
Total - Category - A		20,534	28.1									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	32,197	44.1									
	Urban	8,567	11.7									
	Total	40,764	55.8	H	M					L		
Total - Category - B		40,764	55.8									
C1 - Concrete Wall	Rural	884	1.2									
	Urban	1,073	1.5									
	Total	1,957	2.7	M	L					VL		
C2 - Wood wall	Rural	4,014	5.5									
	Urban	537	0.7									
	Total	4,551	6.2	M	L					M		
Total - Category - C		6,508	8.9									
X - Other Materials	Rural	4,347	5.9									
	Urban	909	1.2									
	Total	5,256	7.1	M	VL					M		
Total - Category - X		5,256	7.2									
TOTAL HOUSES*		73,062										

ROOF											
R1 - Light Weight Sloping Roof	Rural	55,323	75.7								
	Urban	10,961	15.0								
	Total	66,284	90.7	M	M					H	
R2 - Heavy Weight Sloping Roof	Rural	2,523	3.5								
	Urban	512	0.7								
	Total	3,035	4.2	H	M					L	
R3 - Flat Roof	Rural	2,497	3.4								
	Urban	1,246	1.7								
	Total	3,743	5.1								
<i>Damage Risk as per that for the Wall supporting it</i>											
TOTAL HOUSES*		73,062									

Probable Maximum Precipitation at a Station of the district in 24 hrs is 400 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)

- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
 * Total No. of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : JK 12 State : JAMMU & KASHMIR PULWAMA

Table No. : JK 13 State : JAMMU & KASHMIR SHUPIYAN

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
		90.6	9.4								100	
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	37,973	23.8									
	Urban	3,089	1.9									
	Total	41,062	25.7	VH	H						M	
A2 - Stone Wall not packed with mortar	Rural	1,215	0.8									
	Urban	608	0.4									
	Total	1,823	1.2	VH	H						L	
Total - Category - A		42,885	26.9									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	79,411	49.8									
	Urban	13,517	8.5									
	Total	92,928	58.3	H	M						L	
Total - Category - B		92,928	58.3									
C1 - Concrete Wall	Rural	3,293	2.1									
	Urban	738	0.5									
	Total	4,031	2.6	M	L						VL	
C2 - Wood wall	Rural	7,892	4.9									
	Urban	313	0.2									
	Total	8,205	5.1	M	L						M	
Total - Category - C		12,236	7.7									
X - Other Materials	Rural	10,592	6.6									
	Urban	868	0.5									
	Total	11,460	7.1	M	VL						M	
Total - Category - X		11,460	7.2									
TOTAL HOUSES*		159,509										

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
		100									100	
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	23,315	31.1									
	Urban	714	1.0									
	Total	24,029	32.1								H	M
A2 - Stone Wall not packed with mortar	Rural	954	1.3									
	Urban	17	-									
	Total	971	1.3								H	L
Total - Category - A		25,000	33.3									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	39,013	52.0									
	Urban	3,696	4.9									
	Total	42,709	56.9								M	L
Total - Category - B		42,709	57.0									
C1 - Concrete Wall	Rural	2,006	2.7									
	Urban	169	0.2									
	Total	2,175	2.9								L	VL
C2 - Wood wall	Rural	2,743	3.7									
	Urban	25	-									
	Total	2,768	3.7								L	M
Total - Category - C		4,943	6.6									
X - Other Materials	Rural	2,256	3.0									
	Urban	61	0.1									
	Total	2,317	3.1								VL	M
Total - Category - X		2,317	3.1									
TOTAL HOUSES*		74,969										

ROOF												
R1 - Light Weight Sloping Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
		90.6	9.4									
R1 - Light Weight Sloping Roof	Rural	131,114	82.2									
	Urban	16,359	10.3									
	Total	147,473	92.5	M	M						H	
R2 - Heavy Weight Sloping Roof	Rural	1,804	1.1									
	Urban	592	0.4									
	Total	2,396	1.5	H	M						L	
R3 - Flat Roof	Rural	7,458	4.7									
	Urban	2,182	1.4									
	Total	9,640	6.1	<i>Damage Risk as per that for the Wall supporting it</i>								
TOTAL HOUSES*		159,509										

ROOF												
R1 - Light Weight Sloping Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
		100										
R1 - Light Weight Sloping Roof	Rural	61,632	82.2									
	Urban	3,365	4.5									
	Total	64,997	86.7								M	H
R2 - Heavy Weight Sloping Roof	Rural	2,727	3.6									
	Urban	95	0.1									
	Total	2,822	3.7								M	L
R3 - Flat Roof	Rural	5,928	7.9									
	Urban	1,222	1.6									
	Total	7,150	9.5	<i>Damage Risk as per that for the Wall supporting it</i>								
TOTAL HOUSES*		74,969										

Probable Maximum Precipitation at a Station of the district in 24 hrs is 360 mm

Probable Maximum Precipitation at a Station of the district in 24 hrs is 360 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;

M = Moderate; L = Low; VL = Very Low
 * Total No.of Houses excluding Vacant/Locked Houses

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
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- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;

M = Moderate; L = Low; VL = Very Low
 * Total No.of Houses excluding Vacant/Locked Houses

**Distribution of Houses by Predominant Materials of Roof and Wall
and Level of Damage Risk**

Table No. : JK 14 State : JAMMU & KASHMIR ANANTNAG

Wall / Roof		Census Houses		Level of Risk under										Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s				Area in %			
				V	IV	III	II	55 & 50	47	44 & 39	33				
				Area in %				Area in %							
				5.2	94.8									100	
WALL															
A1 - Mud & Unburnt Brick Wall	Rural	60,249	23.6												
	Urban	12,896	5.0												
	Total	73,145	28.6	VH	H										M
A2 - Stone Wall not packed with mortar	Rural	5,249	2.1												
	Urban	524	0.2												
	Total	5,773	2.3	VH	H										L
Total - Category - A		78,918	30.9												
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	95,710	37.5												
	Urban	38,450	15.0												
	Total	134,160	52.5	H	M										L
Total - Category - B		134,160	52.5												
C1 - Concrete Wall	Rural	2,160	0.8												
	Urban	3,815	1.5												
	Total	5,975	2.3	M	L										VL
C2 - Wood wall	Rural	25,987	10.2												
	Urban	4,330	1.7												
	Total	30,317	11.9	M	L										M
Total - Category - C		36,292	14.2												
X - Other Materials	Rural	4,728	1.9												
	Urban	1,447	0.6												
	Total	6,175	2.5	M	VL										M
Total - Category - X		6,175	2.4												
TOTAL HOUSES*		255,545													

ROOF															
R1 - Light Weight Sloping Roof	Rural	178,035	69.7												
	Urban	49,753	19.5												
	Total	227,788	89.2	M	M										H
R2 - Heavy Weight Sloping Roof	Rural	6,512	2.5												
	Urban	3,231	1.3												
	Total	9,743	3.8	H	M										L
R3 - Flat Roof	Rural	9,536	3.7												
	Urban	8,478	3.3												
	Total	18,014	7.0	Damage Risk as per that for the Wall supporting it											
TOTAL HOUSES*		255,545													

Probable Maximum Precipitation at a Station of the district in 24 hrs is 520 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

Notes : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)

EQ Zone V : Very High Damage Risk Zone (MSK > IX)
EQ Zone IV : High Damage Risk Zone (MSK VIII)
EQ Zone III : Moderate Damage Risk Zone (MSK VII)
EQ Zone II : Low Damage Risk Zone (MSK < VI)
Level of Risk : VH = Very High; H = High;
M = Moderate; L = Low; VL = Very Low

* Total No. of Houses excluding Vacant/Locked Houses

**Distribution of Houses by Predominant Materials of Roof and Wall
and Level of Damage Risk**

Table No. : JK 15 State : JAMMU & KASHMIR KULGAM

Wall / Roof		Census Houses		Level of Risk under										Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s				Area in %			
				V	IV	III	II	55 & 50	47	44 & 39	33				
				Area in %				Area in %							
				100											
WALL															
A1 - Mud & Unburnt Brick Wall	Rural	39,388	34.7												
	Urban	7,402	6.5												
	Total	46,790	41.2	H											M
A2 - Stone Wall not packed with mortar	Rural	809	0.7												
	Urban	111	0.1												
	Total	920	0.8	H											L
Total - Category - A		47,710	42.0												
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	37,785	33.3												
	Urban	11,685	10.3												
	Total	49,470	43.6	M											L
Total - Category - B		49,470	43.6												
C1 - Concrete Wall	Rural	2,098	1.8												
	Urban	1,816	1.6												
	Total	3,914	3.4	L											VL
C2 - Wood wall	Rural	8,061	7.1												
	Urban	1,611	1.4												
	Total	9,672	8.5	L											M
Total - Category - C		13,586	12.0												
X - Other Materials	Rural	1,956	1.7												
	Urban	802	0.7												
	Total	2,758	2.4	VL											M
Total - Category - X		2,758	2.4												
TOTAL HOUSES*		113,524													

ROOF															
R1 - Light Weight Sloping Roof	Rural	82,473	72.6												
	Urban	19,319	17.0												
	Total	101,792	89.6	M											H
R2 - Heavy Weight Sloping Roof	Rural	2,914	2.6												
	Urban	811	0.7												
	Total	3,725	3.3	M											L
R3 - Flat Roof	Rural	4,710	4.1												
	Urban	3,297	2.9												
	Total	8,007	7.0	Damage Risk as per that for the Wall supporting it											
TOTAL HOUSES*		113,524													

Probable Maximum Precipitation at a Station of the district in 24 hrs is 520 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

Notes : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)

EQ Zone V : Very High Damage Risk Zone (MSK > IX)
EQ Zone IV : High Damage Risk Zone (MSK VIII)
EQ Zone III : Moderate Damage Risk Zone (MSK VII)
EQ Zone II : Low Damage Risk Zone (MSK < VI)
Level of Risk : VH = Very High; H = High;
M = Moderate; L = Low; VL = Very Low

* Total No. of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : JK 16 State : JAMMU & KASHMIR DODA

Table No. : JK 17 State : JAMMU & KASHMIR RAMBAN

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
		100					100					
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	4,784	3.9									
	Urban	632	0.5									
	Total	5,416	4.4		H					M		
A2 - Stone Wall not packed with mortar	Rural	62,364	51.2									
	Urban	311	0.3									
	Total	62,675	51.5		H					L		
Total - Category - A		68,091	55.9									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	41,979	34.5									
	Urban	8,589	7.0									
	Total	50,568	41.5		M					L		
Total - Category - B		50,568	41.5									
C1 - Concrete Wall	Rural	846	0.7									
	Urban	222	0.2									
	Total	1,068	0.9		L					VL		
C2 - Wood wall	Rural	1,278	1.0									
	Urban	18	-									
	Total	1,296	1.0		L					M		
Total - Category - C		2,364	1.9									
X - Other Materials	Rural	665	0.5									
	Urban	150	0.1									
	Total	815	0.6		VL					M		
Total - Category - X		815	0.7									
TOTAL HOUSES*		121,838										
ROOF												
R1 - Light Weight Sloping Roof	Rural	107,313	88.1									
	Urban	5,302	4.4									
	Total	112,615	92.5		M					H		
R2 - Heavy Weight Sloping Roof	Rural	1,050	0.9									
	Urban	101	0.1									
	Total	1,151	1.0		M					L		
R3 - Flat Roof	Rural	3,553	2.9									
	Urban	4,519	3.7									
	Total	8,072	6.6									
TOTAL HOUSES*		121,838										

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
		100					100					
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	6,849	8.9									
	Urban	245	0.3									
	Total	7,094	9.2		H					M		
A2 - Stone Wall not packed with mortar	Rural	44,859	58.2									
	Urban	375	0.5									
	Total	45,234	58.7		H					L		
Total - Category - A		52,328	67.9									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	19,944	25.9									
	Urban	3,204	4.2									
	Total	23,148	30.1		M					L		
Total - Category - B		23,148	30.0									
C1 - Concrete Wall	Rural	350	0.5									
	Urban	19	-									
	Total	369	0.5		L					VL		
C2 - Wood wall	Rural	388	0.5									
	Urban	112	0.1									
	Total	500	0.6		L					M		
Total - Category - C		869	1.1									
X - Other Materials	Rural	705	0.9									
	Urban	58	0.1									
	Total	763	1.0		VL					M		
Total - Category - X		763	1.0									
TOTAL HOUSES*		77,108										
ROOF												
R1 - Light Weight Sloping Roof	Rural	67,563	87.6									
	Urban	1,854	2.4									
	Total	69,417	90.0		M					H		
R2 - Heavy Weight Sloping Roof	Rural	1,734	2.2									
	Urban	41	0.1									
	Total	1,775	2.3		M					L		
R3 - Flat Roof	Rural	3,798	4.9									
	Urban	2,118	2.7									
	Total	5,916	7.6									
TOTAL HOUSES*		77,108										

Probable Maximum Precipitation at a Station of the district in 24 hrs is 360 mm

Probable Maximum Precipitation at a Station of the district in 24 hrs is 400 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;

M = Moderate; L = Low; VL = Very Low
 * Total No.of Houses excluding Vacant/Locked Houses

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;

M = Moderate; L = Low; VL = Very Low
 * Total No.of Houses excluding Vacant/Locked Houses

**Distribution of Houses by Predominant Materials of Roof and Wall
and Level of Damage Risk**

Table No. : JK 18 State : JAMMU & KASHMIR KISHTWAR

Wall / Roof		Census Houses		Level of Risk under										Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				Area in %		
				V	IV	III	II	55 & 50	47	44 & 39	33			
				Area in %				Area in %						
		100						100						
WALL														
A1 - Mud & Unburnt Brick Wall	Rural	1,612	2.3											
	Urban	206	0.3											
	Total	1,818	2.6		H						M			
A2 - Stone Wall not packed with mortar	Rural	30,143	42.5											
	Urban	241	0.3											
	Total	30,384	42.8		H						L			
Total - Category - A		32,202	45.4											
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	24,511	34.6											
	Urban	4,232	6.0											
	Total	28,743	40.6		M						L			
Total - Category - B		28,743	40.5											
C1 - Concrete Wall	Rural	273	0.4											
	Urban	5	-											
	Total	278	0.4		L						VL			
C2 - Wood wall	Rural	9,228	13.0											
	Urban	12	-											
	Total	9,240	13.0		L						M			
Total - Category - C		9,518	13.4											
X - Other Materials	Rural	394	0.6											
	Urban	54	0.1											
	Total	448	0.7		VL						M			
Total - Category - X		448	0.6											
TOTAL HOUSES*		70,911												

ROOF												
R1 - Light Weight Sloping Roof	Rural	64,022	90.3									
	Urban	3,409	4.8									
	Total	67,431	95.1		M						H	
R2 - Heavy Weight Sloping Roof	Rural	475	0.7									
	Urban	26	-									
	Total	501	0.7		M						L	
R3 - Flat Roof	Rural	1,664	2.3									
	Urban	1,315	1.9									
	Total	2,979	4.2									
<i>Damage Risk as per that for the Wall supporting it</i>												
TOTAL HOUSES*		70,911										

Probable Maximum Precipitation at a Station of the district in 24 hrs is 360 mm

Housing Category : Wall Types

- Category - A :** Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B :** Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C :** Reinforced building, well built wooden structures
- Category - X :** Other materials not covered in A,B,C. These are generally light.

- Notes :**
1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1 -** Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2 -** Heavy Weight (Tiles, Stone/Slate)
- Category - R3 -** Flat Roof (Brick, Concrete)
- EQ Zone V :** Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV :** High Damage Risk Zone (MSK VIII)
- EQ Zone III :** Moderate Damage Risk Zone (MSK VII)
- EQ Zone II :** Low Damage Risk Zone (MSK < VI)

Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
* Total No. of Houses excluding Vacant/Locked Houses

**Distribution of Houses by Predominant Materials of Roof and Wall
and Level of Damage Risk**

Table No. : JK 19 State : JAMMU & KASHMIR UDHAMPUR

Wall / Roof		Census Houses		Level of Risk under										Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				Area in %		
				V	IV	III	II	55 & 50	47	44 & 39	33			
				Area in %				Area in %						
		100						100						
WALL														
A1 - Mud & Unburnt Brick Wall	Rural	34,397	21.7											
	Urban	1,733	1.1											
	Total	36,130	22.8		H						M			
A2 - Stone Wall not packed with mortar	Rural	28,722	18.2											
	Urban	493	0.3											
	Total	29,215	18.5		H						L			
Total - Category - A		65,345	41.3											
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	65,743	41.6											
	Urban	24,044	15.2											
	Total	89,787	56.8		M						L			
Total - Category - B		89,787	56.8											
C1 - Concrete Wall	Rural	641	0.4											
	Urban	406	0.3											
	Total	1,047	0.7		L						VL			
C2 - Wood wall	Rural	549	0.3											
	Urban	24	-											
	Total	573	0.3		L						M			
Total - Category - C		1,620	1.0											
X - Other Materials	Rural	1,187	0.8											
	Urban	222	0.1											
	Total	1,409	0.9		VL						M			
Total - Category - X		1,409	0.9											
TOTAL HOUSES*		158,161												

ROOF												
R1 - Light Weight Sloping Roof	Rural	109,900	69.5									
	Urban	4,916	3.1									
	Total	114,816	72.6		M						H	
R2 - Heavy Weight Sloping Roof	Rural	1,236	0.8									
	Urban	448	0.3									
	Total	1,684	1.1		M						L	
R3 - Flat Roof	Rural	20,103	12.7									
	Urban	21,558	13.6									
	Total	41,661	26.3									
<i>Damage Risk as per that for the Wall supporting it</i>												
TOTAL HOUSES*		158,161										

Probable Maximum Precipitation at a Station of the district in 24 hrs is 400 mm

Housing Category : Wall Types

- Category - A :** Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B :** Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C :** Reinforced building, well built wooden structures
- Category - X :** Other materials not covered in A,B,C. These are generally light.

- Notes :**
1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1 -** Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2 -** Heavy Weight (Tiles, Stone/Slate)
- Category - R3 -** Flat Roof (Brick, Concrete)
- EQ Zone V :** Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV :** High Damage Risk Zone (MSK VIII)
- EQ Zone III :** Moderate Damage Risk Zone (MSK VII)
- EQ Zone II :** Low Damage Risk Zone (MSK < VI)

Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
* Total No. of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : JK 22 State : JAMMU & KASHMIR SAMBA

Wall / Roof		Census Houses		Level of Risk under							Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39		33
				Area in %				Area in %				
		100					100					
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	7,981	7.8									
	Urban	366	0.4									
	Total	8,347	8.2		<i>H</i>					<i>M</i>		
A2 - Stone Wall not packed with mortar	Rural	816	0.8									
	Urban	73	0.1									
	Total	889	0.9		<i>H</i>					<i>L</i>		
Total - Category - A		9,236	9.0									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	74,066	72.1									
	Urban	16,338	15.9									
	Total	90,404	88.0		<i>M</i>					<i>L</i>		
Total - Category - B		90,404	88.0									
C1 - Concrete Wall	Rural	706	0.7									
	Urban	38	-									
	Total	744	0.7		<i>L</i>					<i>VL</i>		
C2 - Wood wall	Rural	85	0.1									
	Urban	15	-									
	Total	100	0.1		<i>L</i>					<i>M</i>		
Total - Category - C		844	0.8									
X - Other Materials	Rural	2,105	2.0									
	Urban	177	0.2									
	Total	2,282	2.2		<i>VL</i>					<i>M</i>		
Total - Category - X		2,282	2.2									
TOTAL HOUSES*		102,766										
ROOF												
R1 - Light Weight Sloping Roof	Rural	25,437	24.8									
	Urban	2,296	2.2									
	Total	27,733	27.0		<i>M</i>					<i>H</i>		
R2 - Heavy Weight Sloping Roof	Rural	2,854	2.8									
	Urban	410	0.4									
	Total	3,264	3.2		<i>M</i>					<i>L</i>		
R3 - Flat Roof	Rural	57,468	55.9									
	Urban	14,301	13.9									
	Total	71,769	69.8									
TOTAL HOUSES*		102,766										

Probable Maximum Precipitation at a Station of the district in 24 hrs is 400 mm

Housing Category : Wall Types

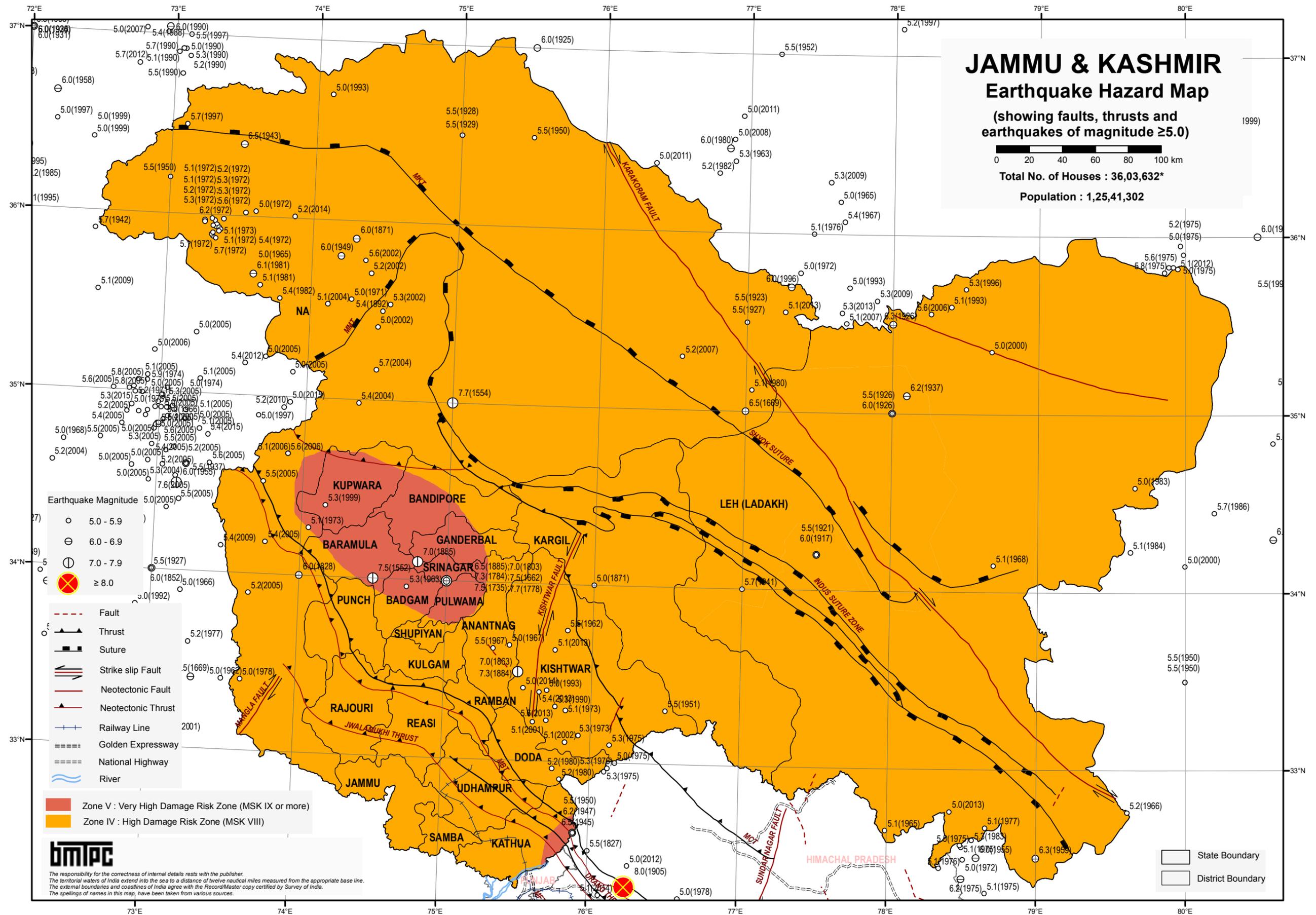
- Category - A :** Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B :** Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C :** Reinforced building, well built wooden structures
- Category - X :** Other materials not covered in A,B,C. These are generally light.

- Notes :**
1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

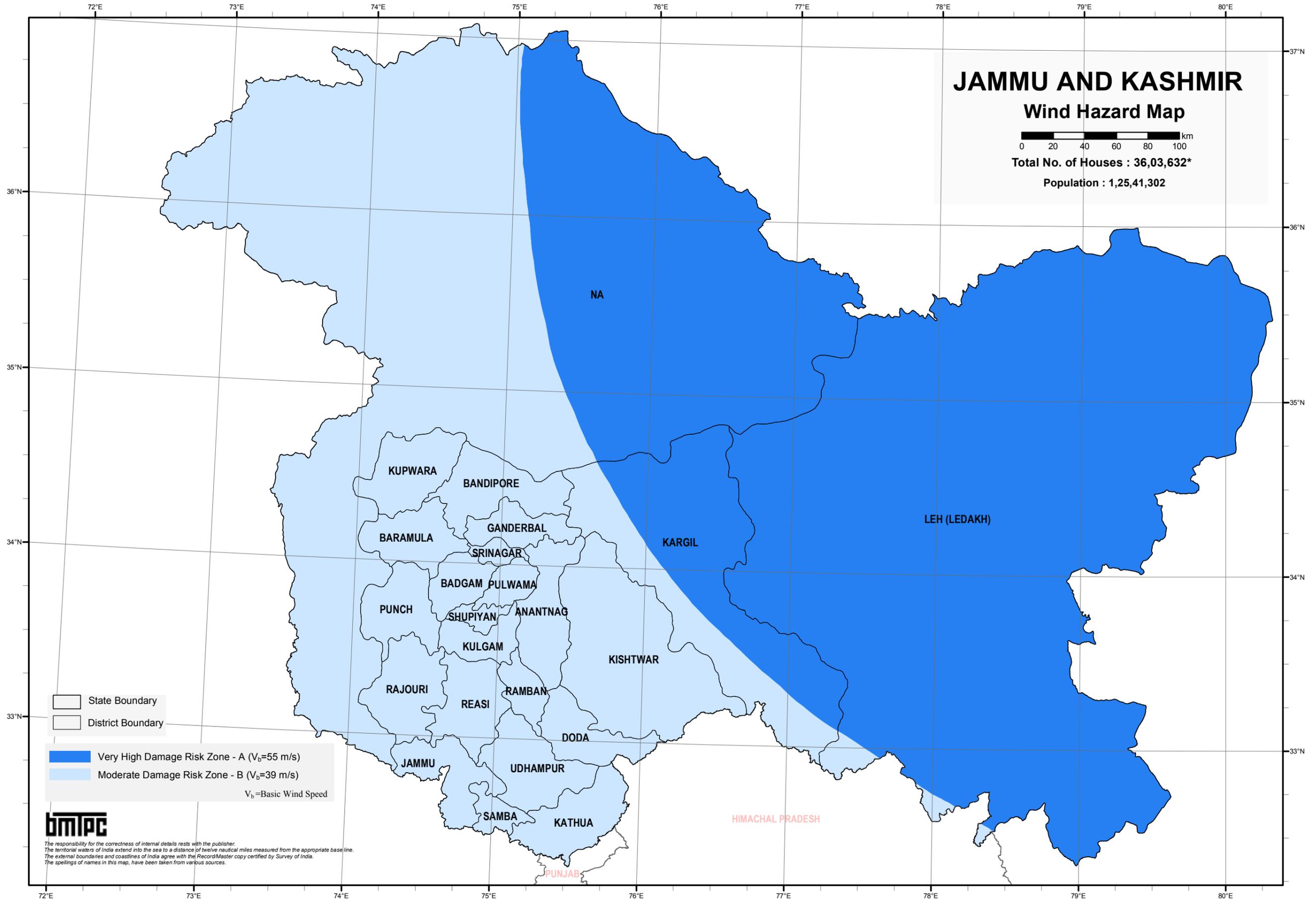
Housing Category : Roof Type

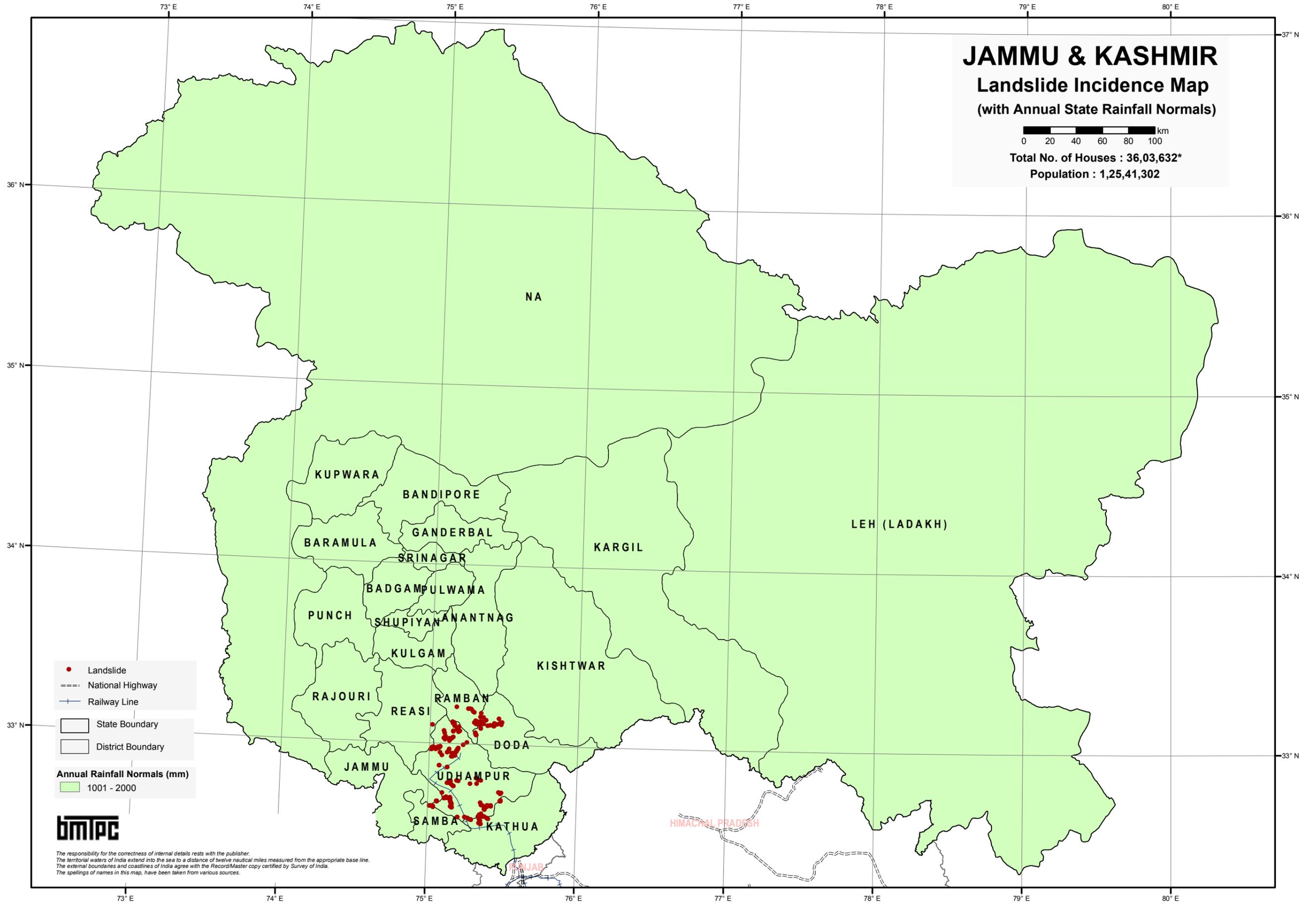
- Category - R1 -** Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2 -** Heavy Weight (Tiles, Stone/Slate)
- Category - R3 -** Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
- M = Moderate; L = Low; VL = Very Low

* Total No. of Houses excluding Vacant/Locked Houses



BMPIC : Vulnerability Atlas - 3rd Edition : Peer Group, MoHUA, GOI; Map is Based on digitised data of SOI; Seismic Zones of India Map IS: 1893 (Part I): 2002, BIS; Earthquake Epicentre from IMD; Seismotectonic Atlas of India and its Environs, GSI; Houses/Population as per Census 2011; *Houses including vacant & locked houses. Disclaimer: The maps are solely for thematic presentation.





bmtpc

The responsibility for the correctness of internal details rests with the publisher.
 The territorial waters of India extend into the sea to a distance of twelve nautical miles measured from the appropriate base line.
 The external boundaries and coastlines of India agree with the Record Master copy certified by Survey of India.
 The spellings of names in this map, have been taken from various sources.

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

JHARKHAND

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
STATE - JHARKHAND				3.9	51.9	44.2	1.0	26.5	72.5			
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	3,684,954	50.3									
	Urban	348,929	4.8									
	Total	4,033,883	55.1	H	M	L	VH	H	M			
A2 - Stone Wall not packed with mortar	Rural	54,122	0.7									
	Urban	19,847	0.3									
	Total	73,969	1.0	H	M	L	H	M	L			
Total - Category - A		4,107,852	56.1									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	1,556,835	21.3									
	Urban	1,396,987	19.1									
	Total	2,953,822	40.4	M	L	VL	H	M	L			
Total - Category - B		2,953,822	40.3									
C1 - Concrete Wall	Rural	25,547	0.3									
	Urban	39,721	0.5									
	Total	65,268	0.8	L	VL	VL	L	VL	VL			
C2 - Wood wall	Rural	14,066	0.2									
	Urban	5,998	0.1									
	Total	20,064	0.3	L	VL	VL	VH	H	M			
Total - Category - C		85,332	1.2									
X - Other Materials	Rural	140,780	1.9									
	Urban	35,962	0.5									
	Total	176,742	2.4	VL	VL	VL	VH	H	M			
Total - Category - X		176,742	2.4									
TOTAL HOUSES*		7,323,748										
ROOF												
R1 - Light Weight Sloping Roof	Rural	1,021,895	14.0									
	Urban	416,511	5.7									
	Total	1,438,406	19.7	M	L	VL	VH	VH	H			
R2 - Heavy Weight Sloping Roof	Rural	3,385,189	46.2									
	Urban	401,295	5.5									
	Total	3,786,484	51.7	M	L	VL	H	M	L			
R3 - Flat Roof	Rural	1,069,220	14.6									
	Urban	1,029,638	14.1									
	Total	2,098,858	28.7	<i>Damage Risk as per that for the Wall supporting it</i>								
TOTAL HOUSES*		7,323,748										

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
EQ Zone IV : High Damage Risk Zone (MSK VIII)
EQ Zone III : Moderate Damage Risk Zone (MSK VII)
EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : JD 01

State : JHARKHAND

GARHWA

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
STATE - JHARKHAND												
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	214,287	77.4									
	Urban	6,227	2.3									
	Total	220,514	79.7									
A2 - Stone Wall not packed with mortar	Rural	561	0.2									
	Urban	74	-									
	Total	635	0.2									
Total - Category - A		221,149	79.9									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	43,061	15.6									
	Urban	10,388	3.8									
	Total	53,449	19.4									
Total - Category - B		53,449	19.3									
C1 - Concrete Wall	Rural	259	0.1									
	Urban	30	-									
	Total	289	0.1									
C2 - Wood wall	Rural	116	-									
	Urban	7	-									
	Total	123	-									
Total - Category - C		412	0.1									
X - Other Materials	Rural	1,531	0.6									
	Urban	165	0.1									
	Total	1,696	0.7									
Total - Category - X		1,696	0.6									
TOTAL HOUSES*		276,706										
ROOF												
R1 - Light Weight Sloping Roof	Rural	32,453	11.7									
	Urban	2,006	0.7									
	Total	34,459	12.4									
R2 - Heavy Weight Sloping Roof	Rural	196,015	70.8									
	Urban	6,187	2.2									
	Total	202,202	73.0									
R3 - Flat Roof	Rural	31,347	11.3									
	Urban	8,698	3.1									
	Total	40,045	14.4	<i>Damage Risk as per that for the Wall supporting it</i>								
TOTAL HOUSES*		276,706										

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 462 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
EQ Zone IV : High Damage Risk Zone (MSK VIII)
EQ Zone III : Moderate Damage Risk Zone (MSK VII)
EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : JD 02 State : JHARKHAND CHATRA

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
				Area in %				Area in %					
WALL						99.8	.2					100	
A1 - Mud & Unburnt Brick Wall	Rural	133,804	65.7										
	Urban	3,315	1.6										
	Total	137,119	67.3			M	L					M	
A2 - Stone Wall not packed with mortar	Rural	554	0.3										
	Urban	26	-										
	Total	580	0.3			M	L					L	
Total - Category - A		137,699	67.6										
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	54,402	26.7										
	Urban	9,013	4.4										
	Total	63,415	31.1			L	VL					L	
Total - Category - B		63,415	31.1										
C1 - Concrete Wall	Rural	570	0.3										
	Urban	122	0.1										
	Total	692	0.4			VL	VL					VL	
C2 - Wood wall	Rural	70	-										
	Urban	4	-										
	Total	74	-			VL	VL					M	
Total - Category - C		766	0.4										
X - Other Materials	Rural	1,545	0.8										
	Urban	212	0.1										
	Total	1,757	0.9			VL	VL					M	
Total - Category - X		1,757	0.9										
TOTAL HOUSES*		203,637											

ROOF													
R1 - Light Weight Sloping Roof	Rural	23,929	11.8										
	Urban	1,944	1.0										
	Total	25,873	12.8			L	VL					H	
R2 - Heavy Weight Sloping Roof	Rural	122,994	60.4										
	Urban	3,470	1.7										
	Total	126,464	62.1			L	VL					L	
R3 - Flat Roof	Rural	44,022	21.6										
	Urban	7,278	3.6										
	Total	51,300	25.2										
<i>Damage Risk as per that for the Wall supporting it</i>													
TOTAL HOUSES*		203,637											

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 698 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)

- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
 Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
 * Total No.of Houses excluding Vacant/Locked Houses

Table No. : JD 03 State : JHARKHAND KODARMA

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
				Area in %				Area in %					
WALL						.3	99.7					100	
A1 - Mud & Unburnt Brick Wall	Rural	54,053	38.0										
	Urban	6,044	4.2										
	Total	60,097	42.2			H	M					M	
A2 - Stone Wall not packed with mortar	Rural	679	0.5										
	Urban	153	0.1										
	Total	832	0.6			H	M					L	
Total - Category - A		60,929	42.8										
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	53,918	37.9										
	Urban	24,521	17.2										
	Total	78,439	55.1			M	L					L	
Total - Category - B		78,439	55.1										
C1 - Concrete Wall	Rural	659	0.5										
	Urban	411	0.3										
	Total	1,070	0.8			L	VL					VL	
C2 - Wood wall	Rural	184	0.1										
	Urban	69	-										
	Total	253	0.1			L	VL					M	
Total - Category - C		1,323	0.9										
X - Other Materials	Rural	1,446	1.0										
	Urban	195	0.1										
	Total	1,641	1.1			VL	VL					M	
Total - Category - X		1,641	1.2										
TOTAL HOUSES*		142,332											

ROOF													
R1 - Light Weight Sloping Roof	Rural	10,566	7.4										
	Urban	3,131	2.2										
	Total	13,697	9.6			M	L					H	
R2 - Heavy Weight Sloping Roof	Rural	52,239	36.7										
	Urban	6,729	4.7										
	Total	58,968	41.4			M	L					L	
R3 - Flat Roof	Rural	48,134	33.8										
	Urban	21,533	15.1										
	Total	69,667	48.9										
<i>Damage Risk as per that for the Wall supporting it</i>													
TOTAL HOUSES*		142,332											

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 582 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)

- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
 Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
 * Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : JD 04 State : JHARKHAND GIRIDIH

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
				Area in %				Area in %					
					.6	99.4						100	
WALL													
A1 - Mud & Unburnt Brick Wall	Rural	243,960	51.0										
	Urban	7,864	1.6										
	Total	251,824	52.6		H	M					M		
A2 - Stone Wall not packed with mortar	Rural	2,124	0.4										
	Urban	319	0.1										
	Total	2,443	0.5		H	M					L		
Total - Category - A		254,267	53.2										
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	181,102	37.9										
	Urban	34,752	7.3										
	Total	215,854	45.2		M	L					L		
Total - Category - B		215,854	45.1										
C1 - Concrete Wall	Rural	3,022	0.6										
	Urban	280	0.1										
	Total	3,302	0.7		L	VL					VL		
C2 - Wood wall	Rural	266	0.1										
	Urban	40	-										
	Total	306	0.1		L	VL					M		
Total - Category - C		3,608	0.8										
X - Other Materials	Rural	3,938	0.8										
	Urban	558	0.1										
	Total	4,496	0.9		VL	VL					M		
Total - Category - X		4,496	0.9										
TOTAL HOUSES*		478,225											
ROOF													
R1 - Light Weight Sloping Roof	Rural	35,537	7.4										
	Urban	4,052	0.8										
	Total	39,589	8.2		M	L					H		
R2 - Heavy Weight Sloping Roof	Rural	251,338	52.6										
	Urban	10,581	2.2										
	Total	261,919	54.8		M	L					L		
R3 - Flat Roof	Rural	147,537	30.9										
	Urban	29,180	6.1										
	Total	176,717	37.0										
TOTAL HOUSES*		478,225											

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 691 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)

- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
 Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
 * Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : JD 05 State : JHARKHAND DEOGHAR

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %		
		No. of Houses	%	EQ Zone				Wind Velocity m/s						
				V	IV	III	II	55 & 50	47	44 & 39	33			
				Area in %				Area in %						
WALL														
A1 - Mud & Unburnt Brick Wall	Rural	159,084	51.9											
	Urban	9,998	3.3											
	Total	169,082	55.2			M					H	M		
A2 - Stone Wall not packed with mortar	Rural	1,071	0.3											
	Urban	508	0.2											
	Total	1,579	0.5			M					M	L		
Total - Category - A		170,661	55.7											
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	82,327	26.9											
	Urban	45,294	14.8											
	Total	127,621	41.7			L					M	L		
Total - Category - B		127,621	41.7											
C1 - Concrete Wall	Rural	1,413	0.5											
	Urban	851	0.3											
	Total	2,264	0.8			VL					VL	VL		
C2 - Wood wall	Rural	230	0.1											
	Urban	56	-											
	Total	286	0.1			VL					H	M		
Total - Category - C		2,550	0.8											
X - Other Materials	Rural	4,529	1.5											
	Urban	880	0.3											
	Total	5,409	1.8			VL					H	M		
Total - Category - X		5,409	1.8											
TOTAL HOUSES*		306,241												
ROOF														
R1 - Light Weight Sloping Roof	Rural	37,809	12.3											
	Urban	7,895	2.6											
	Total	45,704	14.9			L					VH	H		
R2 - Heavy Weight Sloping Roof	Rural	162,534	53.1											
	Urban	12,546	4.1											
	Total	175,080	57.2			L					M	L		
R3 - Flat Roof	Rural	48,311	15.8											
	Urban	37,146	12.1											
	Total	85,457	27.9											
TOTAL HOUSES*		306,241												

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 658 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)

- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
 Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
 * Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : JD 06 State : JHARKHAND GODDA

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
				Area in %				Area in %					
WALL													
A1 - Mud & Unburnt Brick Wall	Rural	137,859	49.4										
	Urban	1,941	0.7										
	Total	139,800	50.1		H	M			H				
A2 - Stone Wall not packed with mortar	Rural	1,016	0.4										
	Urban	76	-										
	Total	1,092	0.4		H	M			M				
Total - Category - A		140,892	50.5										
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	103,877	37.3										
	Urban	11,459	4.1										
	Total	115,336	41.4		M	L			M				
Total - Category - B		115,336	41.4										
C1 - Concrete Wall	Rural	1,550	0.6										
	Urban	99	-										
	Total	1,649	0.6		L	VL			VL				
C2 - Wood wall	Rural	1,638	0.6										
	Urban	16	-										
	Total	1,654	0.6		L	VL			H				
Total - Category - C		3,303	1.2										
X - Other Materials	Rural	19,037	6.8										
	Urban	253	0.1										
	Total	19,290	6.9		VL	VL			H				
Total - Category - X		19,290	6.9										
TOTAL HOUSES*		278,821											

ROOF													
R1 - Light Weight Sloping Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
R1 - Light Weight Sloping Roof		Rural	122,111	43.8									
		Urban	2,269	0.8									
		Total	124,380	44.6		M	L			VH			
R2 - Heavy Weight Sloping Roof	Rural	72,500	26.0										
	Urban	2,332	0.8										
	Total	74,832	26.8		M	L			M				
R3 - Flat Roof	Rural	70,366	25.2										
	Urban	9,243	3.3										
	Total	79,609	28.5										
TOTAL HOUSES*		278,821											

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 665 mm

Housing Category : Wall Types

- Category - A :** Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B :** Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C :** Reinforced building, well built wooden structures
- Category - X :** Other materials not covered in A,B,C. These are generally light.

- Notes :**
1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1 -** Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2 -** Heavy Weight (Tiles, Stone/Slate)
- Category - R3 -** Flat Roof (Brick, Concrete)

- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
 Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
 * Total No.of Houses excluding Vacant/Locked Houses

Table No. : JD 07 State : JHARKHAND SAHIBGANJ

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
				Area in %				Area in %					
WALL													
A1 - Mud & Unburnt Brick Wall	Rural	117,096	46.3										
	Urban	7,682	3.0										
	Total	124,778	49.3		H	M			H				
A2 - Stone Wall not packed with mortar	Rural	731	0.3										
	Urban	305	0.1										
	Total	1,036	0.4		H	M			M				
Total - Category - A		125,814	49.7										
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	58,061	23.0										
	Urban	23,573	9.3										
	Total	81,634	32.3		M	L			M				
Total - Category - B		81,634	32.3										
C1 - Concrete Wall	Rural	433	0.2										
	Urban	245	0.1										
	Total	678	0.3		L	VL			VL				
C2 - Wood wall	Rural	1,804	0.7										
	Urban	251	0.1										
	Total	2,055	0.8		L	VL			H				
Total - Category - C		2,733	1.1										
X - Other Materials	Rural	39,498	15.6										
	Urban	3,284	1.3										
	Total	42,782	16.9		VL	VL			H				
Total - Category - X		42,782	16.9										
TOTAL HOUSES*		252,963											

ROOF													
R1 - Light Weight Sloping Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
R1 - Light Weight Sloping Roof		Rural	63,798	25.2									
		Urban	3,929	1.6									
		Total	67,727	26.8		M	L			VH			
R2 - Heavy Weight Sloping Roof	Rural	126,499	50.0										
	Urban	13,946	5.5										
	Total	140,445	55.5		M	L			M				
R3 - Flat Roof	Rural	27,326	10.8										
	Urban	17,465	6.9										
	Total	44,791	17.7										
TOTAL HOUSES*		252,963											

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 679 mm

Housing Category : Wall Types

- Category - A :** Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B :** Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C :** Reinforced building, well built wooden structures
- Category - X :** Other materials not covered in A,B,C. These are generally light.

- Notes :**
1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1 -** Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2 -** Heavy Weight (Tiles, Stone/Slate)
- Category - R3 -** Flat Roof (Brick, Concrete)

- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
 Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
 * Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : JD 10 State : JHARKHAND BOKARO

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
				Area in %				Area in %					
WALL						89.1	10.9					100	
A1 - Mud & Unburnt Brick Wall	Rural	118,434	25.0										
	Urban	40,762	8.6										
	Total	159,196	33.6		M	L					M		
A2 - Stone Wall not packed with mortar	Rural	1,868	0.4										
	Urban	2,007	0.4										
	Total	3,875	0.8		M	L					L		
Total - Category - A		163,071	34.4										
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	111,931	23.6										
	Urban	182,015	38.4										
	Total	293,946	62.0		L	VL					L		
Total - Category - B		293,946	61.9										
C1 - Concrete Wall	Rural	2,836	0.6										
	Urban	4,809	1.0										
	Total	7,645	1.6			VL	VL				VL		
C2 - Wood wall	Rural	124	-										
	Urban	654	0.1										
	Total	778	0.1			VL	VL				M		
Total - Category - C		8,423	1.8										
X - Other Materials	Rural	3,892	0.8										
	Urban	5,190	1.1										
	Total	9,082	1.9			VL	VL				M		
Total - Category - X		9,082	1.9										
TOTAL HOUSES*		474,522											

ROOF													
R1 - Light Weight Sloping Roof	Rural	37,659	7.9										
	Urban	56,355	11.9										
	Total	94,014	19.8			L	VL				H		
R2 - Heavy Weight Sloping Roof	Rural	112,365	23.7										
	Urban	39,788	8.4										
	Total	152,153	32.1			L	VL				L		
R3 - Flat Roof	Rural	89,061	18.8										
	Urban	139,294	29.4										
	Total	228,355	48.2										
<i>Damage Risk as per that for the Wall supporting it</i>													
TOTAL HOUSES*		474,522											

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 691 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)

- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
 Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
 * Total No.of Houses excluding Vacant/Locked Houses

Table No. : JD 11 State : JHARKHAND LOHARDAGA

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
				Area in %				Area in %					
WALL													
A1 - Mud & Unburnt Brick Wall	Rural	77,513	73.7										
	Urban	3,618	3.4										
	Total	81,131	77.1								L		M
A2 - Stone Wall not packed with mortar	Rural	109	0.1										
	Urban	50	-										
	Total	159	0.1								L		L
Total - Category - A		81,290	77.2										
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	13,591	12.9										
	Urban	9,482	9.0										
	Total	23,073	21.9								VL		L
Total - Category - B		23,073	21.9										
C1 - Concrete Wall	Rural	106	0.1										
	Urban	54	0.1										
	Total	160	0.2								VL		VL
C2 - Wood wall	Rural	49	-										
	Urban	10	-										
	Total	59	-								VL		M
Total - Category - C		219	0.2										
X - Other Materials	Rural	531	0.5										
	Urban	126	0.1										
	Total	657	0.6								VL		M
Total - Category - X		657	0.6										
TOTAL HOUSES*		105,239											

ROOF													
R1 - Light Weight Sloping Roof	Rural	14,820	14.1										
	Urban	2,758	2.6										
	Total	17,578	16.7								VL		H
R2 - Heavy Weight Sloping Roof	Rural	70,929	67.4										
	Urban	4,424	4.2										
	Total	75,353	71.6								VL		L
R3 - Flat Roof	Rural	6,150	5.8										
	Urban	6,158	5.9										
	Total	12,308	11.7										
<i>Damage Risk as per that for the Wall supporting it</i>													
TOTAL HOUSES*		105,239											

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 667 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)

- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
 Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
 * Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : JD 14 State : JHARKHAND LATEHAR

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
						53.6	46.4				100	
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	116,884	77.9									
	Urban	4,411	2.9									
	Total	121,295	80.8		M	L				M		
A2 - Stone Wall not packed with mortar	Rural	212	0.1									
	Urban	137	0.1									
	Total	349	0.2		M	L				L		
Total - Category - A		121,644	81.0									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	18,630	12.4									
	Urban	7,598	5.1									
	Total	26,228	17.5		L	VL				L		
Total - Category - B		26,228	17.5									
C1 - Concrete Wall	Rural	186	0.1									
	Urban	160	0.1									
	Total	346	0.2			VL	VL			VL		
C2 - Wood wall	Rural	136	0.1									
	Urban	103	0.1									
	Total	239	0.2			VL	VL			M		
Total - Category - C		585	0.4									
X - Other Materials	Rural	1,540	1.0									
	Urban	135	0.1									
	Total	1,675	1.1			VL	VL			M		
Total - Category - X		1,675	1.1									
TOTAL HOUSES*		150,132										

ROOF												
R1 - Light Weight Sloping Roof	Rural	25,437	16.9									
	Urban	2,238	1.5									
	Total	27,675	18.4			L	VL			H		
R2 - Heavy Weight Sloping Roof	Rural	102,340	68.2									
	Urban	4,856	3.2									
	Total	107,196	71.4			L	VL			L		
R3 - Flat Roof	Rural	9,811	6.5									
	Urban	5,450	3.6									
	Total	15,261	10.1									
TOTAL HOUSES*		150,132										

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 633 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)

- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
 Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
 * Total No.of Houses excluding Vacant/Locked Houses

Table No. : JD 15 State : JHARKHAND HAZARIBAGH

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
						99.2	.8				100	
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	146,458	40.9									
	Urban	7,681	2.1									
	Total	154,139	43.0			M	L			M		
A2 - Stone Wall not packed with mortar	Rural	1,871	0.5									
	Urban	571	0.2									
	Total	2,442	0.7			M	L			L		
Total - Category - A		156,581	43.7									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	142,543	39.8									
	Urban	52,365	14.6									
	Total	194,908	54.4			L	VL			L		
Total - Category - B		194,908	54.4									
C1 - Concrete Wall	Rural	2,194	0.6									
	Urban	1,077	0.3									
	Total	3,271	0.9			VL	VL			VL		
C2 - Wood wall	Rural	404	0.1									
	Urban	188	0.1									
	Total	592	0.2			VL	VL			M		
Total - Category - C		3,863	1.1									
X - Other Materials	Rural	2,107	0.6									
	Urban	720	0.2									
	Total	2,827	0.8			VL	VL			M		
Total - Category - X		2,827	0.8									
TOTAL HOUSES*		358,179										

ROOF												
R1 - Light Weight Sloping Roof	Rural	29,068	8.1									
	Urban	11,007	3.1									
	Total	40,075	11.2			L	VL			H		
R2 - Heavy Weight Sloping Roof	Rural	143,814	40.2									
	Urban	8,188	2.3									
	Total	152,002	42.5			L	VL			L		
R3 - Flat Roof	Rural	122,695	34.3									
	Urban	43,407	12.1									
	Total	166,102	46.4									
TOTAL HOUSES*		358,179										

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 698 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)

- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
 Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
 * Total No.of Houses excluding Vacant/Locked Houses

**Distribution of Houses by Predominant Materials of Roof and Wall
and Level of Damage Risk**

Table No. : JD 16 State : JHARKHAND RAMGARH

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
				Area in %				Area in %					
WALL						34.0	66.0					100	
A1 - Mud & Unburnt Brick Wall	Rural	55,570	24.3										
	Urban	18,094	7.9										
	Total	73,664	32.2			M	L					M	
A2 - Stone Wall not packed with mortar	Rural	989	0.4										
	Urban	1,071	0.5										
	Total	2,060	0.9			M	L					L	
Total - Category - A		75,724	33.1										
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	65,703	28.7										
	Urban	81,146	35.5										
	Total	146,849	64.2			L	VL					L	
Total - Category - B		146,849	64.2										
C1 - Concrete Wall	Rural	1,063	0.5										
	Urban	1,585	0.7										
	Total	2,648	1.2			VL	VL					VL	
C2 - Wood wall	Rural	137	0.1										
	Urban	366	0.2										
	Total	503	0.3			VL	VL					M	
Total - Category - C		3,151	1.4										
X - Other Materials	Rural	1,539	0.7										
	Urban	1,405	0.6										
	Total	2,944	1.3			VL	VL					M	
Total - Category - X		2,944	1.3										
TOTAL HOUSES*		228,668											

ROOF		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
				Area in %				Area in %					
R1 - Light Weight Sloping Roof	Rural	20,173	8.8										
	Urban	35,611	15.6										
	Total	55,784	24.4			L	VL					H	
R2 - Heavy Weight Sloping Roof	Rural	61,361	26.8										
	Urban	16,678	7.3										
	Total	78,039	34.1			L	VL					L	
R3 - Flat Roof	Rural	43,467	19.0										
	Urban	51,378	22.5										
	Total	94,845	41.5										
TOTAL HOUSES*		228,668											

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 667 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
- 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
- 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)

- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low

* Total No. of Houses excluding Vacant/Locked Houses

**Distribution of Houses by Predominant Materials of Roof and Wall
and Level of Damage Risk**

Table No. : JD 17 State : JHARKHAND DUMKA

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
				Area in %				Area in %					
WALL						100							100
A1 - Mud & Unburnt Brick Wall	Rural	222,894	71.6										
	Urban	5,452	1.8										
	Total	228,346	73.4			M						H	
A2 - Stone Wall not packed with mortar	Rural	813	0.3										
	Urban	50	-										
	Total	863	0.3			M						M	
Total - Category - A		229,209	73.6										
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	57,647	18.5										
	Urban	14,564	4.7										
	Total	72,211	23.2			L						M	
Total - Category - B		72,211	23.2										
C1 - Concrete Wall	Rural	1,019	0.3										
	Urban	534	0.2										
	Total	1,553	0.5			VL						VL	
C2 - Wood wall	Rural	465	0.1										
	Urban	48	-										
	Total	513	0.1			VL						H	
Total - Category - C		2,066	0.7										
X - Other Materials	Rural	7,733	2.5										
	Urban	257	0.1										
	Total	7,990	2.6			VL						H	
Total - Category - X		7,990	2.6										
TOTAL HOUSES*		311,476											

ROOF		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
				Area in %				Area in %					
R1 - Light Weight Sloping Roof	Rural	78,517	25.2										
	Urban	1,709	0.5										
	Total	80,226	25.7			L						VH	
R2 - Heavy Weight Sloping Roof	Rural	183,441	58.9										
	Urban	7,949	2.6										
	Total	191,390	61.5			L						M	
R3 - Flat Roof	Rural	28,613	9.2										
	Urban	11,247	3.6										
	Total	39,860	12.8										
TOTAL HOUSES*		311,476											

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 651 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
- 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
- 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)

- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low

* Total No. of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : JD 18 State : JHARKHAND JAMTARA

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
				Area in %				Area in %					
						100					79.7	20.3	
WALL													
A1 - Mud & Unburnt Brick Wall	Rural	113,909	64.3										
	Urban	4,090	2.3										
	Total	117,999	66.6			M				H	M		
A2 - Stone Wall not packed with mortar	Rural	652	0.4										
	Urban	29	-										
	Total	681	0.4			M				M	L		
Total - Category - A		118,680	67.0										
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	39,971	22.6										
	Urban	14,061	7.9										
	Total	54,032	30.5			L				M	L		
Total - Category - B		54,032	30.5										
C1 - Concrete Wall	Rural	907	0.5										
	Urban	105	0.1										
	Total	1,012	0.6			VL				VL	VL		
C2 - Wood wall	Rural	206	0.1										
	Urban	22	-										
	Total	228	0.1			VL				H	M		
Total - Category - C		1,240	0.7										
X - Other Materials	Rural	3,058	1.7										
	Urban	168	0.1										
	Total	3,226	1.8			VL				H	M		
Total - Category - X		3,226	1.8										
TOTAL HOUSES*		177,178											

ROOF													
R1 - Light Weight Sloping Roof	Rural	35,089	19.8										
	Urban	1,316	0.7										
	Total	36,405	20.5			L				VH	H		
R2 - Heavy Weight Sloping Roof	Rural	101,431	57.2										
	Urban	5,968	3.4										
	Total	107,399	60.6			L				M	L		
R3 - Flat Roof	Rural	22,183	12.5										
	Urban	11,191	6.3										
	Total	33,374	18.8										
<i>Damage Risk as per that for the Wall supporting it</i>													
TOTAL HOUSES*		177,178											

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 651 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)

- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
 Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
 * Total No.of Houses excluding Vacant/Locked Houses

Table No. : JD 19 State : JHARKHAND RANCHI

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
				Area in %				Area in %					
						.4	99.6					100	
WALL													
A1 - Mud & Unburnt Brick Wall	Rural	268,792	39.7										
	Urban	47,853	7.1										
	Total	316,645	46.8			M	L				M		
A2 - Stone Wall not packed with mortar	Rural	7,437	1.1										
	Urban	3,363	0.5										
	Total	10,800	1.6			M	L				L		
Total - Category - A		327,445	48.3										
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	110,100	16.3										
	Urban	215,068	31.7										
	Total	325,168	48.0			L	VL				L		
Total - Category - B		325,168	48.0										
C1 - Concrete Wall	Rural	2,211	0.3										
	Urban	11,546	1.7										
	Total	13,757	2.0			VL	VL				VL		
C2 - Wood wall	Rural	727	0.1										
	Urban	504	0.1										
	Total	1,231	0.2			VL	VL				M		
Total - Category - C		14,988	2.2										
X - Other Materials	Rural	5,695	0.8										
	Urban	4,187	0.6										
	Total	9,882	1.4			VL	VL				M		
Total - Category - X		9,882	1.5										
TOTAL HOUSES*		677,483											

ROOF													
R1 - Light Weight Sloping Roof	Rural	86,406	12.8										
	Urban	100,272	14.8										
	Total	186,678	27.6			L	VL				H		
R2 - Heavy Weight Sloping Roof	Rural	244,805	36.1										
	Urban	42,473	6.3										
	Total	287,278	42.4			L	VL				L		
R3 - Flat Roof	Rural	63,751	9.4										
	Urban	139,776	20.6										
	Total	203,527	30.0										
<i>Damage Risk as per that for the Wall supporting it</i>													
TOTAL HOUSES*		677,483											

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 662 mm

Housing Category : Wall Types

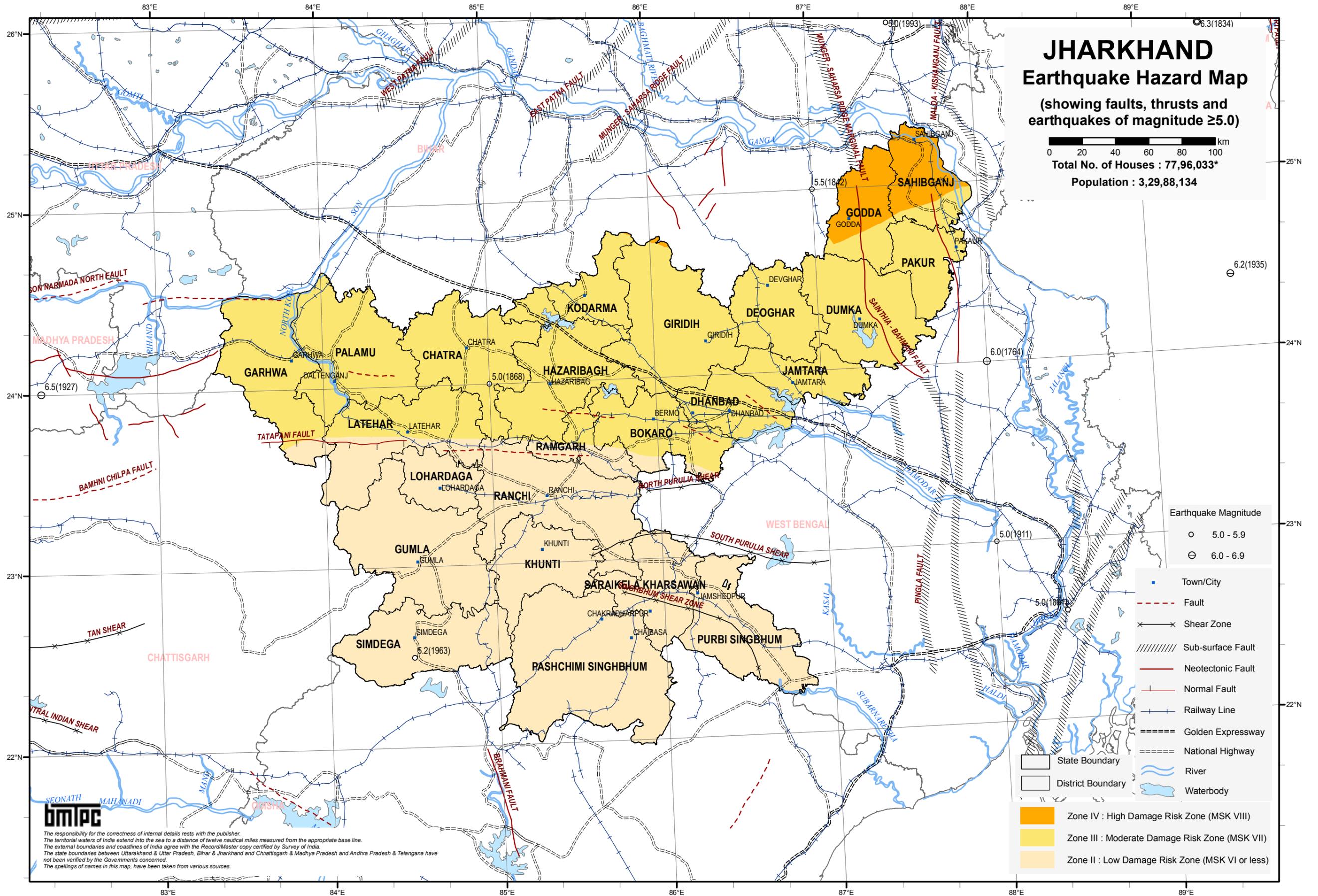
- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)

- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
 Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
 * Total No.of Houses excluding Vacant/Locked Houses



JHARKHAND

Earthquake Hazard Map

(showing faults, thrusts and earthquakes of magnitude ≥ 5.0)

0 20 40 60 80 100 km

Total No. of Houses : 77,96,033*

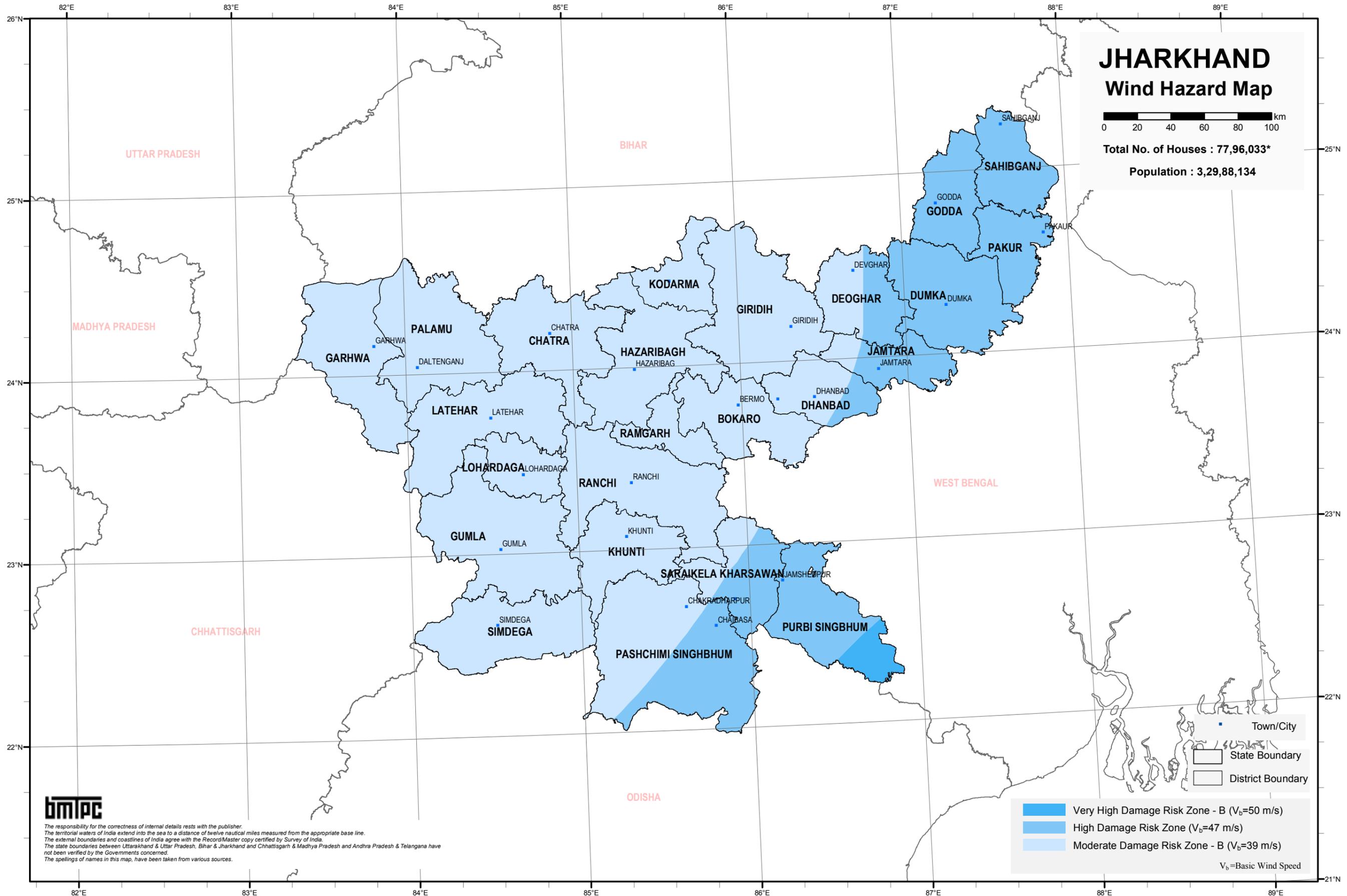
Population : 3,29,88,134

- | | |
|----------------------|---|
| Earthquake Magnitude | |
| ○ | 5.0 - 5.9 |
| ⊖ | 6.0 - 6.9 |
| ■ | Town/City |
| - - - | Fault |
| × - × | Shear Zone |
| | Sub-surface Fault |
| — | Neotectonic Fault |
| — — | Normal Fault |
| —+— | Railway Line |
| ==== | Golden Expressway |
| ----- | National Highway |
| ▭ | State Boundary |
| ▭ | District Boundary |
| ~~~~~ | River |
| ~~~~~ | Waterbody |
| ■ | Zone IV : High Damage Risk Zone (MSK VIII) |
| ■ | Zone III : Moderate Damage Risk Zone (MSK VII) |
| ■ | Zone II : Low Damage Risk Zone (MSK VI or less) |

BMPIC

The responsibility for the correctness of internal details rests with the publisher.
The territorial waters of India extend into the sea to a distance of twelve nautical miles measured from the appropriate base line.
The external boundaries and coastlines of India agree with the Record Master copy certified by Survey of India.
The state boundaries between Uttar Pradesh and Bihar & Jharkhand and Chhattisgarh & Madhya Pradesh and Andhra Pradesh & Telangana have not been verified by the Governments concerned.
The spellings of names in this map, have been taken from various sources.

BMPIC : Vulnerability Atlas - 3rd Edition : Peer Group, MoHUA, GOI; Map is Based on digitised data of SOI; Seismic Zones of India Map IS: 1893 (Part I): 2002, BIS; Earthquake Epicentre from IMD; Seismotectonic Atlas of India and its Environs, GSI; Houses/Population as per Census 2011; *Houses including vacant & locked houses. Disclaimer: The maps are solely for thematic presentation.



Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

KARNATAKA

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
STATE - KARNATAKA												
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	2,625,111	16.3									
	Urban	649,849	4.0									
	Total	3,274,960	20.3			M	L			M	L	
A2 - Stone Wall not packed with mortar	Rural	1,418,139	8.8									
	Urban	560,050	3.5									
	Total	1,978,189	12.3			M	L			L	VL	
Total - Category - A		5,253,149	32.5									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	4,450,480	27.6									
	Urban	4,254,880	26.4									
	Total	8,705,360	54.0			L	VL			L	VL	
Total - Category - B		8,705,360	53.9									
C1 - Concrete Wall	Rural	244,978	1.5									
	Urban	898,852	5.6									
	Total	1,143,830	7.1			VL	VL			VL	VL	
C2 - Wood wall	Rural	110,826	0.7									
	Urban	30,481	0.2									
	Total	141,307	0.9			VL	VL			M	L	
Total - Category - C		1,285,137	8.0									
X - Other Materials	Rural	710,855	4.4									
	Urban	187,333	1.2									
	Total	898,188	5.6			VL	VL			M	L	
Total - Category - X		898,188	5.6									
TOTAL HOUSES*		16,141,834										
ROOF												
R1 - Light Weight Sloping Roof	Rural	3,110,827	19.3									
	Urban	1,393,587	8.6									
	Total	4,504,414	27.9			L	VL			H	M	
R2 - Heavy Weight Sloping Roof	Rural	5,403,547	33.5									
	Urban	1,337,438	8.3									
	Total	6,740,985	41.8			L	VL			L	VL	
R3 - Flat Roof	Rural	1,046,015	6.5									
	Urban	3,850,420	23.9									
	Total	4,896,435	30.4									
<i>Damage Risk as per that for the Wall supporting it</i>												
TOTAL HOUSES*		16,141,834										

Housing Category : Wall Types

Category - A : Buildings in field-stone, rural structures, unburnt brick houses, clay houses

Category - B : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone

Category - C : Reinforced building, well built wooden structures

Category - X : Other materials not covered in A,B,C. These are generally light.

Notes : 1. Flood prone area includes that protected area which may have more severe

damage under failure of protection works. In some other areas the local

damage may be severe under heavy rains and choked drainage.

2. Damage Risk for wall types is indicated assuming heavy flat roof

in categories A, B and C (Reinforced Concrete) building

3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

Category - R1 - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)

Category - R2 - Heavy Weight (Tiles, Stone/Slate)

Category - R3 - Flat Roof (Brick, Concrete)

EQ Zone V : Very High Damage Risk Zone (MSK > IX)

EQ Zone IV : High Damage Risk Zone (MSK VIII)

EQ Zone III : Moderate Damage Risk Zone (MSK VII)

EQ Zone II : Low Damage Risk Zone (MSK < VI)

Level of Risk : VH = Very High; H = High;

M = Moderate; L = Low; VL = Very Low

* Total No. of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : KN 01

State : KARNATAKA

BELGAUM

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
STATE - KARNATAKA												
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	229,981	19.7									
	Urban	63,641	5.5									
	Total	293,622	25.2			M	L			M	L	
A2 - Stone Wall not packed with mortar	Rural	170,046	14.6									
	Urban	30,444	2.6									
	Total	200,490	17.2			M	L			L	VL	
Total - Category - A		494,112	42.3									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	311,573	26.7									
	Urban	157,188	13.5									
	Total	468,761	40.2			L	VL			L	VL	
Total - Category - B		468,761	40.1									
C1 - Concrete Wall	Rural	26,631	2.3									
	Urban	48,631	4.2									
	Total	75,262	6.5			VL	VL			VL	VL	
C2 - Wood wall	Rural	14,957	1.3									
	Urban	3,295	0.3									
	Total	18,252	1.6			VL	VL			M	L	
Total - Category - C		93,514	8.0									
X - Other Materials	Rural	97,680	8.4									
	Urban	13,587	1.2									
	Total	111,267	9.6			VL	VL			M	L	
Total - Category - X		111,267	9.5									
TOTAL HOUSES*		1,167,654										
ROOF												
R1 - Light Weight Sloping Roof	Rural	206,932	17.7									
	Urban	45,104	3.9									
	Total	252,036	21.6			L	VL			H	M	
R2 - Heavy Weight Sloping Roof	Rural	565,499	48.4									
	Urban	124,445	10.7									
	Total	689,944	59.1			L	VL			L	VL	
R3 - Flat Roof	Rural	78,437	6.7									
	Urban	147,237	12.6									
	Total	225,674	19.3									
<i>Damage Risk as per that for the Wall supporting it</i>												
TOTAL HOUSES*		1,167,654										

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. **403 mm**

Housing Category : Wall Types

Category - A : Buildings in field-stone, rural structures, unburnt brick houses, clay houses

Category - B : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone

Category - C : Reinforced building, well built wooden structures

Category - X : Other materials not covered in A,B,C. These are generally light.

Notes : 1. Flood prone area includes that protected area which may have more severe

damage under failure of protection works. In some other areas the local

damage may be severe under heavy rains and choked drainage.

2. Damage Risk for wall types is indicated assuming heavy flat roof

in categories A, B and C (Reinforced Concrete) building

3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

Category - R1 - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)

Category - R2 - Heavy Weight (Tiles, Stone/Slate)

Category - R3 - Flat Roof (Brick, Concrete)

EQ Zone V : Very High Damage Risk Zone (MSK > IX)

EQ Zone IV : High Damage Risk Zone (MSK VIII)

EQ Zone III : Moderate Damage Risk Zone (MSK VII)

EQ Zone II : Low Damage Risk Zone (MSK < VI)

Level of Risk : VH = Very High; H = High;

M = Moderate; L = Low; VL = Very Low

* Total No. of Houses excluding Vacant/Locked Houses

**Distribution of Houses by Predominant Materials of Roof and Wall
and Level of Damage Risk**

Table No. : KN 02 State : KARNATAKA BAGALKOT

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
						3.2	96.8					100
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	28,045	6.6									
	Urban	13,007	3.0									
	Total	41,052	9.6			M	L					L
A2 - Stone Wall not packed with mortar	Rural	72,362	16.9									
	Urban	36,830	8.6									
	Total	109,192	25.5			M	L					VL
Total - Category - A		150,244	35.1									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	123,205	28.8									
	Urban	72,160	16.9									
	Total	195,365	45.7			L	VL					VL
Total - Category - B		195,365	45.7									
C1 - Concrete Wall	Rural	3,607	0.8									
	Urban	9,266	2.2									
	Total	12,873	3.0			VL	VL					VL
C2 - Wood wall	Rural	5,835	1.4									
	Urban	2,821	0.7									
	Total	8,656	2.1			VL	VL					L
Total - Category - C		21,529	5.0									
X - Other Materials	Rural	47,626	11.1									
	Urban	12,848	3.0									
	Total	60,474	14.1			VL	VL					L
Total - Category - X		60,474	14.1									
TOTAL HOUSES*		427,612										
ROOF												
R1 - Light Weight Sloping Roof	Rural	229,686	53.7									
	Urban	77,446	18.1									
	Total	307,132	71.8			L	VL					M
R2 - Heavy Weight Sloping Roof	Rural	22,236	5.2									
	Urban	10,386	2.4									
	Total	32,622	7.6			L	VL					VL
R3 - Flat Roof	Rural	28,758	6.7									
	Urban	59,100	13.8									
	Total	87,858	20.5									
TOTAL HOUSES*		427,612										

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. **409 mm**

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and chocked drainage.
2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

**Distribution of Houses by Predominant Materials of Roof and Wall
and Level of Damage Risk**

Table No. : KN 03 State : KARNATAKA BIJAPUR

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
				Area in %				Area in %					
						11.1	88.9					19.1	80.9
WALL													
A1 - Mud & Unburnt Brick Wall	Rural	44,483	9.4										
	Urban	13,054	2.8										
	Total	57,537	12.2			M	L					M	L
A2 - Stone Wall not packed with mortar	Rural	111,146	23.6										
	Urban	22,705	4.8										
	Total	133,851	28.4			M	L					L	VL
Total - Category - A		191,388	40.6										
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	138,920	29.5										
	Urban	66,099	14.0										
	Total	205,019	43.5			L	VL					L	VL
Total - Category - B		205,019	43.5										
C1 - Concrete Wall	Rural	4,628	1.0										
	Urban	9,034	1.9										
	Total	13,662	2.9			VL	VL					VL	VL
C2 - Wood wall	Rural	6,559	1.4										
	Urban	1,301	0.3										
	Total	7,860	1.7			VL	VL					M	L
Total - Category - C		21,522	4.6										
X - Other Materials	Rural	47,140	10.0										
	Urban	6,466	1.4										
	Total	53,606	11.4			VL	VL					M	L
Total - Category - X		53,606	11.4										
TOTAL HOUSES*		471,535											
ROOF													
R1 - Light Weight Sloping Roof	Rural	288,674	61.2										
	Urban	45,822	9.7										
	Total	334,496	70.9			L	VL					H	M
R2 - Heavy Weight Sloping Roof	Rural	26,596	5.6										
	Urban	10,783	2.3										
	Total	37,379	7.9			L	VL					L	VL
R3 - Flat Roof	Rural	37,606	8.0										
	Urban	62,054	13.2										
	Total	99,660	21.2										
TOTAL HOUSES*		471,535											

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. **416 mm**

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and chocked drainage.
2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

**Distribution of Houses by Predominant Materials of Roof and Wall
and Level of Damage Risk**

Table No. : KN 06 State : KARNATAKA KOPPAL

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
				Area in %				Area in %					
												100	
WALL													
A1 - Mud & Unburnt Brick Wall	Rural	45,945	15.1										
	Urban	6,154	2.0										
	Total	52,099	17.1				L						L
A2 - Stone Wall not packed with mortar	Rural	56,557	18.6										
	Urban	7,306	2.4										
	Total	63,863	21.0				L						VL
Total - Category - A		115,962	38.2										
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	107,528	35.4										
	Urban	35,167	11.6										
	Total	142,695	47.0				VL						VL
Total - Category - B		142,695	47.0										
C1 - Concrete Wall	Rural	6,410	2.1										
	Urban	2,084	0.7										
	Total	8,494	2.8				VL						VL
C2 - Wood wall	Rural	3,444	1.1										
	Urban	664	0.2										
	Total	4,108	1.3				VL						L
Total - Category - C		12,602	4.2										
X - Other Materials	Rural	25,610	8.4										
	Urban	6,678	2.2										
	Total	32,288	10.6				VL						L
Total - Category - X		32,288	10.6										
TOTAL HOUSES*		303,547											
ROOF													
R1 - Light Weight Sloping Roof	Rural	176,968	58.3										
	Urban	23,530	7.8										
	Total	200,498	66.1				VL						M
R2 - Heavy Weight Sloping Roof	Rural	41,725	13.7										
	Urban	7,588	2.5										
	Total	49,313	16.2				VL						VL
R3 - Flat Roof	Rural	26,801	8.8										
	Urban	26,935	8.9										
	Total	53,736	17.7										
TOTAL HOUSES*		303,547											

Probable Maximum Precipitation at a Station of the district in 24 hrs is 320 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

**Distribution of Houses by Predominant Materials of Roof and Wall
and Level of Damage Risk**

Table No. : KN 07 State : KARNATAKA GADAG

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %			
		No. of Houses	%	EQ Zone				Wind Velocity m/s							
				V	IV	III	II	55 & 50	47	44 & 39	33				
				Area in %				Area in %							
														100	
WALL															
A1 - Mud & Unburnt Brick Wall	Rural	39,893	15.6												
	Urban	21,166	8.3												
	Total	61,059	23.9				L							L	
A2 - Stone Wall not packed with mortar	Rural	36,802	14.4												
	Urban	13,647	5.3												
	Total	50,449	19.7				L							VL	
Total - Category - A		111,508	43.7												
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	58,054	22.7												
	Urban	47,289	18.5												
	Total	105,343	41.2				VL							VL	
Total - Category - B		105,343	41.3												
C1 - Concrete Wall	Rural	2,082	0.8												
	Urban	5,717	2.2												
	Total	7,799	3.0				VL							VL	
C2 - Wood wall	Rural	3,496	1.4												
	Urban	1,125	0.4												
	Total	4,621	1.8				VL							L	
Total - Category - C		12,420	4.9												
X - Other Materials	Rural	18,227	7.1												
	Urban	7,874	3.1												
	Total	26,101	10.2				VL							L	
Total - Category - X		26,101	10.2												
TOTAL HOUSES*		255,372													
ROOF															
R1 - Light Weight Sloping Roof	Rural	112,017	43.9												
	Urban	48,380	18.9												
	Total	160,397	62.8				VL							M	
R2 - Heavy Weight Sloping Roof	Rural	35,449	13.9												
	Urban	13,703	5.4												
	Total	49,152	19.3				VL							VL	
R3 - Flat Roof	Rural	11,088	4.3												
	Urban	34,735	13.6												
	Total	45,823	17.9												
TOTAL HOUSES*		255,372													

Probable Maximum Precipitation at a Station of the district in 24 hrs is 280 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : KN 14 State : KARNATAKA SHIMOGA

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %		
		No. of Houses	%	EQ Zone				Wind Velocity m/s						
				V	IV	III	II	55 & 50	47	44 & 39	33			
				Area in %				Area in %						
						30.3	69.7					18.5	81.5	
WALL														
A1 - Mud & Unburnt Brick Wall	Rural	142,396	27.9											
	Urban	36,284	7.1											
	Total	178,680	35.0			M	L			M	L			
A2 - Stone Wall not packed with mortar	Rural	21,790	4.3											
	Urban	14,514	2.8											
	Total	36,304	7.1			M	L			L	VL			
Total - Category - A		214,984	42.2											
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	126,572	24.8											
	Urban	112,094	22.0											
	Total	238,666	46.8			L	VL			L	VL			
Total - Category - B		238,666	46.8											
C1 - Concrete Wall	Rural	3,735	0.7											
	Urban	13,671	2.7											
	Total	17,406	3.4			VL	VL			VL	VL			
C2 - Wood wall	Rural	2,385	0.5											
	Urban	723	0.1											
	Total	3,108	0.6			VL	VL			M	L			
Total - Category - C		20,514	4.0											
X - Other Materials	Rural	31,623	6.2											
	Urban	3,932	0.8											
	Total	35,555	7.0			VL	VL			M	L			
Total - Category - X		35,555	7.0											
TOTAL HOUSES*		509,719												
ROOF														
R1 - Light Weight Sloping Roof	Rural	27,547	5.4											
	Urban	18,767	3.7											
	Total	46,314	9.1			L	VL			H	M			
R2 - Heavy Weight Sloping Roof	Rural	282,202	55.4											
	Urban	83,711	16.4											
	Total	365,913	71.8			L	VL			L	VL			
R3 - Flat Roof	Rural	18,752	3.7											
	Urban	78,740	15.4											
	Total	97,492	19.1											
TOTAL HOUSES*		509,719												

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 819 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
 - Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
 - Category - C** : Reinforced building, well built wooden structures
 - Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
 - Category - R2** - Heavy Weight (Tiles, Stone/Slate)
 - Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : KN 15 State : KARNATAKA UDUPI

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %			
		No. of Houses	%	EQ Zone				Wind Velocity m/s							
				V	IV	III	II	55 & 50	47	44 & 39	33				
				Area in %				Area in %							
WALL															
A1 - Mud & Unburnt Brick Wall	Rural	57,581	16.5												
	Urban	11,047	3.2												
	Total	68,628	19.7			M				M	L				
A2 - Stone Wall not packed with mortar	Rural	24,040	6.9												
	Urban	9,383	2.7												
	Total	33,423	9.6			M				L	VL				
Total - Category - A		102,051	29.2												
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	158,906	45.4												
	Urban	74,821	21.4												
	Total	233,727	66.8			L				L	VL				
Total - Category - B		233,727	66.8												
C1 - Concrete Wall	Rural	1,360	0.4												
	Urban	3,221	0.9												
	Total	4,581	1.3			VL				VL	VL				
C2 - Wood wall	Rural	1,106	0.3												
	Urban	483	0.1												
	Total	1,589	0.4			VL				M	L				
Total - Category - C		6,170	1.8												
X - Other Materials	Rural	6,284	1.8												
	Urban	1,689	0.5												
	Total	7,973	2.3			VL				M	L				
Total - Category - X		7,973	2.3												
TOTAL HOUSES*		349,921													
ROOF															
R1 - Light Weight Sloping Roof	Rural	15,631	4.5												
	Urban	5,487	1.6												
	Total	21,118	6.1			L				H	M				
R2 - Heavy Weight Sloping Roof	Rural	186,739	53.4												
	Urban	52,873	15.1												
	Total	239,612	68.5			L				L	VL				
R3 - Flat Roof	Rural	46,907	13.4												
	Urban	42,284	12.1												
	Total	89,191	25.5												
TOTAL HOUSES*		349,921													

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 853 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
 - Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
 - Category - C** : Reinforced building, well built wooden structures
 - Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
 - Category - R2** - Heavy Weight (Tiles, Stone/Slate)
 - Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : KN 16 State : KARNATAKA CHIKMAGALUR

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
				Area in %				Area in %					
WALL						9.9	90.1				.9	99.1	
A1 - Mud & Unburnt Brick Wall	Rural	115,793	33.4										
	Urban	14,474	4.2										
	Total	130,267	37.6			M	L			M	L		
A2 - Stone Wall not packed with mortar	Rural	12,258	3.5										
	Urban	3,154	0.9										
	Total	15,412	4.4			M	L			L	VL		
Total - Category - A		145,679	42.0										
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	119,029	34.3										
	Urban	47,121	13.6										
	Total	166,150	47.9			L	VL			L	VL		
Total - Category - B		166,150	47.9										
C1 - Concrete Wall	Rural	5,545	1.6										
	Urban	5,482	1.6										
	Total	11,027	3.2			VL	VL			VL	VL		
C2 - Wood wall	Rural	2,465	0.7										
	Urban	320	0.1										
	Total	2,785	0.8			VL	VL			M	L		
Total - Category - C		13,812	4.0										
X - Other Materials	Rural	19,617	5.7										
	Urban	1,612	0.5										
	Total	21,229	6.2			VL	VL			M	L		
Total - Category - X		21,229	6.1										
TOTAL HOUSES*		346,870											

ROOF													
R1 - Light Weight Sloping Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
R1 - Light Weight Sloping Roof	Rural	28,698	8.3										
	Urban	8,553	2.5										
	Total	37,251	10.8			L	VL			H	M		
R2 - Heavy Weight Sloping Roof	Rural	228,653	65.9										
	Urban	34,068	9.8										
	Total	262,721	75.7			L	VL			L	VL		
R3 - Flat Roof	Rural	17,356	5.0										
	Urban	29,542	8.5										
	Total	46,898	13.5	<i>Damage Risk as per that for the Wall supporting it</i>									
TOTAL HOUSES*		346,870											

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. **477 mm**

Housing Category : Wall Types

- Category - A :** Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B :** Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C :** Reinforced building, well built wooden structures
- Category - X :** Other materials not covered in A,B,C. These are generally light.

- Notes :** 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
- 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
- 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1 - Light Weight** (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2 - Heavy Weight** (Tiles, Stone/Slate)
- Category - R3 - Flat Roof** (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)

- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

Table No. : KN 17 State : KARNATAKA TUMKUR

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
				Area in %				Area in %					
WALL													100
A1 - Mud & Unburnt Brick Wall	Rural	138,628	17.4										
	Urban	24,059	3.0										
	Total	162,687	20.4							L			L
A2 - Stone Wall not packed with mortar	Rural	65,291	8.2										
	Urban	8,308	1.0										
	Total	73,599	9.2							L			VL
Total - Category - A		236,286	29.6										
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	358,124	44.8										
	Urban	131,322	16.4										
	Total	489,446	61.2							VL			VL
Total - Category - B		489,446	61.3										
C1 - Concrete Wall	Rural	15,831	2.0										
	Urban	12,410	1.6										
	Total	28,241	3.6							VL			VL
C2 - Wood wall	Rural	7,035	0.9										
	Urban	1,108	0.1										
	Total	8,143	1.0							VL			L
Total - Category - C		36,384	4.6										
X - Other Materials	Rural	32,635	4.1										
	Urban	4,080	0.5										
	Total	36,715	4.6							VL			L
Total - Category - X		36,715	4.6										
TOTAL HOUSES*		798,831											

ROOF													
R1 - Light Weight Sloping Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
R1 - Light Weight Sloping Roof	Rural	196,749	24.6										
	Urban	34,343	4.3										
	Total	231,092	28.9							VL			M
R2 - Heavy Weight Sloping Roof	Rural	364,797	45.7										
	Urban	49,381	6.2										
	Total	414,178	51.9							VL			VL
R3 - Flat Roof	Rural	55,998	7.0										
	Urban	97,563	12.2										
	Total	153,561	19.2	<i>Damage Risk as per that for the Wall supporting it</i>									
TOTAL HOUSES*		798,831											

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. **295 mm**

Housing Category : Wall Types

- Category - A :** Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B :** Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C :** Reinforced building, well built wooden structures
- Category - X :** Other materials not covered in A,B,C. These are generally light.

- Notes :** 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
- 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
- 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1 - Light Weight** (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2 - Heavy Weight** (Tiles, Stone/Slate)
- Category - R3 - Flat Roof** (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)

- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

**Distribution of Houses by Predominant Materials of Roof and Wall
and Level of Damage Risk**

Table No. : KN 18 State : KARNATAKA BANGALORE

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
				Area in %				Area in %					
												100	
WALL													
A1 - Mud & Unburnt Brick Wall	Rural	30,391	1.1										
	Urban	91,294	3.2										
	Total	121,685	4.3				L						L
A2 - Stone Wall not packed with mortar	Rural	21,056	0.7										
	Urban	141,678	4.9										
	Total	162,734	5.6				L						VL
Total - Category - A		284,419	9.9										
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	161,952	5.6										
	Urban	1,818,071	63.0										
	Total	1,980,023	68.6				VL						VL
Total - Category - B		1,980,023	68.7										
C1 - Concrete Wall	Rural	27,724	1.0										
	Urban	545,120	18.9										
	Total	572,844	19.9				VL						VL
C2 - Wood wall	Rural	780	-										
	Urban	2,383	0.1										
	Total	3,163	0.1				VL						L
Total - Category - C		576,007	20.0										
X - Other Materials	Rural	5,247	0.2										
	Urban	37,899	1.3										
	Total	43,146	1.5				VL						L
Total - Category - X		43,146	1.5										
TOTAL HOUSES*		2,883,595											
ROOF													
R1 - Light Weight Sloping Roof	Rural	107,720	3.7										
	Urban	561,650	19.5										
	Total	669,370	23.2				VL						M
R2 - Heavy Weight Sloping Roof	Rural	46,954	1.6										
	Urban	159,072	5.5										
	Total	206,026	7.1				VL						VL
R3 - Flat Roof	Rural	92,476	3.2										
	Urban	1,915,723	66.4										
	Total	2,008,199	69.6										
TOTAL HOUSES*		2,883,595											

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. **434 mm**

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

**Distribution of Houses by Predominant Materials of Roof and Wall
and Level of Damage Risk**

Table No. : KN 19 State : KARNATAKA MANDYA

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %		
		No. of Houses	%	EQ Zone				Wind Velocity m/s						
				V	IV	III	II	55 & 50	47	44 & 39	33			
				Area in %				Area in %						
													100	
WALL														
A1 - Mud & Unburnt Brick Wall	Rural	131,817	25.6											
	Urban	12,488	2.4											
	Total	144,305	28.0				L							L
A2 - Stone Wall not packed with mortar	Rural	45,362	8.8											
	Urban	5,801	1.1											
	Total	51,163	9.9				L							VL
Total - Category - A		195,468	38.0											
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	206,860	40.2											
	Urban	59,116	11.5											
	Total	265,976	51.7				VL							VL
Total - Category - B		265,976	51.7											
C1 - Concrete Wall	Rural	18,523	3.6											
	Urban	13,020	2.5											
	Total	31,543	6.1				VL							VL
C2 - Wood wall	Rural	3,986	0.8											
	Urban	808	0.2											
	Total	4,794	1.0				VL							L
Total - Category - C		36,337	7.1											
X - Other Materials	Rural	14,481	2.8											
	Urban	2,294	0.4											
	Total	16,775	3.2				VL							L
Total - Category - X		16,775	3.3											
TOTAL HOUSES*		514,556												
ROOF														
R1 - Light Weight Sloping Roof	Rural	53,415	10.4											
	Urban	14,715	2.9											
	Total	68,130	13.3				VL							M
R2 - Heavy Weight Sloping Roof	Rural	325,549	63.3											
	Urban	29,682	5.8											
	Total	355,231	69.1				VL							VL
R3 - Flat Roof	Rural	42,065	8.2											
	Urban	49,130	9.5											
	Total	91,195	17.7											
TOTAL HOUSES*		514,556												

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. **385 mm**

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

**Distribution of Houses by Predominant Materials of Roof and Wall
and Level of Damage Risk**

Table No. : KN 22 State : KARNATAKA KODAGU

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
				Area in %				Area in %					
WALL						48.4	51.6				.7	99.3	
A1 - Mud & Unburnt Brick Wall	Rural	64,203	34.9										
	Urban	6,397	3.5										
	Total	70,600	38.4			M	L				M	L	
A2 - Stone Wall not packed with mortar	Rural	12,024	6.5										
	Urban	1,661	0.9										
	Total	13,685	7.4			M	L				L	VL	
Total - Category - A		84,285	45.8										
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	68,969	37.4										
	Urban	17,290	9.4										
	Total	86,259	46.8			L	VL				L	VL	
Total - Category - B		86,259	46.8										
C1 - Concrete Wall	Rural	5,109	2.8										
	Urban	2,035	1.1										
	Total	7,144	3.9			VL	VL				VL	VL	
C2 - Wood wall	Rural	1,098	0.6										
	Urban	116	0.1										
	Total	1,214	0.7			VL	VL				M	L	
Total - Category - C		8,358	4.5										
X - Other Materials	Rural	4,760	2.6										
	Urban	537	0.3										
	Total	5,297	2.9			VL	VL				M	L	
Total - Category - X		5,297	2.9										
TOTAL HOUSES*		184,199											
ROOF													
R1 - Light Weight Sloping Roof	Rural	19,512	10.6										
	Urban	3,024	1.6										
	Total	22,536	12.2			L	VL				H	M	
R2 - Heavy Weight Sloping Roof	Rural	116,537	63.3										
	Urban	12,739	6.9										
	Total	129,276	70.2			L	VL				L	VL	
R3 - Flat Roof	Rural	20,114	10.9										
	Urban	12,273	6.7										
	Total	32,387	17.6										
TOTAL HOUSES*		184,199											

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. **845 mm**

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

**Distribution of Houses by Predominant Materials of Roof and Wall
and Level of Damage Risk**

Table No. : KN 23 State : KARNATAKA MYSORE

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
				Area in %				Area in %					
WALL						4.3	95.7					100	
A1 - Mud & Unburnt Brick Wall	Rural	203,850	24.3										
	Urban	42,056	5.0										
	Total	245,906	29.3			M	L						L
A2 - Stone Wall not packed with mortar	Rural	28,779	3.4										
	Urban	21,497	2.6										
	Total	50,276	6.0			M	L						VL
Total - Category - A		296,182	35.2										
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	218,877	26.0										
	Urban	212,756	25.3										
	Total	431,633	51.3			L	VL						VL
Total - Category - B		431,633	51.4										
C1 - Concrete Wall	Rural	22,756	2.7										
	Urban	64,374	7.7										
	Total	87,130	10.4			VL	VL						VL
C2 - Wood wall	Rural	3,388	0.4										
	Urban	953	0.1										
	Total	4,341	0.5			VL	VL						L
Total - Category - C		91,471	10.9										
X - Other Materials	Rural	16,835	2.0										
	Urban	4,442	0.5										
	Total	21,277	2.5			VL	VL						L
Total - Category - X		21,277	2.5										
TOTAL HOUSES*		840,563											
ROOF													
R1 - Light Weight Sloping Roof	Rural	62,722	7.5										
	Urban	61,365	7.3										
	Total	124,087	14.8			L	VL						M
R2 - Heavy Weight Sloping Roof	Rural	391,630	46.6										
	Urban	72,297	8.6										
	Total	463,927	55.2			L	VL						VL
R3 - Flat Roof	Rural	40,133	4.8										
	Urban	212,416	25.3										
	Total	252,549	30.1										
TOTAL HOUSES*		840,563											

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. **476 mm**

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : KN 24 State : KARNATAKA CHAMARAJANAGAR

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
				Area in %				Area in %					
WALL						3.9	96.1				11.8	88.2	
A1 - Mud & Unburnt Brick Wall	Rural	85,514	30.0										
	Urban	12,205	4.3										
	Total	97,719	34.3			M	L			M	L		
A2 - Stone Wall not packed with mortar	Rural	18,636	6.5										
	Urban	4,339	1.5										
	Total	22,975	8.0			M	L			L	VL		
Total - Category - A		120,694	42.4										
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	107,406	37.7										
	Urban	29,845	10.5										
	Total	137,251	48.2			L	VL			L	VL		
Total - Category - B		137,251	48.2										
C1 - Concrete Wall	Rural	5,336	1.9										
	Urban	3,050	1.1										
	Total	8,386	3.0			VL	VL			VL	VL		
C2 - Wood wall	Rural	1,788	0.6										
	Urban	303	0.1										
	Total	2,091	0.7			VL	VL			M	L		
Total - Category - C		10,477	3.7										
X - Other Materials	Rural	14,738	5.2										
	Urban	1,657	0.6										
	Total	16,395	5.8			VL	VL			M	L		
Total - Category - X		16,395	5.8										
TOTAL HOUSES*		284,817											

ROOF													
R1 - Light Weight Sloping Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
R1 - Light Weight Sloping Roof	Rural	36,421	12.8										
	Urban	5,945	2.1										
	Total	42,366	14.9			L	VL			H	M		
R2 - Heavy Weight Sloping Roof	Rural	181,238	63.6										
	Urban	25,049	8.8										
	Total	206,287	72.4			L	VL			L	VL		
R3 - Flat Roof	Rural	15,759	5.5										
	Urban	20,405	7.2										
	Total	36,164	12.7										
TOTAL HOUSES*		284,817											

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. **476 mm**

Housing Category : Wall Types

- Category - A :** Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B :** Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C :** Reinforced building, well built wooden structures
- Category - X :** Other materials not covered in A,B,C. These are generally light.

- Notes :** 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
- 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
- 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1 - Light Weight** (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2 - Heavy Weight** (Tiles, Stone/Slate)
- Category - R3 - Flat Roof** (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)

- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

Table No. : KN 25 State : KARNATAKA GULBARGA

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
				Area in %				Area in %					
WALL													
A1 - Mud & Unburnt Brick Wall	Rural	24,742	4.5										
	Urban	7,219	1.3										
	Total	31,961	5.8							L	M	L	
A2 - Stone Wall not packed with mortar	Rural	147,782	26.9										
	Urban	35,835	6.5										
	Total	183,617	33.4							L	L	VL	
Total - Category - A		215,578	39.3										
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	153,721	28.0										
	Urban	127,927	23.3										
	Total	281,648	51.3							VL	L	VL	
Total - Category - B		281,648	51.3										
C1 - Concrete Wall	Rural	5,511	1.0										
	Urban	7,906	1.4										
	Total	13,417	2.4							VL	VL	VL	
C2 - Wood wall	Rural	5,977	1.1										
	Urban	1,697	0.3										
	Total	7,674	1.4							VL	M	L	
Total - Category - C		21,091	3.8										
X - Other Materials	Rural	26,039	4.7										
	Urban	4,768	0.9										
	Total	30,807	5.6							VL	M	L	
Total - Category - X		30,807	5.6										
TOTAL HOUSES*		549,124											

ROOF													
R1 - Light Weight Sloping Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
R1 - Light Weight Sloping Roof	Rural	135,425	24.7										
	Urban	24,705	4.5										
	Total	160,130	29.2							VL	H	M	
R2 - Heavy Weight Sloping Roof	Rural	177,471	32.3										
	Urban	46,792	8.5										
	Total	224,263	40.8							VL	L	VL	
R3 - Flat Roof	Rural	50,876	9.3										
	Urban	113,855	20.7										
	Total	164,731	30.0										
TOTAL HOUSES*		549,124											

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. **423 mm**

Housing Category : Wall Types

- Category - A :** Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B :** Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C :** Reinforced building, well built wooden structures
- Category - X :** Other materials not covered in A,B,C. These are generally light.

- Notes :** 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
- 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
- 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1 - Light Weight** (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2 - Heavy Weight** (Tiles, Stone/Slate)
- Category - R3 - Flat Roof** (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)

- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : KN 28 State : KARNATAKA CHIKKABALLAPURA

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %										
		No. of Houses	%	EQ Zone				Wind Velocity m/s														
				V	IV	III	II	55 & 50	47	44 & 39	33											
				Area in %				Area in %														
												100								100		
WALL																						
A1 - Mud & Unburnt Brick Wall	Rural	44,421	12.1																			
	Urban	6,103	1.7																			
	Total	50,524	13.8																			L
A2 - Stone Wall not packed with mortar	Rural	25,898	7.1																			
	Urban	5,228	1.4																			
	Total	31,126	8.5																			VL
Total - Category - A		81,650	22.3																			
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	196,820	53.7																			
	Urban	64,820	17.7																			
	Total	261,640	71.4																			VL
Total - Category - B		261,640	71.4																			
C1 - Concrete Wall	Rural	6,225	1.7																			
	Urban	5,477	1.5																			
	Total	11,702	3.2																			VL
C2 - Wood wall	Rural	2,467	0.7																			
	Urban	334	0.1																			
	Total	2,801	0.8																			VL
Total - Category - C		14,503	4.0																			
X - Other Materials	Rural	7,440	2.0																			
	Urban	995	0.3																			
	Total	8,435	2.3																			VL
Total - Category - X		8,435	2.3																			
TOTAL HOUSES*		366,228																				

ROOF																						
R1 - Light Weight Sloping Roof	Rural	71,493	19.5																			
	Urban	13,609	3.7																			
	Total	85,102	23.2																			M
R2 - Heavy Weight Sloping Roof	Rural	172,729	47.2																			
	Urban	25,473	7.0																			
	Total	198,202	54.2																			VL
R3 - Flat Roof	Rural	39,049	10.7																			
	Urban	43,875	12.0																			
	Total	82,924	22.7																			VL
TOTAL HOUSES*		366,228																				

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. **477 mm**

Housing Category : Wall Types

- Category - A :** Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B :** Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C :** Reinforced building, well built wooden structures
- Category - X :** Other materials not covered in A,B,C. These are generally light.

- Notes :** 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
- 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
- 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1 -** Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2 -** Heavy Weight (Tiles, Stone/Slate)
- Category - R3 -** Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)

- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

Table No. : KN 29 State : KARNATAKA BANGALORE RURAL

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %										
		No. of Houses	%	EQ Zone				Wind Velocity m/s														
				V	IV	III	II	55 & 50	47	44 & 39	33											
				Area in %				Area in %														
																						100
WALL																						
A1 - Mud & Unburnt Brick Wall	Rural	47,984	16.8																			
	Urban	7,405	2.6																			
	Total	55,389	19.4																			L
A2 - Stone Wall not packed with mortar	Rural	11,379	4.0																			
	Urban	4,233	1.5																			
	Total	15,612	5.5																			VL
Total - Category - A		71,001	24.8																			
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	128,454	44.9																			
	Urban	61,393	21.5																			
	Total	189,847	66.4																			VL
Total - Category - B		189,847	66.4																			
C1 - Concrete Wall	Rural	9,356	3.3																			
	Urban	7,825	2.7																			
	Total	17,181	6.0																			VL
C2 - Wood wall	Rural	1,385	0.5																			
	Urban	224	0.1																			
	Total	1,609	0.6																			VL
Total - Category - C		18,790	6.6																			
X - Other Materials	Rural	4,837	1.7																			
	Urban	1,368	0.5																			
	Total	6,205	2.2																			VL
Total - Category - X		6,205	2.2																			
TOTAL HOUSES*		285,843																				

ROOF																						
R1 - Light Weight Sloping Roof	Rural	82,530	28.9																			
	Urban	22,330	7.8																			
	Total	104,860	36.7																			M
R2 - Heavy Weight Sloping Roof	Rural	80,579	28.2																			
	Urban	12,803	4.5																			
	Total	93,382	32.7																			VL
R3 - Flat Roof	Rural	40,286	14.1																			
	Urban	47,315	16.6																			
	Total	87,601	30.7																			VL
TOTAL HOUSES*		285,843																				

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. **385 mm**

Housing Category : Wall Types

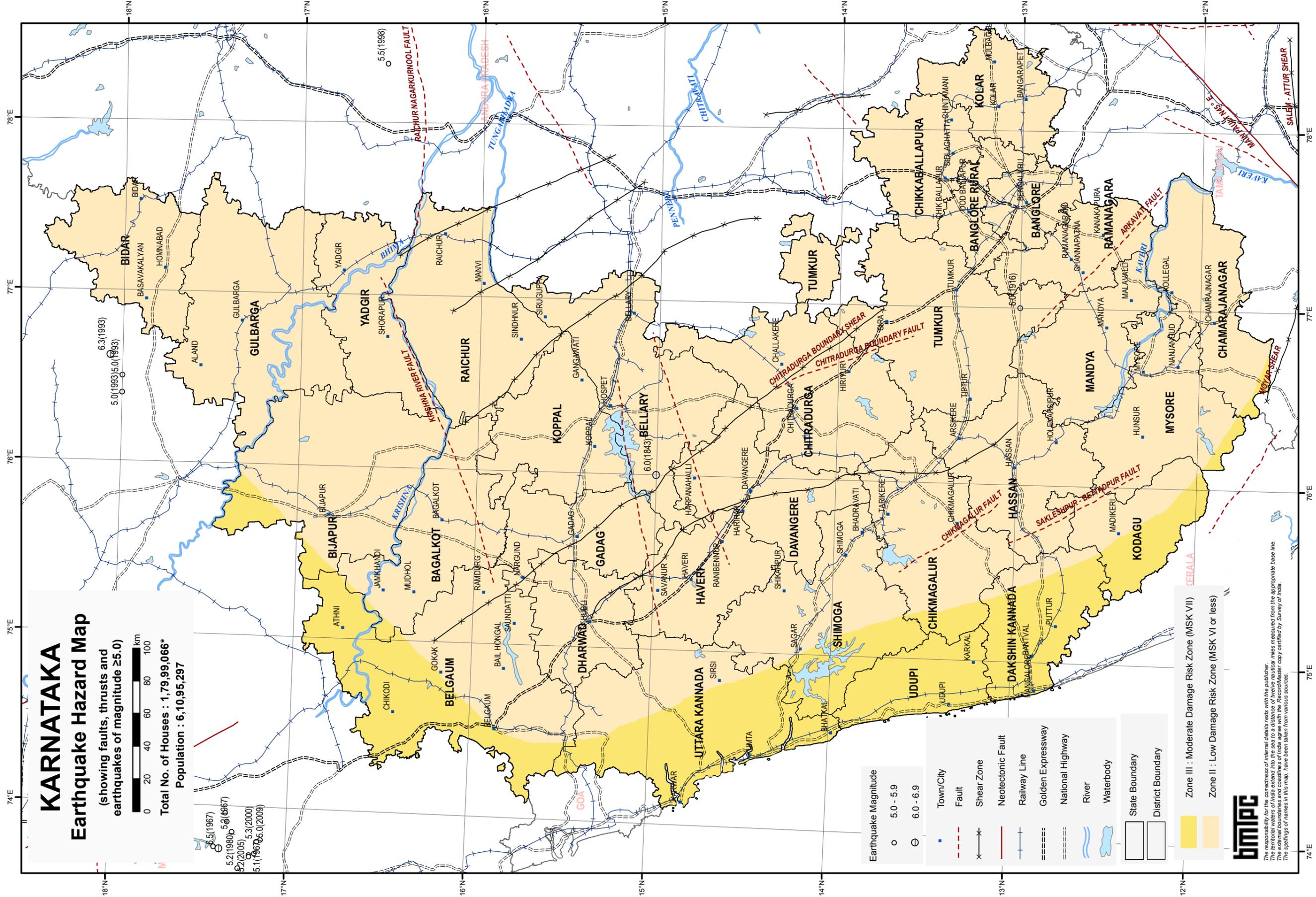
- Category - A :** Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B :** Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C :** Reinforced building, well built wooden structures
- Category - X :** Other materials not covered in A,B,C. These are generally light.

- Notes :** 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
- 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
- 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1 -** Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2 -** Heavy Weight (Tiles, Stone/Slate)
- Category - R3 -** Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)

- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses



KARNATAKA Earthquake Hazard Map

(showing faults, thrusts and earthquakes of magnitude ≥ 5.0)



Total No. of Houses : 1,79,99,066*
Population : 6,10,95,297

- 5.5 (1967)
- 5.2 (1980)
- 5.2 (2005)
- 5.3 (2000)
- 5.1 (1996)
- 5.0 (1993)
- 5.0 (1993)
- 6.3 (1993)
- 5.5 (1998)
- 6.0 (1843)

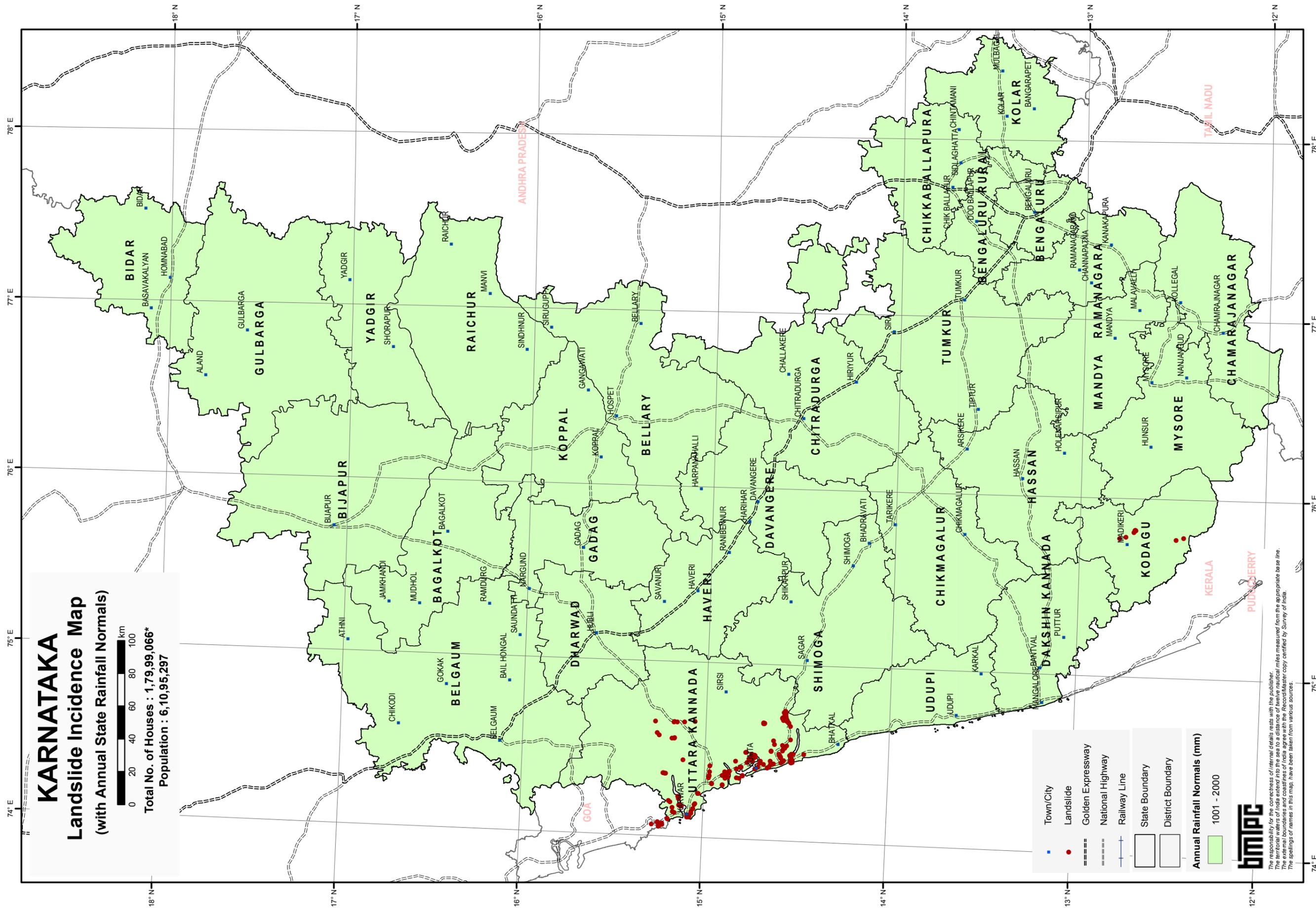
Earthquake Magnitude	Town/City	Fault	Shear Zone	Neotectonic Fault	Railway Line	Golden Expressway	National Highway	River	Waterbody	State Boundary	District Boundary
○ 5.0 - 5.9	●	---	✕	---	---	====	====	---	---	---	---
⊙ 6.0 - 6.9		---	✕	---	---	====	====	---	---	---	---

- Zone III : Moderate Damage Risk Zone (MSK VII)
- Zone II : Low Damage Risk Zone (MSK VI or less)



The responsibility for the correctness of internal details rests with the publisher. The territorial waters of India extend into the sea to a distance of twelve nautical miles measured from the appropriate base line. The external boundaries and coordinates of India agree with the Record Master copy certified by Survey of India. The spellings of names in this map, have been taken from various sources.

BMPIC : Vulnerability Atlas - 3rd Edition ; Peer Group. MoHUA, GOI; Map is Based on digitised data of SOI; Seismic Zones of India Map IS: 1899 (Part I) - 2002, BIS; Earthquake Epicentre from IMD; Seismotectonic Atlas of India and its Environs, GSI; Houses/Population as per Census 2011; *Houses including vacant & locked houses. Disclaimer: The maps are solely for thematic presentation.



The responsibility for the correctness of internal details rests with the publisher. The territorial waters of India extend into the sea to a distance of twelve nautical miles measured from the appropriate base line. The external boundaries and coastlines of India agree with the Record Master copy certified by Survey of India. The spellings of names in this map have been taken from various sources.

BMTPC: Vulnerability Atlas - 3rd Edition: Peer Group, MoHUA, GOI: Map is Based on digitised data of SOI; Landslide Incidence data GSI; Annual Rainfall data IMD; Houses/Population as per Census 2011; * Houses including vacant & locked houses. Disclaimer: The maps are solely for thematic presentation.

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

KERALA

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
STATE - KERALA											15.7	
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	707,519	7.1									
	Urban	316,646	3.2									
	Total	1,024,165	10.3		M	L			M	L		VH
A2 - Stone Wall not packed with mortar	Rural	584,665	5.9									
	Urban	357,987	3.6									
	Total	942,652	9.5		M	L			L	VL		VH
Total - Category - A		1,966,817	19.8									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	3,509,527	35.3									
	Urban	3,729,499	37.5									
	Total	7,239,026	72.8		L	VL			L	VL		H/M
Total - Category - B		7,239,026	72.9									
C1 - Concrete Wall	Rural	147,353	1.5									
	Urban	138,709	1.4									
	Total	286,062	2.9			VL	VL		VL	VL		L/VL
C2 - Wood wall	Rural	55,606	0.6									
	Urban	48,475	0.5									
	Total	104,081	1.1			VL	VL		M	L		H
Total - Category - C		390,143	3.9									
X - Other Materials	Rural	223,565	2.3									
	Urban	115,604	1.2									
	Total	339,169	3.5			VL	VL		M	L		VH
Total - Category - X		339,169	3.4									
TOTAL HOUSES*		9,935,155										
ROOF												
R1 - Light Weight Sloping Roof	Rural	872,193	8.8									
	Urban	429,085	4.3									
	Total	1,301,278	13.1			L	VL		H	M		VH
R2 - Heavy Weight Sloping Roof	Rural	2,239,189	22.5									
	Urban	1,497,262	15.1									
	Total	3,736,451	37.6			L	VL		L	VL		H
R3 - Flat Roof	Rural	2,116,853	21.3									
	Urban	2,780,573	28.0									
	Total	4,897,426	49.3									
TOTAL HOUSES*											9,935,155	

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : KL 01

State : KERALA

KASARAGOD

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
STATE - KERALA											24.1	
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	26,634	7.3									
	Urban	3,606	1.0									
	Total	30,240	8.3			M			M	L		VH
A2 - Stone Wall not packed with mortar	Rural	47,816	13.0									
	Urban	15,689	4.3									
	Total	63,505	17.3			M			L	VL		VH
Total - Category - A		93,745	25.5									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	140,548	38.3									
	Urban	119,720	32.6									
	Total	260,268	70.9			L			L	VL		H/M
Total - Category - B		260,268	70.9									
C1 - Concrete Wall	Rural	1,457	0.4									
	Urban	1,409	0.4									
	Total	2,866	0.8			VL			VL	VL		L/VL
C2 - Wood wall	Rural	996	0.3									
	Urban	402	0.1									
	Total	1,398	0.4			VL			M	L		H
Total - Category - C		4,264	1.2									
X - Other Materials	Rural	6,851	1.9									
	Urban	1,864	0.5									
	Total	8,715	2.4			VL			M	L		VH
Total - Category - X		8,715	2.4									
TOTAL HOUSES*		366,992										
ROOF												
R1 - Light Weight Sloping Roof	Rural	18,818	5.1									
	Urban	3,758	1.0									
	Total	22,576	6.1			L			H	M		VH
R2 - Heavy Weight Sloping Roof	Rural	114,573	31.2									
	Urban	47,779	13.0									
	Total	162,352	44.2			L			L	VL		H
R3 - Flat Roof	Rural	90,911	24.8									
	Urban	91,153	24.8									
	Total	182,064	49.6									
TOTAL HOUSES*											366,992	

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 853 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : KL 02 State : KERALA KANNUR

Table No. : KL 03 State : KERALA WAYANAD

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %		
		No. of Houses	%	EQ Zone				Wind Velocity m/s						
				V	IV	III	II	55 & 50	47	44 & 39	33			
				Area in %				Area in %						
						100					76.4	23.6	11.9	
WALL														
A1 - Mud & Unburnt Brick Wall	Rural	36,629	4.9											
	Urban	43,331	5.8											
	Total	79,960	10.7			M					M	L		VH
A2 - Stone Wall not packed with mortar	Rural	47,773	6.3											
	Urban	43,384	5.8											
	Total	91,157	12.1			M					L	VL		VH
Total - Category - A		171,117	22.7											
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	176,463	23.4											
	Urban	389,355	51.7											
	Total	565,818	75.1			L					L	VL		H/M
Total - Category - B		565,818	75.1											
C1 - Concrete Wall	Rural	2,040	0.3											
	Urban	2,878	0.4											
	Total	4,918	0.7			VL					VL	VL		L/VL
C2 - Wood wall	Rural	1,437	0.2											
	Urban	1,670	0.2											
	Total	3,107	0.4			VL					M	L		H
Total - Category - C		8,025	1.1											
X - Other Materials	Rural	5,249	0.7											
	Urban	3,242	0.4											
	Total	8,491	1.1			VL					M	L		VH
Total - Category - X		8,491	1.1											
TOTAL HOUSES*		753,451												
ROOF														
R1 - Light Weight Sloping Roof	Rural	25,814	3.4											
	Urban	8,443	1.1											
	Total	34,257	4.5			L					H	M		VH
R2 - Heavy Weight Sloping Roof	Rural	137,751	18.3											
	Urban	186,143	24.7											
	Total	323,894	43.0			L					L	VL		H
R3 - Flat Roof	Rural	106,026	14.1											
	Urban	289,274	38.4											
	Total	395,300	52.5											
TOTAL HOUSES*		753,451												

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %		
		No. of Houses	%	EQ Zone				Wind Velocity m/s						
				V	IV	III	II	55 & 50	47	44 & 39	33			
				Area in %				Area in %						
						100						2.9	97.1	
WALL														
A1 - Mud & Unburnt Brick Wall	Rural	35,183	14.4											
	Urban	844	0.3											
	Total	36,027	14.7			M					M	L		
A2 - Stone Wall not packed with mortar	Rural	11,170	4.6											
	Urban	319	0.1											
	Total	11,489	4.7			M					L	VL		
Total - Category - A		47,516	19.4											
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	167,415	68.5											
	Urban	7,954	3.3											
	Total	175,369	71.8			L					L	VL		
Total - Category - B		175,369	71.7											
C1 - Concrete Wall	Rural	3,530	1.4											
	Urban	65	-											
	Total	3,595	1.4			VL						VL		VL
C2 - Wood wall	Rural	1,735	0.7											
	Urban	61	-											
	Total	1,796	0.7			VL					M	L		
Total - Category - C		5,391	2.2											
X - Other Materials	Rural	15,918	6.5											
	Urban	354	0.1											
	Total	16,272	6.6			VL						M	L	
Total - Category - X		16,272	6.7											
TOTAL HOUSES*		244,548												
ROOF														
R1 - Light Weight Sloping Roof	Rural	60,255	24.6											
	Urban	1,932	0.8											
	Total	62,187	25.4			L						H	M	
R2 - Heavy Weight Sloping Roof	Rural	104,753	42.8											
	Urban	2,579	1.1											
	Total	107,332	43.9			L						L	VL	
R3 - Flat Roof	Rural	69,943	28.6											
	Urban	5,086	2.1											
	Total	75,029	30.7											
TOTAL HOUSES*		244,548												

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. **888 mm**

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. **818 mm**

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
- 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
- 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)

- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
- 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
- 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)

- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : KL 04 State : KERALA KOZHIKODE

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
				Area in %				Area in %					
						100					97.2	2.8	5.2
WALL													
A1 - Mud & Unburnt Brick Wall	Rural	34,929	4.0										
	Urban	17,539	2.0										
	Total	52,468	6.0			M				M	L		VH
A2 - Stone Wall not packed with mortar	Rural	32,996	3.8										
	Urban	45,834	5.2										
	Total	78,830	9.0			M				L	VL		VH
Total - Category - A		131,298	15.0										
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	206,888	23.6										
	Urban	506,153	57.7										
	Total	713,041	81.3			L				L	VL		H/M
Total - Category - B		713,041	81.3										
C1 - Concrete Wall	Rural	1,763	0.2										
	Urban	6,203	0.7										
	Total	7,966	0.9			VL				VL	VL		L/VL
C2 - Wood wall	Rural	1,422	0.2										
	Urban	3,005	0.3										
	Total	4,427	0.5			VL				M	L		H
Total - Category - C		12,393	1.4										
X - Other Materials	Rural	9,765	1.1										
	Urban	10,078	1.1										
	Total	19,843	2.2			VL				M	L		VH
Total - Category - X		19,843	2.3										
TOTAL HOUSES*		876,575											
ROOF													
R1 - Light Weight Sloping Roof	Rural	33,041	3.8										
	Urban	28,416	3.2										
	Total	61,457	7.0			L				H	M		VH
R2 - Heavy Weight Sloping Roof	Rural	106,939	12.2										
	Urban	200,582	22.9										
	Total	307,521	35.1			L				L	VL		H
R3 - Flat Roof	Rural	147,783	16.9										
	Urban	359,814	41.0										
	Total	507,597	57.9										
TOTAL HOUSES*		876,575											

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 733 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
 - Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
 - Category - C** : Reinforced building, well built wooden structures
 - Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes :**
1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
 - Category - R2** - Heavy Weight (Tiles, Stone/Slate)
 - Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : KL 05 State : KERALA MALAPPURAM

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %		
		No. of Houses	%	EQ Zone				Wind Velocity m/s						
				V	IV	III	II	55 & 50	47	44 & 39	33			
				Area in %				Area in %						
						100						88.2	11.8	12.2
WALL														
A1 - Mud & Unburnt Brick Wall	Rural	55,768	5.6											
	Urban	20,624	2.1											
	Total	76,392	7.7			M				M	L		VH	
A2 - Stone Wall not packed with mortar	Rural	63,876	6.4											
	Urban	36,598	3.7											
	Total	100,474	10.1			M				L	VL		VH	
Total - Category - A		176,866	17.7											
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	408,881	41.0											
	Urban	374,795	37.6											
	Total	783,676	78.6			L				L	VL		H/M	
Total - Category - B		783,676	78.6											
C1 - Concrete Wall	Rural	3,836	0.4											
	Urban	4,346	0.4											
	Total	8,182	0.8			VL				VL	VL		L/VL	
C2 - Wood wall	Rural	2,618	0.3											
	Urban	1,447	0.1											
	Total	4,065	0.4			VL				M	L		H	
Total - Category - C		12,247	1.2											
X - Other Materials	Rural	17,301	1.7											
	Urban	7,283	0.7											
	Total	24,584	2.4			VL				M	L		VH	
Total - Category - X		24,584	2.5											
TOTAL HOUSES*		997,373												
ROOF														
R1 - Light Weight Sloping Roof	Rural	24,997	2.5											
	Urban	13,822	1.4											
	Total	38,819	3.9			L				H	M		VH	
R2 - Heavy Weight Sloping Roof	Rural	266,289	26.7											
	Urban	158,200	15.9											
	Total	424,489	42.6			L				L	VL		H	
R3 - Flat Roof	Rural	260,994	26.2											
	Urban	273,071	27.4											
	Total	534,065	53.6											
TOTAL HOUSES*		997,373												

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 733 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
 - Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
 - Category - C** : Reinforced building, well built wooden structures
 - Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes :**
1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
 - Category - R2** - Heavy Weight (Tiles, Stone/Slate)
 - Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : KL 06 State : KERALA PALAKKAD

Table No. : KL 07 State : KERALA THRISSUR

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %				
		No. of Houses	%	EQ Zone				Wind Velocity m/s								
				V	IV	III	II	55 & 50	47	44 & 39	33					
				Area in %				Area in %								
						100						100			15.5	
WALL																
A1 - Mud & Unburnt Brick Wall	Rural	144,167	18.1													
	Urban	35,894	4.5													
	Total	180,061	22.6												M	M
A2 - Stone Wall not packed with mortar	Rural	45,393	5.7													
	Urban	9,987	1.3													
	Total	55,380	7.0												M	L
Total - Category - A		235,441	29.6													
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	365,715	45.9													
	Urban	139,318	17.5													
	Total	505,033	63.4												L	L
Total - Category - B		505,033	63.4													
C1 - Concrete Wall	Rural	10,107	1.3													
	Urban	7,309	0.9													
	Total	17,416	2.2												VL	VL
C2 - Wood wall	Rural	3,270	0.4													
	Urban	801	0.1													
	Total	4,071	0.5												VL	M
Total - Category - C		21,487	2.7													
X - Other Materials	Rural	29,322	3.7													
	Urban	5,191	0.7													
	Total	34,513	4.4												VL	M
Total - Category - X		34,513	4.3													
TOTAL HOUSES*		796,474														

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %				
		No. of Houses	%	EQ Zone				Wind Velocity m/s								
				V	IV	III	II	55 & 50	47	44 & 39	33					
				Area in %				Area in %								
						100										16.1
WALL																
A1 - Mud & Unburnt Brick Wall	Rural	49,385	5.2													
	Urban	60,720	6.4													
	Total	110,105	11.6												M	M
A2 - Stone Wall not packed with mortar	Rural	38,531	4.1													
	Urban	55,977	5.9													
	Total	94,508	10.0												M	L
Total - Category - A		204,613	21.7													
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	192,348	20.4													
	Urban	479,149	50.9													
	Total	671,497	71.3												L	L
Total - Category - B		671,497	71.3													
C1 - Concrete Wall	Rural	10,028	1.1													
	Urban	17,271	1.8													
	Total	27,299	2.9												VL	VL
C2 - Wood wall	Rural	1,420	0.2													
	Urban	2,288	0.2													
	Total	3,708	0.4												VL	M
Total - Category - C		31,007	3.3													
X - Other Materials	Rural	13,093	1.4													
	Urban	21,859	2.3													
	Total	34,952	3.7												VL	M
Total - Category - X		34,952	3.7													
TOTAL HOUSES*		942,069														

ROOF																
R1 - Light Weight Sloping Roof	Rural	52,666	6.6													
	Urban	13,195	1.7													
	Total	65,861	8.3												L	H
R2 - Heavy Weight Sloping Roof	Rural	374,730	47.0													
	Urban	91,341	11.5													
	Total	466,071	58.5												L	L
R3 - Flat Roof	Rural	170,578	21.4													
	Urban	93,964	11.8													
	Total	264,542	33.2													
TOTAL HOUSES*		796,474														

ROOF																
R1 - Light Weight Sloping Roof	Rural	22,376	2.4													
	Urban	40,539	4.3													
	Total	62,915	6.7												L	H
R2 - Heavy Weight Sloping Roof	Rural	118,941	12.6													
	Urban	191,059	20.3													
	Total	310,000	32.9												L	L
R3 - Flat Roof	Rural	163,488	17.4													
	Urban	405,666	43.1													
	Total	569,154	60.5													
TOTAL HOUSES*		942,069														

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. **645 mm**

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. **448 mm**

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
- 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
- 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)

- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : KL 08 State : KERALA ERNAKULAM

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %				
		No. of Houses	%	EQ Zone				Wind Velocity m/s								
				V	IV	III	II	55 & 50	47	44 & 39	33					
				Area in %				Area in %								
						100					100				26.3	
WALL																
A1 - Mud & Unburnt Brick Wall	Rural	18,067	1.8													
	Urban	18,086	1.8													
	Total	36,153	3.6			M					M					VH
A2 - Stone Wall not packed with mortar	Rural	49,232	4.8													
	Urban	46,132	4.5													
	Total	95,364	9.3			M					L					VH
Total - Category - A		131,517	12.8													
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	243,172	23.7													
	Urban	582,193	56.7													
	Total	825,365	80.4			L					L					H/M
Total - Category - B		825,365	80.3													
C1 - Concrete Wall	Rural	10,705	1.0													
	Urban	31,947	3.1													
	Total	42,652	4.1			VL					VL					L/VL
C2 - Wood wall	Rural	1,663	0.2													
	Urban	3,174	0.3													
	Total	4,837	0.5			VL					M					H
Total - Category - C		47,489	4.6													
X - Other Materials	Rural	9,216	0.9													
	Urban	13,674	1.3													
	Total	22,890	2.2			VL					M					VH
Total - Category - X		22,890	2.2													
TOTAL HOUSES*		1,027,261														
ROOF																
R1 - Light Weight Sloping Roof	Rural	23,661	2.3													
	Urban	39,611	3.9													
	Total	63,272	6.2			L					H					VH
R2 - Heavy Weight Sloping Roof	Rural	124,363	12.1													
	Urban	180,911	17.6													
	Total	305,274	29.7			L					L					H
R3 - Flat Roof	Rural	184,031	17.9													
	Urban	474,684	46.2													
	Total	658,715	64.1													
TOTAL HOUSES*		1,027,261														

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 448 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
 - Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
 - Category - C** : Reinforced building, well built wooden structures
 - Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes :** 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
 - Category - R2** - Heavy Weight (Tiles, Stone/Slate)
 - Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : KL 09 State : KERALA IDUKKI

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %				
		No. of Houses	%	EQ Zone				Wind Velocity m/s								
				V	IV	III	II	55 & 50	47	44 & 39	33					
				Area in %				Area in %								
						87.1	12.9									2.2
WALL																
A1 - Mud & Unburnt Brick Wall	Rural	45,144	12.6													
	Urban	2,098	0.6													
	Total	47,242	13.2			M	L				M					VH
A2 - Stone Wall not packed with mortar	Rural	30,834	8.6													
	Urban	1,149	0.3													
	Total	31,983	8.9			M	L				L					VH
Total - Category - A		79,225	22.1													
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	220,337	61.4													
	Urban	13,062	3.6													
	Total	233,399	65.0			L	VL				L					H/M
Total - Category - B		233,399	65.0													
C1 - Concrete Wall	Rural	19,770	5.5													
	Urban	1,036	0.3													
	Total	20,806	5.8			VL	VL				VL					L/VL
C2 - Wood wall	Rural	2,922	0.8													
	Urban	69	-													
	Total	2,991	0.8			VL	VL				M					H
Total - Category - C		23,797	6.6													
X - Other Materials	Rural	21,994	6.1													
	Urban	532	0.1													
	Total	22,526	6.2			VL	VL				M					VH
Total - Category - X		22,526	6.3													
TOTAL HOUSES*		358,947														
ROOF																
R1 - Light Weight Sloping Roof	Rural	165,960	46.2													
	Urban	1,326	0.4													
	Total	167,286	46.6			L	VL				H					VH
R2 - Heavy Weight Sloping Roof	Rural	99,629	27.8													
	Urban	5,750	1.6													
	Total	105,379	29.4			L	VL				L					H
R3 - Flat Roof	Rural	75,412	21.0													
	Urban	10,870	3.0													
	Total	86,282	24.0													
TOTAL HOUSES*		358,947														

Probable Maximum Precipitation at a Station of the district in 24 hrs is 520 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
 - Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
 - Category - C** : Reinforced building, well built wooden structures
 - Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes :** 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
 - Category - R2** - Heavy Weight (Tiles, Stone/Slate)
 - Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : KL 10 State : KERALA KOTTAYAM

Table No. : KL 11 State : KERALA ALAPPUZHA

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %						
		No. of Houses	%	EQ Zone				Wind Velocity m/s										
				V	IV	III	II	55 & 50	47	44 & 39	33							
				Area in %				Area in %										
						100						100			11.9			
WALL																		
A1 - Mud & Unburnt Brick Wall	Rural	33,052	5.4															
	Urban	10,864	1.8															
	Total	43,916	7.2															
A2 - Stone Wall not packed with mortar	Rural	41,737	6.8															
	Urban	14,233	2.3															
	Total	55,970	9.1															
Total - Category - A		99,886	16.3															
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	306,760	50.1															
	Urban	134,077	21.9															
	Total	440,837	72.0															
Total - Category - B		440,837	72.0															
C1 - Concrete Wall	Rural	22,521	3.7															
	Urban	8,305	1.4															
	Total	30,826	5.1															
C2 - Wood wall	Rural	10,833	1.8															
	Urban	2,010	0.3															
	Total	12,843	2.1															
Total - Category - C		43,669	7.1															
X - Other Materials	Rural	22,529	3.7															
	Urban	4,975	0.8															
	Total	27,504	4.5															
Total - Category - X		27,504	4.5															
TOTAL HOUSES*		611,896																
ROOF																		
R1 - Light Weight Sloping Roof	Rural	119,557	19.5															
	Urban	38,458	6.3															
	Total	158,015	25.8															
R2 - Heavy Weight Sloping Roof	Rural	174,633	28.5															
	Urban	64,214	10.5															
	Total	238,847	39.0															
R3 - Flat Roof	Rural	143,242	23.4															
	Urban	71,792	11.7															
	Total	215,034	35.1															
TOTAL HOUSES*		611,896																

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %							
		No. of Houses	%	EQ Zone				Wind Velocity m/s											
				V	IV	III	II	55 & 50	47	44 & 39	33								
				Area in %				Area in %											
						100													
WALL																			
A1 - Mud & Unburnt Brick Wall	Rural	11,075	1.7																
	Urban	7,777	1.2																
	Total	18,852	2.9																
A2 - Stone Wall not packed with mortar	Rural	27,047	4.1																
	Urban	15,113	2.3																
	Total	42,160	6.4																
Total - Category - A		61,012	9.3																
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	225,746	34.2																
	Urban	289,922	44.0																
	Total	515,668	78.2																
Total - Category - B		515,668	78.2																
C1 - Concrete Wall	Rural	10,202	1.5																
	Urban	8,674	1.3																
	Total	18,876	2.8																
C2 - Wood wall	Rural	12,078	1.8																
	Urban	18,587	2.8																
	Total	30,665	4.6																
Total - Category - C		49,541	7.5																
X - Other Materials	Rural	16,306	2.5																
	Urban	16,934	2.6																
	Total	33,240	5.1																
Total - Category - X		33,240	5.0																
TOTAL HOUSES*		659,461																	
ROOF																			
R1 - Light Weight Sloping Roof	Rural	65,785	10.0																
	Urban	66,241	10.0																
	Total	132,026	20.0																
R2 - Heavy Weight Sloping Roof	Rural	124,436	18.9																
	Urban	146,792	22.3																
	Total	271,228	41.2																
R3 - Flat Roof	Rural	112,233	17.0																
	Urban	143,974	21.8																
	Total	256,207	38.8																
TOTAL HOUSES*		659,461																	

Probable Maximum Precipitation at a Station of the district in 24 hrs is 480 mm

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 496 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
- 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
- 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V** : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV** : High Damage Risk Zone (MSK VIII)
- EQ Zone III** : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II** : Low Damage Risk Zone (MSK < VI)

- Level of Risk** : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
- 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
- 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V** : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV** : High Damage Risk Zone (MSK VIII)
- EQ Zone III** : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II** : Low Damage Risk Zone (MSK < VI)

- Level of Risk** : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : KL 12 State : KERALA PATHANAMTHITTA

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %		
		No. of Houses	%	EQ Zone				Wind Velocity m/s						
				V	IV	III	II	55 & 50	47	44 & 39	33			
				Area in %				Area in %						
						92.9	7.1				100		26.9	
WALL														
A1 - Mud & Unburnt Brick Wall	Rural	43,831	10.5											
	Urban	3,397	0.8											
	Total	47,228	11.3			M	L				M			VH
A2 - Stone Wall not packed with mortar	Rural	37,729	9.1											
	Urban	3,562	0.9											
	Total	41,291	10.0			M	L				L			VH
Total - Category - A		88,519	21.3											
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	250,097	60.1											
	Urban	36,409	8.7											
	Total	286,506	68.8			L	VL				L			H/M
Total - Category - B		286,506	68.8											
C1 - Concrete Wall	Rural	16,229	3.9											
	Urban	3,509	0.8											
	Total	19,738	4.7			VL	VL				VL			L/VL
C2 - Wood wall	Rural	4,660	1.1											
	Urban	375	0.1											
	Total	5,035	1.2			VL	VL				M			H
Total - Category - C		24,773	6.0											
X - Other Materials	Rural	15,140	3.6											
	Urban	1,249	0.3											
	Total	16,389	3.9			VL	VL				M			VH
Total - Category - X		16,389	3.9											
TOTAL HOUSES*		416,187												
ROOF														
R1 - Light Weight Sloping Roof	Rural	56,781	13.6											
	Urban	6,182	1.5											
	Total	62,963	15.1			L	VL				H			VH
R2 - Heavy Weight Sloping Roof	Rural	160,969	38.7											
	Urban	15,543	3.7											
	Total	176,512	42.4			L	VL				L			H
R3 - Flat Roof	Rural	149,936	36.0											
	Urban	26,776	6.4											
	Total	176,712	42.4											
TOTAL HOUSES*		416,187												

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 450 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
 - Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
 - Category - C** : Reinforced building, well built wooden structures
 - Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes :**
1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
 - Category - R2** - Heavy Weight (Tiles, Stone/Slate)
 - Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : KL 13 State : KERALA KOLLAM

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %		
		No. of Houses	%	EQ Zone				Wind Velocity m/s						
				V	IV	III	II	55 & 50	47	44 & 39	33			
				Area in %				Area in %						
						100							28.7	
WALL														
A1 - Mud & Unburnt Brick Wall	Rural	60,836	7.2											
	Urban	16,490	2.0											
	Total	77,326	9.2			M					M			VH
A2 - Stone Wall not packed with mortar	Rural	54,129	6.4											
	Urban	28,377	3.4											
	Total	82,506	9.8			M					L			VH
Total - Category - A		159,832	19.0											
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	320,985	38.2											
	Urban	284,168	33.9											
	Total	605,153	72.1			L					L			H/M
Total - Category - B		605,153	72.1											
C1 - Concrete Wall	Rural	14,624	1.7											
	Urban	11,345	1.4											
	Total	25,969	3.1			VL					VL			L/VL
C2 - Wood wall	Rural	7,282	0.9											
	Urban	12,533	1.5											
	Total	19,815	2.4			VL					M			H
Total - Category - C		45,784	5.5											
X - Other Materials	Rural	15,827	1.9											
	Urban	12,623	1.5											
	Total	28,450	3.4			VL					M			VH
Total - Category - X		28,450	3.4											
TOTAL HOUSES*		839,219												
ROOF														
R1 - Light Weight Sloping Roof	Rural	73,792	8.8											
	Urban	55,260	6.6											
	Total	129,052	15.4			L					H			VH
R2 - Heavy Weight Sloping Roof	Rural	192,604	23.0											
	Urban	106,154	12.6											
	Total	298,758	35.6			L					L			H
R3 - Flat Roof	Rural	207,287	24.7											
	Urban	204,122	24.3											
	Total	411,409	49.0											
TOTAL HOUSES*		839,219												

Probable Maximum Precipitation at a Station of the district in 24 hrs is 440 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
 - Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
 - Category - C** : Reinforced building, well built wooden structures
 - Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes :**
1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
 - Category - R2** - Heavy Weight (Tiles, Stone/Slate)
 - Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : KL 14 State : KERALA THIRUVANANTHAPURAM

Wall / Roof		Census Houses		Level of Risk under							Flood Prone Area in %			
		No. of Houses	%	EQ Zone				Wind Velocity m/s						
				V	IV	III	II	55 & 50	47	44 & 39		33		
							100					100		24.0
WALL														
A1 - Mud & Unburnt Brick Wall	Rural	112,819	10.8											
	Urban	75,376	7.2											
	Total	188,195	18.0				M						M	VH
A2 - Stone Wall not packed with mortar	Rural	56,402	5.4											
	Urban	41,633	4.0											
	Total	98,035	9.4				M						L	VH
Total - Category - A		286,230	27.4											
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	284,172	27.2											
	Urban	373,224	35.7											
	Total	657,396	62.9				L						L	H/M
Total - Category - B		657,396	62.9											
C1 - Concrete Wall	Rural	20,541	2.0											
	Urban	34,412	3.3											
	Total	54,953	5.3				VL						VL	L/VL
C2 - Wood wall	Rural	3,270	0.3											
	Urban	2,053	0.2											
	Total	5,323	0.5				VL						M	H
Total - Category - C		60,276	5.8											
X - Other Materials	Rural	25,054	2.4											
	Urban	15,746	1.5											
	Total	40,800	3.9				VL						M	VH
Total - Category - X		40,800	3.9											
TOTAL HOUSES*		1,044,702												
ROOF														
R1 - Light Weight Sloping Roof	Rural	128,690	12.3											
	Urban	111,902	10.7										L	H
	Total	240,592	23.0											VH
R2 - Heavy Weight Sloping Roof	Rural	138,579	13.3											
	Urban	100,215	9.6											
	Total	238,794	22.9				L						L	H
R3 - Flat Roof	Rural	234,989	22.5											
	Urban	330,327	31.6											
	Total	565,316	54.1											
TOTAL HOUSES*		1,044,702												

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 485 mm

Housing Category : Wall Types

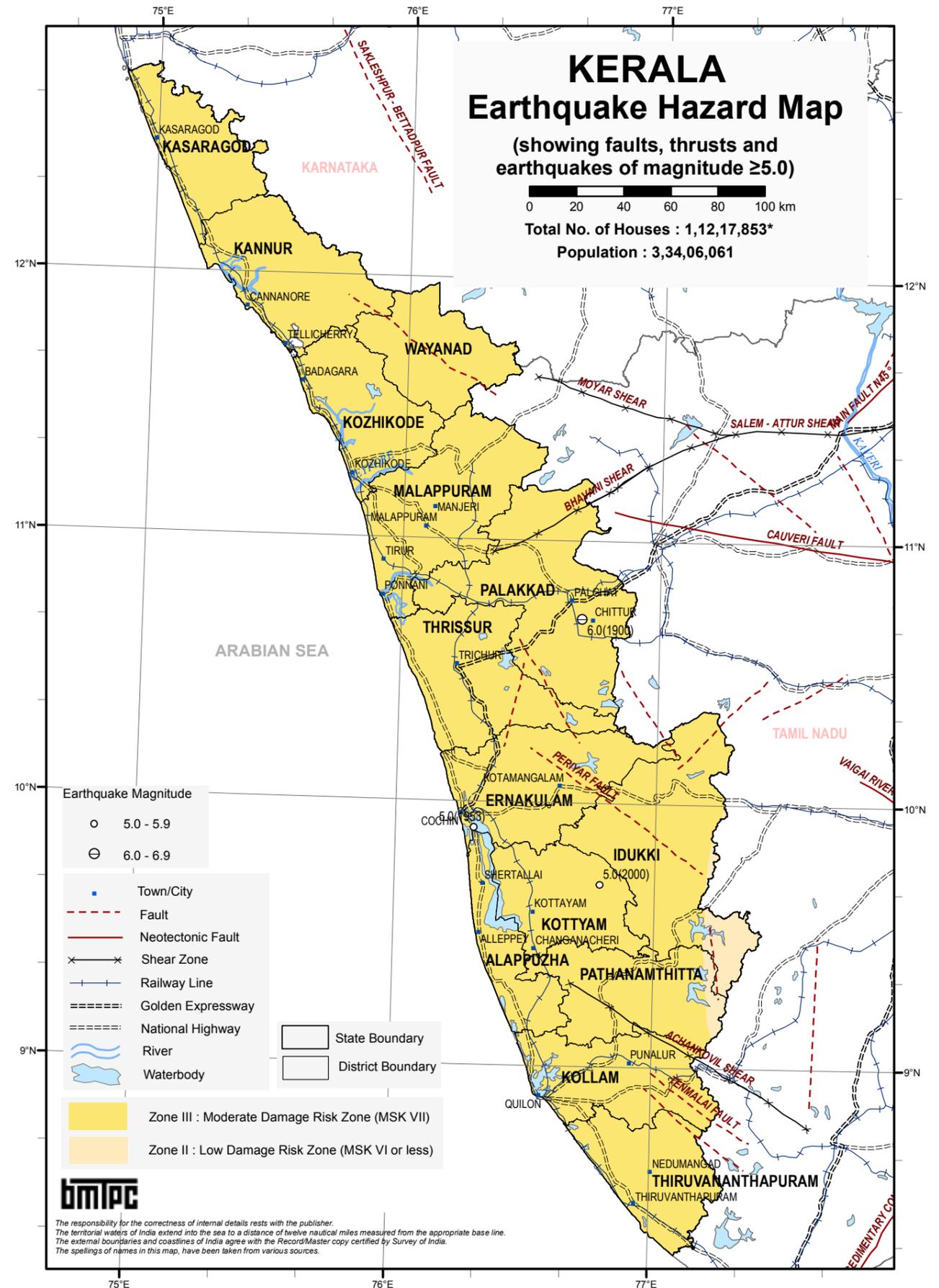
- Category - A :** Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B :** Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C :** Reinforced building, well built wooden structures
- Category - X :** Other materials not covered in A,B,C. These are generally light.

- Notes :**
1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

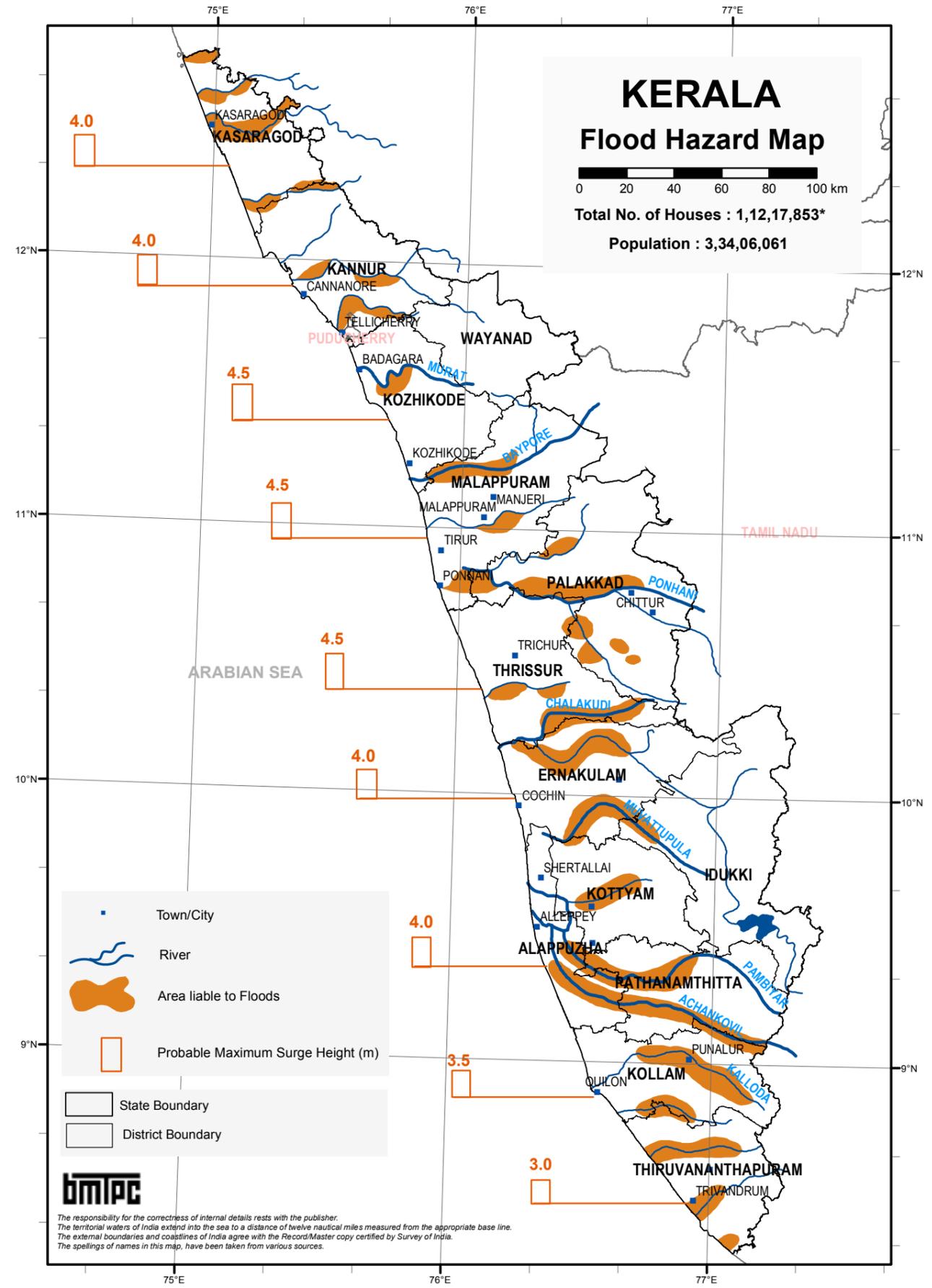
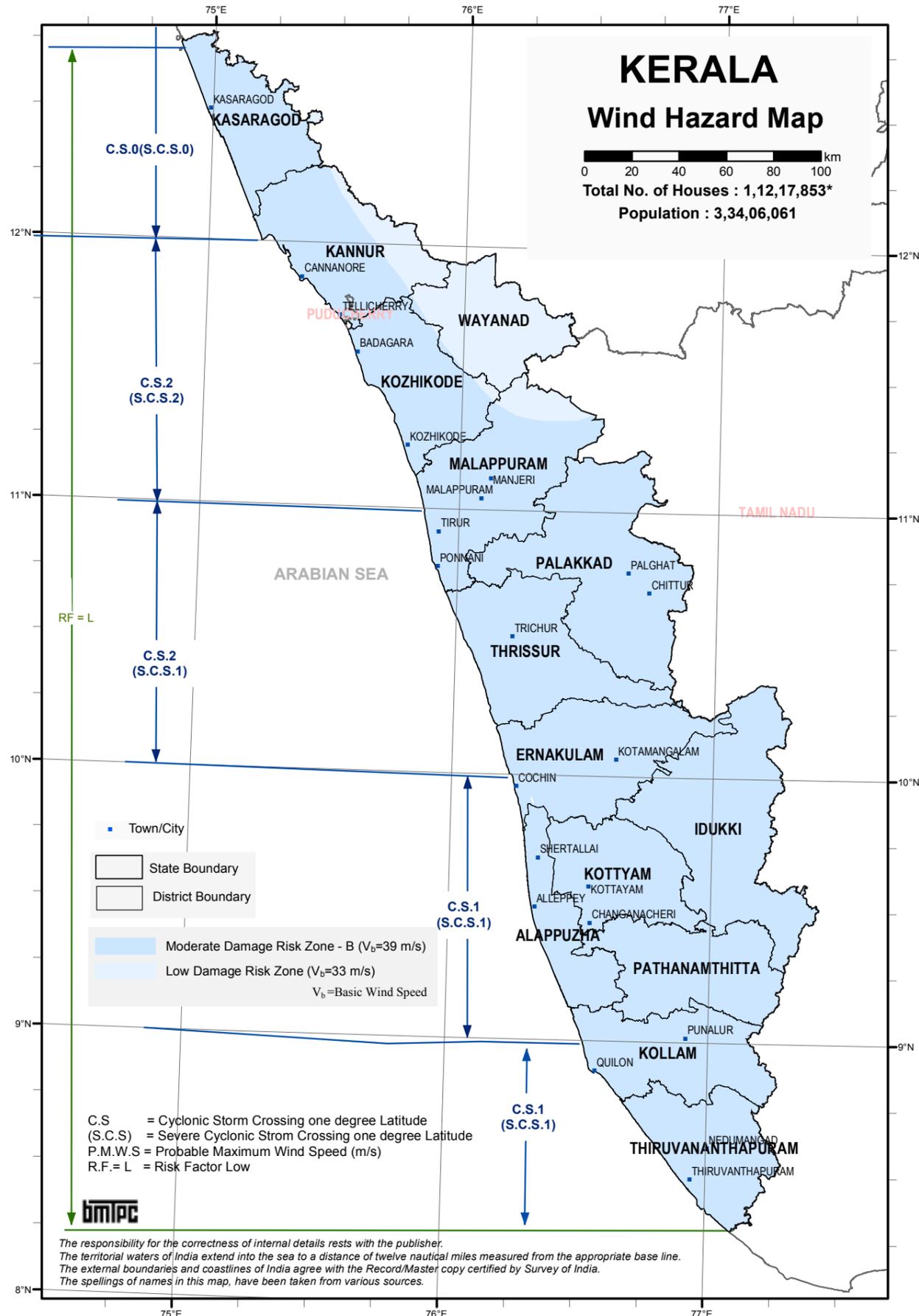
Housing Category : Roof Type

- Category - R1 -** Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2 -** Heavy Weight (Tiles, Stone/Slate)
- Category - R3 -** Flat Roof (Brick, Concrete)
- EQ Zone V :** Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV :** High Damage Risk Zone (MSK VIII)
- EQ Zone III :** Moderate Damage Risk Zone (MSK VII)
- EQ Zone II :** Low Damage Risk Zone (MSK < VI)

Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
 * Total No. of Houses excluding Vacant/Locked Houses

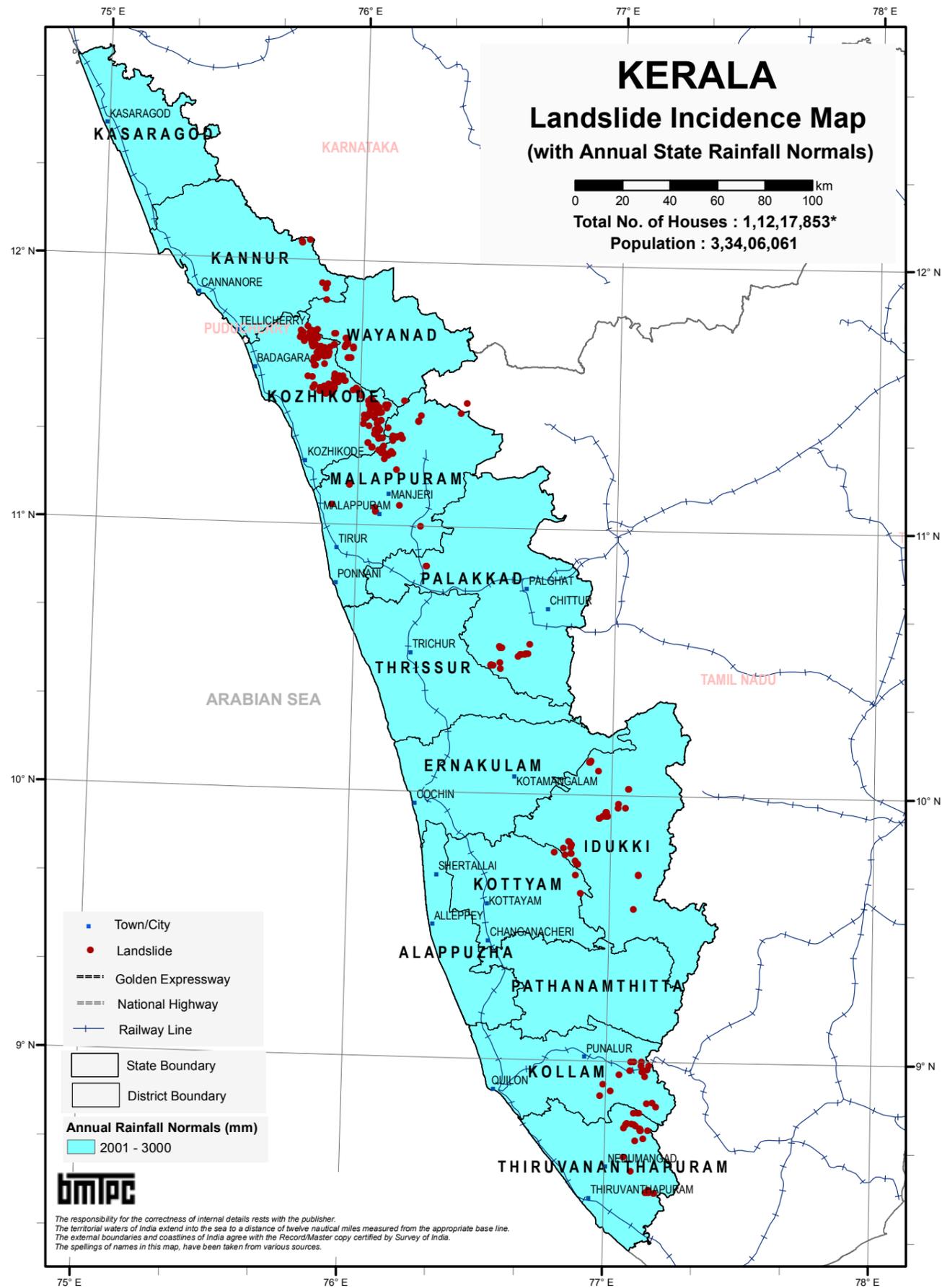


BMPGC : Vulnerability Atlas - 3rd Edition : Peer Group, MoHUA, GOI; Map is Based on digitised data of SOI; Seismic Zones of India Map IS:1893 (Part I): 2016/NBC: 2016, BIS; Earthquake Epicentre from IMD; Seismotectonic Atlas of India and its Environs, GSI; Houses/Population as per Census 2011; *Houses including vacant & locked houses. Disclaimer: The maps are solely for thematic presentation.



BMTPC : Vulnerability Atlas - 3rd Edition; Peer Group, MoHUA; Map is Based on digitised data of SOI, GOI; Basic Wind Speed Map National Building Code 2016; Cyclone Data, 1891-2015, IMD, GOI. Houses/Population as per Census 2011; *Houses including vacant & locked houses. Disclaimer: The maps are solely for thematic presentation.

BMTPC : Vulnerability Atlas - 3rd Edition; Peer Group, MoHUA; Map is Based on digitised data of SOI, GOI; Census of India 2011; Flood Atlas (1987), Task Force Report (2004), C.W.C., G.O.I. Houses/Population as per Census 2011; * Houses including vacant & locked houses. Disclaimer: The maps are solely for thematic presentation.



BMTPC: Vulnerability Atlas - 3rd Edition: Peer Group, MoHUA, GOI: Map is Based on digitised data of SOI; Landslide Incidence data GSI; Annual Rainfall data IMD. Houses/Population as per Census 2011; * Houses including vacant & locked houses. Disclaimer: The maps are solely for thematic presentation.

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

MADHYA PRADESH

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
STATE - MADHYA PRADESH												
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	7,269,030	41.7									
	Urban	844,994	4.8									
	Total	8,114,024	46.5			M	L			H	M	
A2 - Stone Wall not packed with mortar	Rural	418,391	2.4									
	Urban	69,119	0.4									
	Total	487,510	2.8			M	L			M	L	
Total - Category - A		8,601,534	49.4									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	4,329,335	24.8									
	Urban	3,387,463	19.4									
	Total	7,716,798	44.2			L	VL			M	L	
Total - Category - B		7,716,798	44.3									
C1 - Concrete Wall	Rural	60,201	0.3									
	Urban	119,018	0.7									
	Total	179,219	1.0				VL	VL		VL	VL	
C2 - Wood wall	Rural	126,260	0.7									
	Urban	17,964	0.1									
	Total	144,224	0.8				VL	VL		H	M	
Total - Category - C		323,443	1.9									
X - Other Materials	Rural	662,463	3.8									
	Urban	123,231	0.7									
	Total	785,694	4.5				VL	VL		H	M	
Total - Category - X		785,694	4.5									
TOTAL HOUSES*		17,427,469										

ROOF												
R1 - Light Weight Sloping Roof	Rural	2,612,332	15.0									
	Urban	993,870	5.7									
	Total	3,606,202	20.7			L	VL			VH	H	
R2 - Heavy Weight Sloping Roof	Rural	8,957,268	51.4									
	Urban	1,379,878	7.9									
	Total	10,337,146	59.3			L	VL			M	L	
R3 - Flat Roof	Rural	1,296,080	7.4									
	Urban	2,188,041	12.6									
	Total	3,484,121	20.0									
<i>Damage Risk as per that for the Wall supporting it</i>												
TOTAL HOUSES*		17,427,469										

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : MP 01

State : MADHYA PRADESH

SHEOPUR

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
STATE - MADHYA PRADESH												
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	38,451	23.0									
	Urban	3,835	2.3									
	Total	42,286	25.3							L	H	
A2 - Stone Wall not packed with mortar	Rural	30,875	18.5									
	Urban	1,959	1.2									
	Total	32,834	19.7							L	M	
Total - Category - A		75,120	44.9									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	63,078	37.7									
	Urban	17,658	10.6									
	Total	80,736	48.3							VL	M	
Total - Category - B		80,736	48.3									
C1 - Concrete Wall	Rural	81	-									
	Urban	219	0.1									
	Total	300	0.1							VL	VL	
C2 - Wood wall	Rural	2,523	1.5									
	Urban	125	0.1									
	Total	2,648	1.6							VL	H	
Total - Category - C		2,948	1.8									
X - Other Materials	Rural	8,016	4.8									
	Urban	338	0.2									
	Total	8,354	5.0							VL	H	
Total - Category - X		8,354	5.0									
TOTAL HOUSES*		167,158										

ROOF												
R1 - Light Weight Sloping Roof	Rural	27,269	16.3									
	Urban	2,753	1.6									
	Total	30,022	17.9							VL	VH	
R2 - Heavy Weight Sloping Roof	Rural	106,508	63.7									
	Urban	17,568	10.5									
	Total	124,076	74.2							VL	M	
R3 - Flat Roof	Rural	9,247	5.5									
	Urban	3,813	2.3									
	Total	13,060	7.8									
<i>Damage Risk as per that for the Wall supporting it</i>												
TOTAL HOUSES*		167,158										

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 669 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : MP 10 State : MADHYA PRADESH SAGAR

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
						5.9	94.1			77.0	23.0	
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	234,310	40.3									
	Urban	34,935	6.0									
	Total	269,245	46.3			M	L			H	M	
A2 - Stone Wall not packed with mortar	Rural	41,088	7.1									
	Urban	3,935	0.7									
	Total	45,023	7.8			M	L			M	L	
Total - Category - A		314,268	54.0									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	133,170	22.9									
	Urban	105,457	18.1									
	Total	238,627	41.0			L	VL			M	L	
Total - Category - B		238,627	41.0									
C1 - Concrete Wall	Rural	2,186	0.4									
	Urban	4,259	0.7									
	Total	6,445	1.1			VL	VL			VL	VL	
C2 - Wood wall	Rural	5,987	1.0									
	Urban	730	0.1									
	Total	6,717	1.1			VL	VL			H	M	
Total - Category - C		13,162	2.3									
X - Other Materials	Rural	12,284	2.1									
	Urban	3,690	0.6									
	Total	15,974	2.7			VL	VL			H	M	
Total - Category - X		15,974	2.7									
TOTAL HOUSES*		582,031										

ROOF												
R1 - Light Weight Sloping Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
		Area in %				Area in %						
R1 - Light Weight Sloping Roof	Rural	47,335	8.1									
	Urban	18,238	3.1									
	Total	65,573	11.2			L	VL			VH	H	
R2 - Heavy Weight Sloping Roof	Rural	344,290	59.2									
	Urban	69,468	11.9									
	Total	413,758	71.1			L	VL			M	L	
R3 - Flat Roof	Rural	37,400	6.4									
	Urban	65,300	11.2									
	Total	102,700	17.6									
TOTAL HOUSES*		582,031										

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 493 mm

Housing Category : Wall Types

- Category - A :** Buildings in field-stone, rural structures, unburnt brick houses, clay houses
 - Category - B :** Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
 - Category - C :** Reinforced building, well built wooden structures
 - Category - X :** Other materials not covered in A,B,C. These are generally light.
- Notes :** 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1 - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)**
 - Category - R2 - Heavy Weight (Tiles, Stone/Slate)**
 - Category - R3 - Flat Roof (Brick, Concrete)**
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
EQ Zone IV : High Damage Risk Zone (MSK VIII)
EQ Zone III : Moderate Damage Risk Zone (MSK VII)
EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

Table No. : MP 11 State : MADHYA PRADESH DAMOH

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %		
		No. of Houses	%	EQ Zone				Wind Velocity m/s						
				V	IV	III	II	55 & 50	47	44 & 39	33			
				Area in %				Area in %						
						19.4	80.6					53.2	46.8	
WALL														
A1 - Mud & Unburnt Brick Wall	Rural	114,827	32.9											
	Urban	15,639	4.5											
	Total	130,466	37.4			M	L			H	M			
A2 - Stone Wall not packed with mortar	Rural	62,191	17.8											
	Urban	1,239	0.4											
	Total	63,430	18.2			M	L			M	L			
Total - Category - A		193,896	55.5											
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	101,984	29.2											
	Urban	41,001	11.7											
	Total	142,985	40.9			L	VL			M	L			
Total - Category - B		142,985	40.9											
C1 - Concrete Wall	Rural	409	0.1											
	Urban	896	0.3											
	Total	1,305	0.4			VL	VL			VL	VL			
C2 - Wood wall	Rural	2,860	0.8											
	Urban	174	-											
	Total	3,034	0.8			VL	VL			H	M			
Total - Category - C		4,339	1.2											
X - Other Materials	Rural	6,660	1.9											
	Urban	1,359	0.4											
	Total	8,019	2.3			VL	VL			H	M			
Total - Category - X		8,019	2.3											
TOTAL HOUSES*		349,239												

ROOF												
R1 - Light Weight Sloping Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
		Area in %				Area in %						
R1 - Light Weight Sloping Roof	Rural	28,489	8.2									
	Urban	6,969	2.0									
	Total	35,458	10.2			L	VL			VH	H	
R2 - Heavy Weight Sloping Roof	Rural	241,630	69.2									
	Urban	35,436	10.1									
	Total	277,066	79.3			L	VL			M	L	
R3 - Flat Roof	Rural	18,812	5.4									
	Urban	17,903	5.1									
	Total	36,715	10.5									
TOTAL HOUSES*		349,239										

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 503 mm

Housing Category : Wall Types

- Category - A :** Buildings in field-stone, rural structures, unburnt brick houses, clay houses
 - Category - B :** Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
 - Category - C :** Reinforced building, well built wooden structures
 - Category - X :** Other materials not covered in A,B,C. These are generally light.
- Notes :** 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1 - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)**
 - Category - R2 - Heavy Weight (Tiles, Stone/Slate)**
 - Category - R3 - Flat Roof (Brick, Concrete)**
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
EQ Zone IV : High Damage Risk Zone (MSK VIII)
EQ Zone III : Moderate Damage Risk Zone (MSK VII)
EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : MP 14 State : MADHYA PRADESH UMARIA

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
				Area in %				Area in %					
WALL						95.4	4.6					100	
A1 - Mud & Unburnt Brick Wall	Rural	104,285	64.9										
	Urban	6,760	4.2										
	Total	111,045	69.1			M	L				M		
A2 - Stone Wall not packed with mortar	Rural	363	0.2										
	Urban	136	0.1										
	Total	499	0.3			M	L				L		
Total - Category - A		111,544	69.4										
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	24,883	15.5										
	Urban	19,612	12.2										
	Total	44,495	27.7			L	VL				L		
Total - Category - B		44,495	27.7										
C1 - Concrete Wall	Rural	381	0.2										
	Urban	253	0.2										
	Total	634	0.4			VL	VL				VL		
C2 - Wood wall	Rural	923	0.6										
	Urban	6	-										
	Total	929	0.6			VL	VL				M		
Total - Category - C		1,563	1.0										
X - Other Materials	Rural	2,580	1.6										
	Urban	556	0.3										
	Total	3,136	1.9			VL	VL				M		
Total - Category - X		3,136	2.0										
TOTAL HOUSES*		160,738											

ROOF													
R1 - Light Weight Sloping Roof	Rural	36,187	22.5										
	Urban	8,000	5.0										
	Total	44,187	27.5			L	VL				H		
R2 - Heavy Weight Sloping Roof	Rural	84,010	52.3										
	Urban	8,079	5.0										
	Total	92,089	57.3			L	VL				L		
R3 - Flat Roof	Rural	13,218	8.2										
	Urban	11,244	7.0										
	Total	24,462	15.2										
<i>Damage Risk as per that for the Wall supporting it</i>													
TOTAL HOUSES*		160,738											

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. **442 mm**

Housing Category : Wall Types

- Category - A :** Buildings in field-stone, rural structures, unburnt brick houses, clay houses
 - Category - B :** Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
 - Category - C :** Reinforced building, well built wooden structures
 - Category - X :** Other materials not covered in A,B,C. These are generally light.
- Notes :** 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1 -** Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
 - Category - R2 -** Heavy Weight (Tiles, Stone/Slate)
 - Category - R3 -** Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
EQ Zone IV : High Damage Risk Zone (MSK VIII)
EQ Zone III : Moderate Damage Risk Zone (MSK VII)
EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

Table No. : MP 15 State : MADHYA PRADESH NEEMUCH

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
				Area in %				Area in %					
WALL													
A1 - Mud & Unburnt Brick Wall	Rural	50,252	22.4										
	Urban	7,811	3.5										
	Total	58,063	25.9					L			H		
A2 - Stone Wall not packed with mortar	Rural	17,000	7.6										
	Urban	6,417	2.9										
	Total	23,417	10.5					L			M		
Total - Category - A		81,480	36.3										
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	93,152	41.6										
	Urban	45,220	20.2										
	Total	138,372	61.8					VL			M		
Total - Category - B		138,372	61.7										
C1 - Concrete Wall	Rural	364	0.2										
	Urban	453	0.2										
	Total	817	0.4					VL			VL		
C2 - Wood wall	Rural	613	0.3										
	Urban	339	0.2										
	Total	952	0.5					VL			H		
Total - Category - C		1,769	0.8										
X - Other Materials	Rural	2,051	0.9										
	Urban	517	0.2										
	Total	2,568	1.1					VL			H		
Total - Category - X		2,568	1.1										
TOTAL HOUSES*		224,189											

ROOF													
R1 - Light Weight Sloping Roof	Rural	29,821	13.3										
	Urban	9,321	4.2										
	Total	39,142	17.5					VL			VH		
R2 - Heavy Weight Sloping Roof	Rural	119,653	53.4										
	Urban	36,819	16.4										
	Total	156,472	69.8					VL			M		
R3 - Flat Roof	Rural	13,958	6.2										
	Urban	14,617	6.5										
	Total	28,575	12.7										
<i>Damage Risk as per that for the Wall supporting it</i>													
TOTAL HOUSES*		224,189											

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. **427 mm**

Housing Category : Wall Types

- Category - A :** Buildings in field-stone, rural structures, unburnt brick houses, clay houses
 - Category - B :** Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
 - Category - C :** Reinforced building, well built wooden structures
 - Category - X :** Other materials not covered in A,B,C. These are generally light.
- Notes :** 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1 -** Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
 - Category - R2 -** Heavy Weight (Tiles, Stone/Slate)
 - Category - R3 -** Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
EQ Zone IV : High Damage Risk Zone (MSK VIII)
EQ Zone III : Moderate Damage Risk Zone (MSK VII)
EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

**Distribution of Houses by Predominant Materials of Roof and Wall
and Level of Damage Risk**

Table No. : MP 20 State : MADHYA PRADESH DEWAS

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
WALL						50.8	49.2			36.2	63.8	
A1 - Mud & Unburnt Brick Wall	Rural	106,613	30.0									
	Urban	18,713	5.3									
	Total	125,326	35.3			M	L			H	M	
A2 - Stone Wall not packed with mortar	Rural	2,503	0.7									
	Urban	832	0.2									
	Total	3,335	0.9			M	L			M	L	
Total - Category - A		128,661	36.1									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	109,045	30.6									
	Urban	64,342	18.1									
	Total	173,387	48.7			L	VL			M	L	
Total - Category - B		173,387	48.7									
C1 - Concrete Wall	Rural	2,047	0.6									
	Urban	4,703	1.3									
	Total	6,750	1.9			VL	VL			VL	VL	
C2 - Wood wall	Rural	7,442	2.1									
	Urban	325	0.1									
	Total	7,767	2.2			VL	VL			H	M	
Total - Category - C		14,517	4.1									
X - Other Materials	Rural	34,264	9.6									
	Urban	5,094	1.4									
	Total	39,358	11.0			VL	VL			H	M	
Total - Category - X		39,358	11.1									
TOTAL HOUSES*		355,923										
ROOF												
R1 - Light Weight Sloping Roof	Rural	86,976	24.4									
	Urban	33,780	9.5									
	Total	120,756	33.9			L	VL			VH	H	
R2 - Heavy Weight Sloping Roof	Rural	139,709	39.3									
	Urban	17,600	4.9									
	Total	157,309	44.2			L	VL			M	L	
R3 - Flat Roof	Rural	35,229	9.9									
	Urban	42,629	12.0									
	Total	77,858	21.9									
TOTAL HOUSES*		355,923										

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 400 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
EQ Zone IV : High Damage Risk Zone (MSK VIII)
EQ Zone III : Moderate Damage Risk Zone (MSK VII)
EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

**Distribution of Houses by Predominant Materials of Roof and Wall
and Level of Damage Risk**

Table No. : MP 21 State : MADHYA PRADESH DHAR

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
WALL						51.2	48.8			33.5	66.5	
A1 - Mud & Unburnt Brick Wall	Rural	183,591	37.8									
	Urban	17,175	3.5									
	Total	200,766	41.3			M	L			H	M	
A2 - Stone Wall not packed with mortar	Rural	7,939	1.6									
	Urban	880	0.2									
	Total	8,819	1.8			M	L			M	L	
Total - Category - A		209,585	43.2									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	160,364	33.0									
	Urban	67,886	14.0									
	Total	228,250	47.0			L	VL			M	L	
Total - Category - B		228,250	47.0									
C1 - Concrete Wall	Rural	3,173	0.7									
	Urban	4,356	0.9									
	Total	7,529	1.6			VL	VL			VL	VL	
C2 - Wood wall	Rural	13,886	2.9									
	Urban	158	-									
	Total	14,044	2.9			VL	VL			H	M	
Total - Category - C		21,573	4.4									
X - Other Materials	Rural	22,697	4.7									
	Urban	3,347	0.7									
	Total	26,044	5.4			VL	VL			H	M	
Total - Category - X		26,044	5.4									
TOTAL HOUSES*		485,452										
ROOF												
R1 - Light Weight Sloping Roof	Rural	158,565	32.7									
	Urban	34,910	7.2									
	Total	193,475	39.9			L	VL			VH	H	
R2 - Heavy Weight Sloping Roof	Rural	181,273	37.3									
	Urban	9,449	1.9									
	Total	190,722	39.2			L	VL			M	L	
R3 - Flat Roof	Rural	51,812	10.7									
	Urban	49,443	10.2									
	Total	101,255	20.9									
TOTAL HOUSES*		485,452										

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 511 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
EQ Zone IV : High Damage Risk Zone (MSK VIII)
EQ Zone III : Moderate Damage Risk Zone (MSK VII)
EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : MP 22 State : MADHYA PRADESH INDORE

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
WALL						15.5	84.5			58.1	41.9	
A1 - Mud & Unburnt Brick Wall	Rural	70,714	9.8									
	Urban	47,537	6.6									
	Total	118,251	16.4			M	L			H	M	
A2 - Stone Wall not packed with mortar	Rural	1,157	0.2									
	Urban	3,771	0.5									
	Total	4,928	0.7			M	L			M	L	
Total - Category - A		123,179	17.1									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	90,332	12.5									
	Urban	430,402	59.7									
	Total	520,734	72.2			L	VL			M	L	
Total - Category - B		520,734	72.3									
C1 - Concrete Wall	Rural	4,530	0.6									
	Urban	36,060	5.0									
	Total	40,590	5.6			VL	VL			VL	VL	
C2 - Wood wall	Rural	1,502	0.2									
	Urban	2,771	0.4									
	Total	4,273	0.6			VL	VL			H	M	
Total - Category - C		44,863	6.2									
X - Other Materials	Rural	14,697	2.0									
	Urban	17,076	2.4									
	Total	31,773	4.4			VL	VL			H	M	
Total - Category - X		31,773	4.4									
TOTAL HOUSES*		720,549										

ROOF												
R1 - Light Weight Sloping Roof	Rural	92,432	12.8									
	Urban	155,234	21.5									
	Total	247,666	34.3			L	VL			VH	H	
R2 - Heavy Weight Sloping Roof	Rural	34,643	4.8									
	Urban	25,356	3.5									
	Total	59,999	8.3			L	VL			M	L	
R3 - Flat Roof	Rural	55,857	7.8									
	Urban	357,027	49.5									
	Total	412,884	57.3									
TOTAL HOUSES*		720,549										

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. **414 mm**

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
 - Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
 - Category - C** : Reinforced building, well built wooden structures
 - Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
 - Category - R2** - Heavy Weight (Tiles, Stone/Slate)
 - Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

Table No. : MP 23 State : MADHYA PRADESH WEST NIMAR

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	158,708	36.7									
	Urban	15,382	3.6									
	Total	174,090	40.3							M	M	
A2 - Stone Wall not packed with mortar	Rural	1,456	0.3									
	Urban	436	0.1									
	Total	1,892	0.4							M	L	
Total - Category - A		175,982	40.7									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	124,596	28.8									
	Urban	49,550	11.5									
	Total	174,146	40.3							L	L	
Total - Category - B		174,146	40.3									
C1 - Concrete Wall	Rural	2,893	0.7									
	Urban	1,125	0.3									
	Total	4,018	1.0							VL	VL	
C2 - Wood wall	Rural	4,977	1.2									
	Urban	118	-									
	Total	5,095	1.2							VL	M	
Total - Category - C		9,113	2.1									
X - Other Materials	Rural	70,955	16.4									
	Urban	2,232	0.5									
	Total	73,187	16.9							VL	M	
Total - Category - X		73,187	16.9									
TOTAL HOUSES*		432,428										

ROOF												
R1 - Light Weight Sloping Roof	Rural	198,595	45.9									
	Urban	28,872	6.7									
	Total	227,467	52.6							L	H	
R2 - Heavy Weight Sloping Roof	Rural	127,613	29.5									
	Urban	6,854	1.6									
	Total	134,467	31.1							L	L	
R3 - Flat Roof	Rural	37,377	8.6									
	Urban	33,117	7.7									
	Total	70,494	16.3									
TOTAL HOUSES*		432,428										

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. **530 mm**

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
 - Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
 - Category - C** : Reinforced building, well built wooden structures
 - Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
 - Category - R2** - Heavy Weight (Tiles, Stone/Slate)
 - Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

**Distribution of Houses by Predominant Materials of Roof and Wall
and Level of Damage Risk**

Table No. : MP 24 State : MADHYA PRADESH BARWANI

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
				Area in %				Area in %					
WALL													
A1 - Mud & Unburnt Brick Wall	Rural	88,300	31.0										
	Urban	10,887	3.8										
	Total	99,187	34.8										
A2 - Stone Wall not packed with mortar	Rural	793	0.3										
	Urban	229	0.1										
	Total	1,022	0.4										
Total - Category - A		100,209	35.2										
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	62,402	21.9										
	Urban	28,610	10.1										
	Total	91,012	32.0										
Total - Category - B		91,012	32.0										
C1 - Concrete Wall	Rural	1,066	0.4										
	Urban	855	0.3										
	Total	1,921	0.7										
C2 - Wood wall	Rural	3,522	1.2										
	Urban	157	0.1										
	Total	3,679	1.3										
Total - Category - C		5,600	2.0										
X - Other Materials	Rural	84,588	29.7										
	Urban	3,012	1.1										
	Total	87,600	30.8										
Total - Category - X		87,600	30.8										
TOTAL HOUSES*		284,421											
ROOF													
R1 - Light Weight Sloping Roof	Rural	82,613	29.0										
	Urban	19,135	6.7										
	Total	101,748	35.7										
R2 - Heavy Weight Sloping Roof	Rural	142,057	49.9										
	Urban	8,014	2.8										
	Total	150,071	52.7										
R3 - Flat Roof	Rural	16,001	5.6										
	Urban	16,601	5.8										
	Total	32,602	11.4										
TOTAL HOUSES*		284,421											

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. **530 mm**

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
EQ Zone IV : High Damage Risk Zone (MSK VIII)
EQ Zone III : Moderate Damage Risk Zone (MSK VII)
EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

**Distribution of Houses by Predominant Materials of Roof and Wall
and Level of Damage Risk**

Table No. : MP 25 State : MADHYA PRADESH RAJGARH

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
				Area in %				Area in %					
WALL													
A1 - Mud & Unburnt Brick Wall	Rural	182,254	47.3										
	Urban	17,397	4.5										
	Total	199,651	51.8										
A2 - Stone Wall not packed with mortar	Rural	4,534	1.2										
	Urban	520	0.1										
	Total	5,054	1.3										
Total - Category - A		204,705	53.2										
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	123,961	32.2										
	Urban	44,103	11.5										
	Total	168,064	43.7										
Total - Category - B		168,064	43.6										
C1 - Concrete Wall	Rural	1,739	0.5										
	Urban	600	0.2										
	Total	2,339	0.7										
C2 - Wood wall	Rural	775	0.2										
	Urban	141	-										
	Total	916	0.2										
Total - Category - C		3,255	0.8										
X - Other Materials	Rural	7,896	2.1										
	Urban	1,213	0.3										
	Total	9,109	2.4										
Total - Category - X		9,109	2.4										
TOTAL HOUSES*		385,133											
ROOF													
R1 - Light Weight Sloping Roof	Rural	44,788	11.6										
	Urban	14,614	3.8										
	Total	59,402	15.4										
R2 - Heavy Weight Sloping Roof	Rural	238,800	62.0										
	Urban	25,173	6.5										
	Total	263,973	68.5										
R3 - Flat Roof	Rural	37,571	9.8										
	Urban	24,187	6.3										
	Total	61,758	16.1										
TOTAL HOUSES*		385,133											

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. **446 mm**

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
EQ Zone IV : High Damage Risk Zone (MSK VIII)
EQ Zone III : Moderate Damage Risk Zone (MSK VII)
EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : MP 28 State : MADHYA PRADESH SEHORE

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
WALL						36.0	64.0			46.8	53.2	
A1 - Mud & Unburnt Brick Wall	Rural	94,150	30.0									
	Urban	9,998	3.2									
	Total	104,148	33.2			M	L			H	M	
A2 - Stone Wall not packed with mortar	Rural	1,555	0.5									
	Urban	415	0.1									
	Total	1,970	0.6			M	L			M	L	
Total - Category - A		106,118	33.8									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	134,207	42.7									
	Urban	41,372	13.2									
	Total	175,579	55.9			L	VL			M	L	
Total - Category - B		175,579	55.9									
C1 - Concrete Wall	Rural	1,635	0.5									
	Urban	517	0.2									
	Total	2,152	0.7			VL	VL			VL	VL	
C2 - Wood wall	Rural	6,079	1.9									
	Urban	263	0.1									
	Total	6,342	2.0			VL	VL			H	M	
Total - Category - C		8,494	2.7									
X - Other Materials	Rural	21,935	7.0									
	Urban	1,939	0.6									
	Total	23,874	7.6			VL	VL			H	M	
Total - Category - X		23,874	7.6									
TOTAL HOUSES*		314,065										
ROOF												
R1 - Light Weight Sloping Roof	Rural	40,580	12.9									
	Urban	13,992	4.5									
	Total	54,572	17.4			L	VL			VH	H	
R2 - Heavy Weight Sloping Roof	Rural	182,766	58.2									
	Urban	12,888	4.1									
	Total	195,654	62.3			L	VL			M	L	
R3 - Flat Roof	Rural	36,215	11.5									
	Urban	27,624	8.8									
	Total	63,839	20.3									
TOTAL HOUSES*		314,065										

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. **478 mm**

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
- M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : MP 29 State : MADHYA PRADESH RAISEN

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
WALL						34.1	65.9			19.6	80.4	
A1 - Mud & Unburnt Brick Wall	Rural	137,129	43.9									
	Urban	16,215	5.2									
	Total	153,344	49.1			M	L			H	M	
A2 - Stone Wall not packed with mortar	Rural	10,883	3.5									
	Urban	1,501	0.5									
	Total	12,384	4.0			M	L			M	L	
Total - Category - A		165,728	53.1									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	70,067	22.4									
	Urban	47,404	15.2									
	Total	117,471	37.6			L	VL			M	L	
Total - Category - B		117,471	37.6									
C1 - Concrete Wall	Rural	955	0.3									
	Urban	876	0.3									
	Total	1,831	0.6			VL	VL			VL	VL	
C2 - Wood wall	Rural	9,843	3.2									
	Urban	464	0.1									
	Total	10,307	3.3			VL	VL			H	M	
Total - Category - C		12,138	3.9									
X - Other Materials	Rural	14,083	4.5									
	Urban	2,867	0.9									
	Total	16,950	5.4			VL	VL			H	M	
Total - Category - X		16,950	5.4									
TOTAL HOUSES*		312,287										
ROOF												
R1 - Light Weight Sloping Roof	Rural	28,663	9.2									
	Urban	14,338	4.6									
	Total	43,001	13.8			L	VL			VH	H	
R2 - Heavy Weight Sloping Roof	Rural	188,900	60.5									
	Urban	22,970	7.4									
	Total	211,870	67.9			L	VL			M	L	
R3 - Flat Roof	Rural	25,397	8.1									
	Urban	32,019	10.3									
	Total	57,416	18.4									
TOTAL HOUSES*		312,287										

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. **601 mm**

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
- M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : MP 32 State : MADHYA PRADESH HOSHANGABAD

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %		
		No. of Houses	%	EQ Zone				Wind Velocity m/s						
				V	IV	III	II	55 & 50	47	44 & 39	33			
				Area in %				Area in %						
WALL														
A1 - Mud & Unburnt Brick Wall	Rural	74,278	25.1											
	Urban	13,540	4.6											
	Total	87,818	29.7			M				M				
A2 - Stone Wall not packed with mortar	Rural	977	0.3											
	Urban	502	0.2											
	Total	1,479	0.5			M				L				
Total - Category - A		89,297	30.2											
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	101,947	34.5											
	Urban	75,252	25.5											
	Total	177,199	60.0			L				L				
Total - Category - B		177,199	60.0											
C1 - Concrete Wall	Rural	1,629	0.6											
	Urban	1,439	0.5											
	Total	3,068	1.1			VL				VL				
C2 - Wood wall	Rural	3,762	1.3											
	Urban	377	0.1											
	Total	4,139	1.4			VL				M				
Total - Category - C		7,207	2.4											
X - Other Materials	Rural	17,891	6.1											
	Urban	3,809	1.3											
	Total	21,700	7.4			VL				M				
Total - Category - X		21,700	7.3											
TOTAL HOUSES*		295,403												
ROOF														
R1 - Light Weight Sloping Roof	Rural	34,805	11.8											
	Urban	20,633	7.0											
	Total	55,438	18.8			L				H				
R2 - Heavy Weight Sloping Roof	Rural	140,434	47.5											
	Urban	24,073	8.1											
	Total	164,507	55.6			L				L				
R3 - Flat Roof	Rural	25,245	8.5											
	Urban	50,213	17.0											
	Total	75,458	25.5											
TOTAL HOUSES*		295,403												

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. **503 mm**

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
- M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : MP 33 State : MADHYA PRADESH KATNI

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %		
		No. of Houses	%	EQ Zone				Wind Velocity m/s						
				V	IV	III	II	55 & 50	47	44 & 39	33			
				Area in %				Area in %						
WALL														
A1 - Mud & Unburnt Brick Wall	Rural	185,734	56.6											
	Urban	12,186	3.7											
	Total	197,920	60.3			M				L				
A2 - Stone Wall not packed with mortar	Rural	2,743	0.8											
	Urban	704	0.2											
	Total	3,447	1.0			M				L				
Total - Category - A		201,367	61.4											
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	69,301	21.1											
	Urban	51,942	15.8											
	Total	121,243	36.9			L				VL				
Total - Category - B		121,243	37.0											
C1 - Concrete Wall	Rural	611	0.2											
	Urban	379	0.1											
	Total	990	0.3			VL				VL				
C2 - Wood wall	Rural	235	0.1											
	Urban	60	-											
	Total	295	0.1			VL				VL				
Total - Category - C		1,285	0.4											
X - Other Materials	Rural	3,330	1.0											
	Urban	792	0.2											
	Total	4,122	1.2			VL				VL				
Total - Category - X		4,122	1.3											
TOTAL HOUSES*		328,017												
ROOF														
R1 - Light Weight Sloping Roof	Rural	37,609	11.5											
	Urban	9,368	2.9											
	Total	46,977	14.4			L				VL				
R2 - Heavy Weight Sloping Roof	Rural	192,025	58.5											
	Urban	30,216	9.2											
	Total	222,241	67.7			L				VL				
R3 - Flat Roof	Rural	32,320	9.9											
	Urban	26,479	8.1											
	Total	58,799	18.0											
TOTAL HOUSES*		328,017												

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. **478 mm**

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
- M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : MP 36 State : MADHYA PRADESH DINDORI

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
				Area in %				Area in %					
WALL						25.2	74.8					100	
A1 - Mud & Unburnt Brick Wall	Rural	158,503	71.4										
	Urban	2,798	1.3										
	Total	161,301	72.7			M	L					M	
A2 - Stone Wall not packed with mortar	Rural	438	0.2										
	Urban	99	-										
	Total	537	0.2			M	L					L	
Total - Category - A		161,838	72.9										
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	39,267	17.7										
	Urban	5,356	2.4										
	Total	44,623	20.1			L	VL					L	
Total - Category - B		44,623	20.1										
C1 - Concrete Wall	Rural	701	0.3										
	Urban	120	0.1										
	Total	821	0.4			VL	VL					VL	
C2 - Wood wall	Rural	7,308	3.3										
	Urban	16	-										
	Total	7,324	3.3			VL	VL					M	
Total - Category - C		8,145	3.7										
X - Other Materials	Rural	7,008	3.2										
	Urban	516	0.2										
	Total	7,524	3.4			VL	VL					M	
Total - Category - X		7,524	3.4										
TOTAL HOUSES*		222,130											
ROOF													
R1 - Light Weight Sloping Roof	Rural	39,446	17.8										
	Urban	1,865	0.8										
	Total	41,311	18.6			L	VL					H	
R2 - Heavy Weight Sloping Roof	Rural	163,329	73.5										
	Urban	3,358	1.5										
	Total	166,687	75.0			L	VL					L	
R3 - Flat Roof	Rural	10,450	4.7										
	Urban	3,682	1.7										
	Total	14,132	6.4										
TOTAL HOUSES*		222,130											

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. **448 mm**

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
- M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : MP 37 State : MADHYA PRADESH MANDLA

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
				Area in %				Area in %					
WALL						19.1	80.9					100	
A1 - Mud & Unburnt Brick Wall	Rural	217,353	71.3										
	Urban	11,680	3.8										
	Total	229,033	75.1			M	L					M	
A2 - Stone Wall not packed with mortar	Rural	519	0.2										
	Urban	190	0.1										
	Total	709	0.3			M	L					L	
Total - Category - A		229,742	75.3										
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	42,220	13.8										
	Urban	20,176	6.6										
	Total	62,396	20.4			L	VL					L	
Total - Category - B		62,396	20.5										
C1 - Concrete Wall	Rural	444	0.1										
	Urban	326	0.1										
	Total	770	0.2			VL	VL					VL	
C2 - Wood wall	Rural	4,265	1.4										
	Urban	188	0.1										
	Total	4,453	1.5			VL	VL					M	
Total - Category - C		5,223	1.7										
X - Other Materials	Rural	6,322	2.1										
	Urban	1,344	0.4										
	Total	7,666	2.5			VL	VL					M	
Total - Category - X		7,666	2.5										
TOTAL HOUSES*		305,027											
ROOF													
R1 - Light Weight Sloping Roof	Rural	40,388	13.2										
	Urban	4,583	1.5										
	Total	44,971	14.7			L	VL					H	
R2 - Heavy Weight Sloping Roof	Rural	212,203	69.6										
	Urban	13,251	4.3										
	Total	225,454	73.9			L	VL					L	
R3 - Flat Roof	Rural	18,532	6.1										
	Urban	16,070	5.3										
	Total	34,602	11.4										
TOTAL HOUSES*		305,027											

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. **448 mm**

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
- M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : MP 38 State : MADHYA PRADESH CHHINDWARA

Wall / Roof	Census Houses	No. of Houses	%	Level of Risk under										Flood Prone Area in %
				EQ Zone				Wind Velocity m/s				Flood Prone Area in %		
				V	IV	III	II	55 & 50	47	44 & 39	33			
				Area in %				Area in %						
WALL						59.7	40.3					100		
A1 - Mud & Unburnt Brick Wall	Rural	281,641	54.6											
	Urban	36,889	7.1											
	Total	318,530	61.7			M	L					M		
A2 - Stone Wall not packed with mortar	Rural	2,665	0.5											
	Urban	768	0.1											
	Total	3,433	0.6			M	L					L		
Total - Category - A		321,963	62.4											
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	82,956	16.1											
	Urban	83,783	16.2											
	Total	166,739	32.3			L	VL					L		
Total - Category - B		166,739	32.3											
C1 - Concrete Wall	Rural	2,618	0.5											
	Urban	2,887	0.6											
	Total	5,505	1.1			VL	VL					VL		
C2 - Wood wall	Rural	5,037	1.0											
	Urban	286	0.1											
	Total	5,323	1.1			VL	VL					M		
Total - Category - C		10,828	2.1											
X - Other Materials	Rural	14,070	2.7											
	Urban	2,674	0.5											
	Total	16,744	3.2			VL	VL					M		
Total - Category - X		16,744	3.2											
TOTAL HOUSES*		516,274												

Wall / Roof	Census Houses	No. of Houses	%	Level of Risk under										Flood Prone Area in %
				EQ Zone				Wind Velocity m/s				Flood Prone Area in %		
				V	IV	III	II	55 & 50	47	44 & 39	33			
				Area in %				Area in %						
ROOF														
R1 - Light Weight Sloping Roof	Rural	43,083	8.3											
	Urban	28,601	5.5											
	Total	71,684	13.8			L	VL					H		
R2 - Heavy Weight Sloping Roof	Rural	306,106	59.3											
	Urban	46,081	8.9											
	Total	352,187	68.2			L	VL					L		
R3 - Flat Roof	Rural	39,798	7.7											
	Urban	52,605	10.2											
	Total	92,403	17.9											
TOTAL HOUSES*		516,274												

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. **484 mm**

Housing Category : Wall Types

- Category - A :** Buildings in field-stone, rural structures, unburnt brick houses, clay houses
 - Category - B :** Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
 - Category - C :** Reinforced building, well built wooden structures
 - Category - X :** Other materials not covered in A,B,C. These are generally light.
- Notes :** 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1 - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)**
 - Category - R2 - Heavy Weight (Tiles, Stone/Slate)**
 - Category - R3 - Flat Roof (Brick, Concrete)**
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
EQ Zone IV : High Damage Risk Zone (MSK VIII)
EQ Zone III : Moderate Damage Risk Zone (MSK VII)
EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

Table No. : MP 39 State : MADHYA PRADESH SEONI

Wall / Roof	Census Houses	No. of Houses	%	Level of Risk under										Flood Prone Area in %
				EQ Zone				Wind Velocity m/s				Flood Prone Area in %		
				V	IV	III	II	55 & 50	47	44 & 39	33			
				Area in %				Area in %						
WALL						21.0	79.0					100		
A1 - Mud & Unburnt Brick Wall	Rural	241,790	66.3											
	Urban	11,822	3.2											
	Total	253,612	69.5			M	L					M		
A2 - Stone Wall not packed with mortar	Rural	954	0.3											
	Urban	209	0.1											
	Total	1,163	0.4			M	L					L		
Total - Category - A		254,775	69.8											
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	66,892	18.3											
	Urban	28,554	7.8											
	Total	95,446	26.1			L	VL					L		
Total - Category - B		95,446	26.2											
C1 - Concrete Wall	Rural	1,525	0.4											
	Urban	1,285	0.4											
	Total	2,810	0.8			VL	VL					VL		
C2 - Wood wall	Rural	4,826	1.3											
	Urban	197	0.1											
	Total	5,023	1.4			VL	VL					M		
Total - Category - C		7,833	2.1											
X - Other Materials	Rural	5,840	1.6											
	Urban	1,071	0.3											
	Total	6,911	1.9			VL	VL					M		
Total - Category - X		6,911	1.9											
TOTAL HOUSES*		364,965												

Wall / Roof	Census Houses	No. of Houses	%	Level of Risk under										Flood Prone Area in %
				EQ Zone				Wind Velocity m/s				Flood Prone Area in %		
				V	IV	III	II	55 & 50	47	44 & 39	33			
				Area in %				Area in %						
ROOF														
R1 - Light Weight Sloping Roof	Rural	26,015	7.1											
	Urban	4,236	1.2											
	Total	30,251	8.3			L	VL					H		
R2 - Heavy Weight Sloping Roof	Rural	269,396	73.8											
	Urban	15,326	4.2											
	Total	284,722	78.0			L	VL					L		
R3 - Flat Roof	Rural	26,416	7.2											
	Urban	23,576	6.5											
	Total	49,992	13.7											
TOTAL HOUSES*		364,965												

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. **482 mm**

Housing Category : Wall Types

- Category - A :** Buildings in field-stone, rural structures, unburnt brick houses, clay houses
 - Category - B :** Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
 - Category - C :** Reinforced building, well built wooden structures
 - Category - X :** Other materials not covered in A,B,C. These are generally light.
- Notes :** 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1 - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)**
 - Category - R2 - Heavy Weight (Tiles, Stone/Slate)**
 - Category - R3 - Flat Roof (Brick, Concrete)**
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
EQ Zone IV : High Damage Risk Zone (MSK VIII)
EQ Zone III : Moderate Damage Risk Zone (MSK VII)
EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : MP 42 State : MADHYA PRADESH ASHOKNAGAR

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %		
		No. of Houses	%	EQ Zone				Wind Velocity m/s						
				V	IV	III	II	55 & 50	47	44 & 39	33			
				Area in %				Area in %						
WALL														
A1 - Mud & Unburnt Brick Wall	Rural	106,959	53.8											
	Urban	9,502	4.8											
	Total	116,461	58.6				L			H				
A2 - Stone Wall not packed with mortar	Rural	18,304	9.2											
	Urban	3,749	1.9											
	Total	22,053	11.1				L			M				
Total - Category - A		138,514	69.7											
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	34,035	17.1											
	Urban	19,830	10.0											
	Total	53,865	27.1				VL			M				
Total - Category - B		53,865	27.1											
C1 - Concrete Wall	Rural	428	0.2											
	Urban	284	0.1											
	Total	712	0.3				VL			VL				
C2 - Wood wall	Rural	780	0.4											
	Urban	185	0.1											
	Total	965	0.5				VL			H				
Total - Category - C		1,677	0.8											
X - Other Materials	Rural	4,020	2.0											
	Urban	557	0.3											
	Total	4,577	2.3				VL			H				
Total - Category - X		4,577	2.3											
TOTAL HOUSES*		198,633												

ROOF														
R1 - Light Weight Sloping Roof		Census Houses		Level of Risk under								Flood Prone Area in %		
		No. of Houses	%	EQ Zone				Wind Velocity m/s						
				V	IV	III	II	55 & 50	47	44 & 39	33			
R1 - Light Weight Sloping Roof	Rural	26,401	13.3											
	Urban	4,320	2.2											
	Total	30,721	15.5				VL			VH				
R2 - Heavy Weight Sloping Roof	Rural	126,414	63.6											
	Urban	19,371	9.8											
	Total	145,785	73.4				VL			M				
R3 - Flat Roof	Rural	11,711	5.9											
	Urban	10,416	5.2											
	Total	22,127	11.1											
<i>Damage Risk as per that for the Wall supporting it</i>														
TOTAL HOUSES*		198,633												

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 513 mm

Housing Category : Wall Types

- Category - A :** Buildings in field-stone, rural structures, unburnt brick houses, clay houses
 - Category - B :** Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
 - Category - C :** Reinforced building, well built wooden structures
 - Category - X :** Other materials not covered in A,B,C. These are generally light.
- Notes :** 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1 -** Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
 - Category - R2 -** Heavy Weight (Tiles, Stone/Slate)
 - Category - R3 -** Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
EQ Zone IV : High Damage Risk Zone (MSK VIII)
EQ Zone III : Moderate Damage Risk Zone (MSK VII)
EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

Table No. : MP 43 State : MADHYA PRADESH SHAHDOL

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %		
		No. of Houses	%	EQ Zone				Wind Velocity m/s						
				V	IV	III	II	55 & 50	47	44 & 39	33			
				Area in %				Area in %						
WALL														
A1 - Mud & Unburnt Brick Wall	Rural	184,247	66.4											
	Urban	14,368	5.2											
	Total	198,615	71.6				M			L			M	
A2 - Stone Wall not packed with mortar	Rural	910	0.3											
	Urban	420	0.2											
	Total	1,330	0.5				M			L			L	
Total - Category - A		199,945	72.1											
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	36,204	13.1											
	Urban	35,379	12.8											
	Total	71,583	25.9				L			VL			L	
Total - Category - B		71,583	25.8											
C1 - Concrete Wall	Rural	292	0.1											
	Urban	596	0.2											
	Total	888	0.3				VL			VL			VL	
C2 - Wood wall	Rural	854	0.3											
	Urban	42	-											
	Total	896	0.3				VL			VL			M	
Total - Category - C		1,784	0.6											
X - Other Materials	Rural	2,917	1.1											
	Urban	1,129	0.4											
	Total	4,046	1.5				VL			VL			M	
Total - Category - X		4,046	1.5											
TOTAL HOUSES*		277,358												

ROOF														
R1 - Light Weight Sloping Roof		Census Houses		Level of Risk under								Flood Prone Area in %		
		No. of Houses	%	EQ Zone				Wind Velocity m/s						
				V	IV	III	II	55 & 50	47	44 & 39	33			
R1 - Light Weight Sloping Roof	Rural	41,890	15.1											
	Urban	12,372	4.5											
	Total	54,262	19.6				L			VL			H	
R2 - Heavy Weight Sloping Roof	Rural	164,440	59.3											
	Urban	17,761	6.4											
	Total	182,201	65.7				L			VL			L	
R3 - Flat Roof	Rural	19,094	6.9											
	Urban	21,801	7.9											
	Total	40,895	14.8											
<i>Damage Risk as per that for the Wall supporting it</i>														
TOTAL HOUSES*		277,358												

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 401 mm

Housing Category : Wall Types

- Category - A :** Buildings in field-stone, rural structures, unburnt brick houses, clay houses
 - Category - B :** Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
 - Category - C :** Reinforced building, well built wooden structures
 - Category - X :** Other materials not covered in A,B,C. These are generally light.
- Notes :** 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1 -** Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
 - Category - R2 -** Heavy Weight (Tiles, Stone/Slate)
 - Category - R3 -** Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
EQ Zone IV : High Damage Risk Zone (MSK VIII)
EQ Zone III : Moderate Damage Risk Zone (MSK VII)
EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : MP 44 State : MADHYA PRADESH ANUPPUR

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
				Area in %				Area in %					
WALL						44.5	55.5					100	
A1 - Mud & Unburnt Brick Wall	Rural	111,819	57.9										
	Urban	15,145	7.8										
	Total	126,964	65.7			M	L			M			
A2 - Stone Wall not packed with mortar	Rural	282	0.1										
	Urban	353	0.2										
	Total	635	0.3			M	L			L			
Total - Category - A		127,599	66.1										
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	25,507	13.2										
	Urban	34,493	17.9										
	Total	60,000	31.1			L	VL			L			
Total - Category - B		60,000	31.1										
C1 - Concrete Wall	Rural	459	0.2										
	Urban	591	0.3										
	Total	1,050	0.5			VL	VL			VL			
C2 - Wood wall	Rural	662	0.3										
	Urban	145	0.1										
	Total	807	0.4			VL	VL			M			
Total - Category - C		1,857	1.0										
X - Other Materials	Rural	2,555	1.3										
	Urban	1,037	0.5										
	Total	3,592	1.8			VL	VL			M			
Total - Category - X		3,592	1.9										
TOTAL HOUSES*		193,048											
ROOF													
R1 - Light Weight Sloping Roof	Rural	29,202	15.1										
	Urban	13,965	7.2										
	Total	43,167	22.3			L	VL			H			
R2 - Heavy Weight Sloping Roof	Rural	100,651	52.1										
	Urban	15,411	8.0										
	Total	116,062	60.1			L	VL			L			
R3 - Flat Roof	Rural	11,431	5.9										
	Urban	22,388	11.6										
	Total	33,819	17.5										
TOTAL HOUSES*		193,048											

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. **401 mm**

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
- M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : MP 45 State : MADHYA PRADESH SIDHI

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
				Area in %				Area in %					
WALL						53.3	46.7					100	
A1 - Mud & Unburnt Brick Wall	Rural	203,364	77.3										
	Urban	8,433	3.2										
	Total	211,797	80.5			M	L			M			
A2 - Stone Wall not packed with mortar	Rural	2,086	0.8										
	Urban	175	0.1										
	Total	2,261	0.9			M	L			L			
Total - Category - A		214,058	81.4										
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	30,530	11.6										
	Urban	13,271	5.0										
	Total	43,801	16.6			L	VL			L			
Total - Category - B		43,801	16.7										
C1 - Concrete Wall	Rural	493	0.2										
	Urban	360	0.1										
	Total	853	0.3			VL	VL			VL			
C2 - Wood wall	Rural	271	0.1										
	Urban	9	-										
	Total	280	0.1			VL	VL			M			
Total - Category - C		1,133	0.4										
X - Other Materials	Rural	3,580	1.4										
	Urban	359	0.1										
	Total	3,939	1.5			VL	VL			M			
Total - Category - X		3,939	1.5										
TOTAL HOUSES*		262,931											
ROOF													
R1 - Light Weight Sloping Roof	Rural	53,502	20.3										
	Urban	2,589	1.0										
	Total	56,091	21.3			L	VL			H			
R2 - Heavy Weight Sloping Roof	Rural	168,018	63.9										
	Urban	8,836	3.4										
	Total	176,854	67.3			L	VL			L			
R3 - Flat Roof	Rural	18,804	7.2										
	Urban	11,182	4.3										
	Total	29,986	11.5										
TOTAL HOUSES*		262,931											

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. **523 mm**

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
- M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : MP 46 State : MADHYA PRADESH SINGRAULI

Table No. : MP 47 State : MADHYA PRADESH JHABUA

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %		
		No. of Houses	%	EQ Zone				Wind Velocity m/s						
				V	IV	III	II	55 & 50	47	44 & 39	33			
				Area in %				Area in %						
						97.0	3.0					100		
WALL														
A1 - Mud & Unburnt Brick Wall	Rural	191,015	72.8											
	Urban	12,504	4.8											
	Total	203,519	77.6			M	L					M		
A2 - Stone Wall not packed with mortar	Rural	1,387	0.5											
	Urban	603	0.2											
	Total	1,990	0.7			M	L					L		
Total - Category - A		205,509	78.3											
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	17,407	6.6											
	Urban	35,067	13.4											
	Total	52,474	20.0			L	VL					L		
Total - Category - B		52,474	20.0											
C1 - Concrete Wall	Rural	130	-											
	Urban	593	0.2											
	Total	723	0.2			VL	VL					VL		
C2 - Wood wall	Rural	145	0.1											
	Urban	71	-											
	Total	216	0.1			VL	VL					M		
Total - Category - C		939	0.4											
X - Other Materials	Rural	2,192	0.8											
	Urban	1,422	0.5											
	Total	3,614	1.3			VL	VL					M		
Total - Category - X		3,614	1.4											
TOTAL HOUSES*		262,536												

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %		
		No. of Houses	%	EQ Zone				Wind Velocity m/s						
				V	IV	III	II	55 & 50	47	44 & 39	33			
				Area in %				Area in %						
						3.5	96.5					11.1	88.9	
WALL														
A1 - Mud & Unburnt Brick Wall	Rural	90,465	39.8											
	Urban	4,221	1.9											
	Total	94,686	41.7			M	L					H	M	
A2 - Stone Wall not packed with mortar	Rural	8,977	3.9											
	Urban	116	0.1											
	Total	9,093	4.0			M	L					M	L	
Total - Category - A		103,779	45.7											
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	81,391	35.8											
	Urban	16,548	7.3											
	Total	97,939	43.1			L	VL					M	L	
Total - Category - B		97,939	43.1											
C1 - Concrete Wall	Rural	469	0.2											
	Urban	359	0.2											
	Total	828	0.4			VL	VL					VL	VL	
C2 - Wood wall	Rural	5,748	2.5											
	Urban	17	-											
	Total	5,765	2.5			VL	VL					H	M	
Total - Category - C		6,593	2.9											
X - Other Materials	Rural	18,561	8.2											
	Urban	414	0.2											
	Total	18,975	8.4			VL	VL					H	M	
Total - Category - X		18,975	8.3											
TOTAL HOUSES*		227,286												

ROOF														
R1 - Light Weight Sloping Roof		Census Houses		Level of Risk under								Flood Prone Area in %		
		No. of Houses	%	EQ Zone				Wind Velocity m/s						
		Area in %				Area in %								
R1 - Light Weight Sloping Roof	Rural	51,321	19.5											
	Urban	14,885	5.7											
	Total	66,206	25.2			L	VL					H		
R2 - Heavy Weight Sloping Roof	Rural	149,678	57.0											
	Urban	9,635	3.7											
	Total	159,313	60.7			L	VL					L		
Total - Category - R1														
R3 - Flat Roof	Rural	11,277	4.3											
	Urban	25,740	9.8											
	Total	37,017	14.1											
Total - Category - R3														
TOTAL HOUSES*		262,536												

ROOF														
R1 - Light Weight Sloping Roof		Census Houses		Level of Risk under								Flood Prone Area in %		
		No. of Houses	%	EQ Zone				Wind Velocity m/s						
		Area in %				Area in %								
R1 - Light Weight Sloping Roof	Rural	31,461	13.8											
	Urban	5,335	2.3											
	Total	36,796	16.1			L	VL					VH	H	
R2 - Heavy Weight Sloping Roof	Rural	158,284	69.6											
	Urban	5,037	2.2											
	Total	163,321	71.8			L	VL					M	L	
Total - Category - R2														
R3 - Flat Roof	Rural	15,866	7.0											
	Urban	11,303	5.0											
	Total	27,169	12.0											
Total - Category - R3														
TOTAL HOUSES*		227,286												

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. **438 mm**

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. **492 mm**

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
- 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
- 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V** : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV** : High Damage Risk Zone (MSK VIII)
- EQ Zone III** : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II** : Low Damage Risk Zone (MSK < VI)

- Level of Risk** : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
- 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
- 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V** : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV** : High Damage Risk Zone (MSK VIII)
- EQ Zone III** : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II** : Low Damage Risk Zone (MSK < VI)

- Level of Risk** : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : MP 48 State : MADHYA PRADESH ALIRAJPUR

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
				Area in %				Area in %					
WALL						98.3	1.7					100	
A1 - Mud & Unburnt Brick Wall	Rural	72,617	49.7										
	Urban	2,997	2.1										
	Total	75,614	51.8			M	L					M	
A2 - Stone Wall not packed with mortar	Rural	648	0.4										
	Urban	53	-										
	Total	701	0.4			M	L					L	
Total - Category - A		76,315	52.3										
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	43,465	29.8										
	Urban	9,434	6.5										
	Total	52,899	36.3			L	VL					L	
Total - Category - B		52,899	36.2										
C1 - Concrete Wall	Rural	369	0.3										
	Urban	63	-										
	Total	432	0.3			VL	VL					VL	
C2 - Wood wall	Rural	4,828	3.3										
	Urban	45	-										
	Total	4,873	3.3			VL	VL					M	
Total - Category - C		5,305	3.6										
X - Other Materials	Rural	11,158	7.6										
	Urban	305	0.2										
	Total	11,463	7.8			VL	VL					M	
Total - Category - X		11,463	7.9										
TOTAL HOUSES*		145,982											
ROOF													
R1 - Light Weight Sloping Roof	Rural	23,565	16.1										
	Urban	2,849	2.0										
	Total	26,414	18.1			L	VL					H	
R2 - Heavy Weight Sloping Roof	Rural	100,493	68.8										
	Urban	3,067	2.1										
	Total	103,560	70.9			L	VL					L	
R3 - Flat Roof	Rural	9,027	6.2										
	Urban	6,981	4.8										
	Total	16,008	11.0										
TOTAL HOUSES*		145,982											

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. **492 mm**

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
- M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : MP 49 State : MADHYA PRADESH EAST NIMAR

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
				Area in %				Area in %					
WALL													
A1 - Mud & Unburnt Brick Wall	Rural	116,331	37.9										
	Urban	14,361	4.7										
	Total	130,692	42.6			M						M	
A2 - Stone Wall not packed with mortar	Rural	1,893	0.6										
	Urban	718	0.2										
	Total	2,611	0.8			M						L	
Total - Category - A		133,303	43.4										
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	83,153	27.1										
	Urban	36,136	11.8										
	Total	119,289	38.9			L						L	
Total - Category - B		119,289	38.8										
C1 - Concrete Wall	Rural	2,708	0.9										
	Urban	2,644	0.9										
	Total	5,352	1.8			VL						VL	
C2 - Wood wall	Rural	1,538	0.5										
	Urban	520	0.2										
	Total	2,058	0.7			VL						M	
Total - Category - C		7,410	2.4										
X - Other Materials	Rural	43,711	14.2										
	Urban	3,485	1.1										
	Total	47,196	15.3			VL						M	
Total - Category - X		47,196	15.4										
TOTAL HOUSES*		307,198											
ROOF													
R1 - Light Weight Sloping Roof	Rural	130,526	42.5										
	Urban	23,912	7.8										
	Total	154,438	50.3			L						H	
R2 - Heavy Weight Sloping Roof	Rural	95,867	31.2										
	Urban	9,258	3.0										
	Total	105,125	34.2			L						L	
R3 - Flat Roof	Rural	22,941	7.5										
	Urban	24,694	8.0										
	Total	47,635	15.5										
TOTAL HOUSES*		307,198											

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. **431 mm**

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
- M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : MP 50 State : MADHYA PRADESH BURHANPUR

Wall / Roof		Census Houses		Level of Risk under							Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39		33
				Area in %				Area in %				
WALL						100				100		
A1 - Mud & Unburnt Brick Wall	Rural	43,612	26.0									
	Urban	19,960	11.9									
	Total	63,572	37.9									
A2 - Stone Wall not packed with mortar	Rural	381	0.2									
	Urban	455	0.3									
	Total	836	0.5									
Total - Category - A		64,408	38.4									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	33,708	20.1									
	Urban	32,463	19.4									
	Total	66,171	39.5									
Total - Category - B		66,171	39.5									
C1 - Concrete Wall	Rural	2,046	1.2									
	Urban	2,274	1.4									
	Total	4,320	2.6									
C2 - Wood wall	Rural	2,469	1.5									
	Urban	384	0.2									
	Total	2,853	1.7									
Total - Category - C		7,173	4.3									
X - Other Materials	Rural	27,403	16.3									
	Urban	2,462	1.5									
	Total	29,865	17.8									
Total - Category - X		29,865	17.8									
TOTAL HOUSES*		167,617										
ROOF												
R1 - Light Weight Sloping Roof	Rural	73,069	43.6									
	Urban	34,888	20.8									
	Total	107,957	64.4									
R2 - Heavy Weight Sloping Roof	Rural	22,739	13.6									
	Urban	2,646	1.6									
	Total	25,385	15.2									
R3 - Flat Roof	Rural	13,811	8.2									
	Urban	20,464	12.2									
	Total	34,275	20.4									
TOTAL HOUSES*		167,617										

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 452 mm

Housing Category : Wall Types

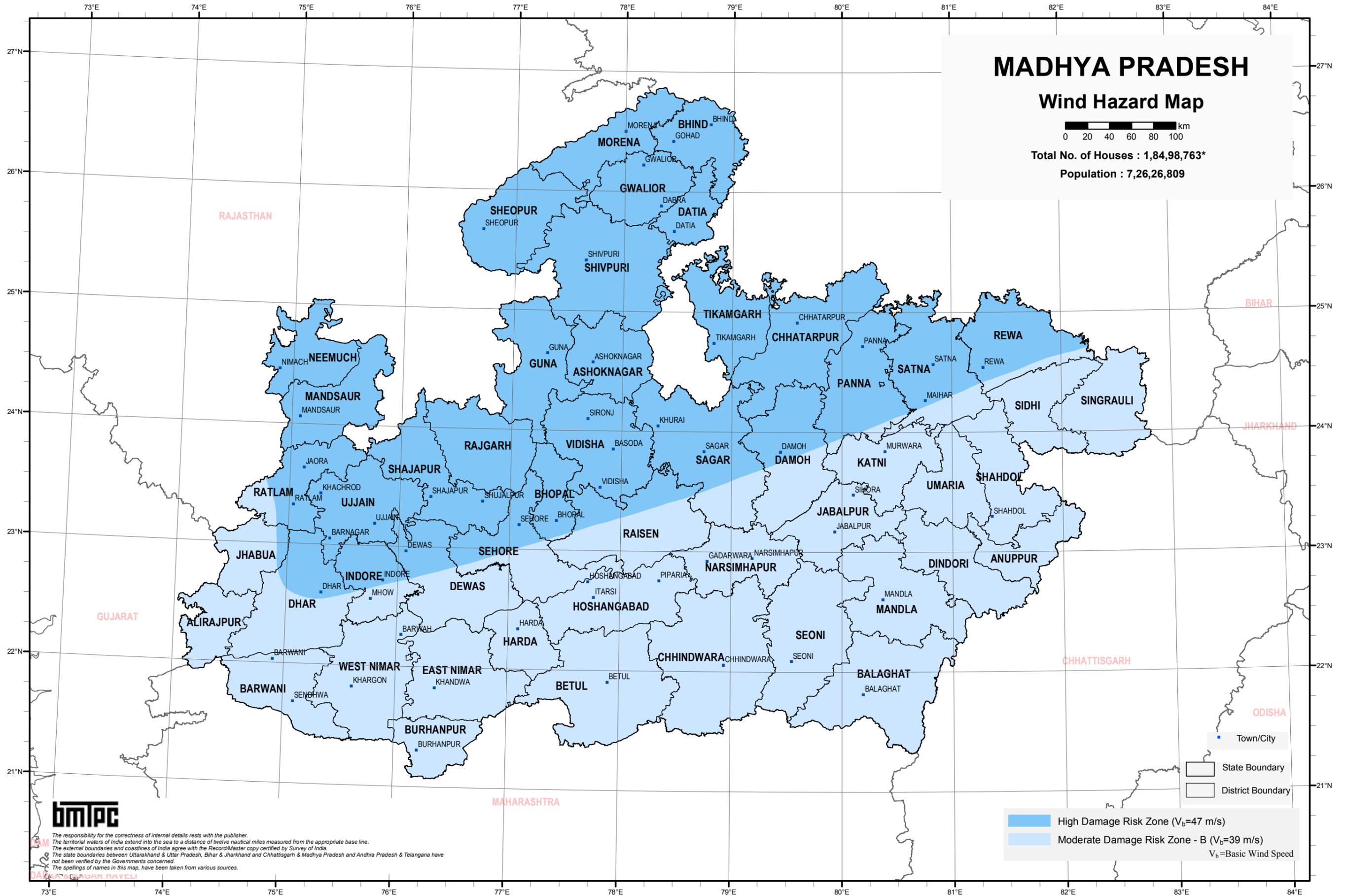
- Category - A :** Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B :** Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C :** Reinforced building, well built wooden structures
- Category - X :** Other materials not covered in A,B,C. These are generally light.

- Notes :**
1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1 -** Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2 -** Heavy Weight (Tiles, Stone/Slate)
- Category - R3 -** Flat Roof (Brick, Concrete)
- EQ Zone V :** Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV :** High Damage Risk Zone (MSK VIII)
- EQ Zone III :** Moderate Damage Risk Zone (MSK VII)
- EQ Zone II :** Low Damage Risk Zone (MSK < VI)

Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
 * Total No. of Houses excluding Vacant/Locked Houses



The responsibility for the correctness of internal details rests with the publisher.
 The territorial waters of India extend into the sea to a distance of twelve nautical miles measured from the appropriate base line.
 The external boundaries and coastlines of India agree with the Record/Master copy certified by Survey of India.
 The state boundaries between Uttarakhand & Uttar Pradesh, Bihar & Jharkhand and Chhattisgarh & Madhya Pradesh and Andhra Pradesh & Telangana have not been verified by the Governments concerned.
 The spellings of names in this map, have been taken from various sources.

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

MAHARASHTRA

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
STATE - MAHARASHTRA				5.6	50.4	43.9				94.4	5.6	
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	4,726,424	16.0									
	Urban	1,061,904	3.6									
	Total	5,788,328	19.6		H	M	L			M	L	
A2 - Stone Wall not packed with mortar	Rural	683,207	2.3									
	Urban	297,353	1.0									
	Total	980,560	3.3		H	M	L			L	VL	
Total - Category - A		6,768,888	22.9									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	7,369,334	24.9									
	Urban	9,193,798	31.1									
	Total	16,563,132	56.0		M	L	VL			L	VL	
Total - Category - B		16,563,132	56.0									
C1 - Concrete Wall	Rural	845,425	2.9									
	Urban	2,348,762	7.9									
	Total	3,194,187	10.8		L	VL	VL			VL	VL	
C2 - Wood wall	Rural	187,899	0.6									
	Urban	136,595	0.5									
	Total	324,494	1.1		L	VL	VL			M	L	
Total - Category - C		3,518,681	11.9									
X - Other Materials	Rural	1,984,261	6.7									
	Urban	761,144	2.6									
	Total	2,745,405	9.3		VL	VL	VL			M	L	
Total - Category - X		2,745,405	9.3									
TOTAL HOUSES*		29,596,106										

ROOF												
R1 - Light Weight Sloping Roof	Rural	8,426,867	28.5									
	Urban	4,710,284	15.9									
	Total	13,137,151	44.4		M	L	VL			H	M	
R2 - Heavy Weight Sloping Roof	Rural	5,199,720	17.6									
	Urban	1,625,240	5.5									
	Total	6,824,960	23.1		M	L	VL			L	VL	
R3 - Flat Roof	Rural	2,169,963	7.3									
	Urban	7,464,032	25.2									
	Total	9,633,995	32.5									
TOTAL HOUSES*		29,596,106										

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : MH 01

State : MAHARASHTRA

NANDURBAR

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
				Area in %				Area in %					
WALL													
A1 - Mud & Unburnt Brick Wall	Rural	78,229	21.0										
	Urban	10,906	2.9										
	Total	89,135	23.9							M	M		
A2 - Stone Wall not packed with mortar	Rural	3,888	1.0										
	Urban	1,138	0.3										
	Total	5,026	1.3							M	L		
Total - Category - A		94,161	25.3										
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	73,012	19.6										
	Urban	39,051	10.5										
	Total	112,063	30.1							L	L		
Total - Category - B		112,063	30.1										
C1 - Concrete Wall	Rural	4,764	1.3										
	Urban	3,997	1.1										
	Total	8,761	2.4							VL	VL		
C2 - Wood wall	Rural	2,317	0.6										
	Urban	992	0.3										
	Total	3,309	0.9							VL	M		
Total - Category - C		12,070	3.2										
X - Other Materials	Rural	147,721	39.7										
	Urban	6,536	1.8										
	Total	154,257	41.5							VL	M		
Total - Category - X		154,257	41.4										
TOTAL HOUSES*		372,551											

ROOF												
R1 - Light Weight Sloping Roof	Rural	104,027	27.9									
	Urban	26,568	7.1									
	Total	130,595	35.0							L	H	
R2 - Heavy Weight Sloping Roof	Rural	185,869	49.9									
	Urban	9,694	2.6									
	Total	195,563	52.5							L	L	
R3 - Flat Roof	Rural	20,035	5.4									
	Urban	26,358	7.1									
	Total	46,393	12.5									
TOTAL HOUSES*		372,551										

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 528 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : MH 02

State : MAHARASHTRA

DHULE

Table No. : MH 03

State : MAHARASHTRA

JALGAON

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
				Area in %				Area in %					
						100						100	
WALL													
A1 - Mud & Unburnt Brick Wall	Rural	173,294	36.6										
	Urban	21,867	4.6										
	Total	195,161	41.2				M					M	
A2 - Stone Wall not packed with mortar	Rural	6,672	1.4										
	Urban	3,036	0.6										
	Total	9,708	2.0				M					L	
Total - Category - A		204,869	43.2										
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	109,082	23.0										
	Urban	91,688	19.4										
	Total	200,770	42.4				L					L	
Total - Category - B		200,770	42.4										
C1 - Concrete Wall	Rural	8,612	1.8										
	Urban	7,766	1.6										
	Total	16,378	3.4				VL					VL	
C2 - Wood wall	Rural	2,249	0.5										
	Urban	2,345	0.5										
	Total	4,594	1.0				VL					M	
Total - Category - C		20,972	4.4										
X - Other Materials	Rural	43,357	9.2										
	Urban	3,804	0.8										
	Total	47,161	10.0				VL					M	
Total - Category - X		47,161	10.0										
TOTAL HOUSES*		473,772											

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
				Area in %				Area in %					
						54.1	45.9					100	
WALL													
A1 - Mud & Unburnt Brick Wall	Rural	268,840	25.6										
	Urban	46,212	4.4										
	Total	315,052	30.0				M	L				M	
A2 - Stone Wall not packed with mortar	Rural	18,242	1.7										
	Urban	6,556	0.6										
	Total	24,798	2.3				M	L				L	
Total - Category - A		339,850	32.4										
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	281,349	26.8										
	Urban	225,495	21.5										
	Total	506,844	48.3				L	VL				L	
Total - Category - B		506,844	48.3										
C1 - Concrete Wall	Rural	37,536	3.6										
	Urban	23,697	2.3										
	Total	61,233	5.9				VL	VL				VL	
C2 - Wood wall	Rural	8,810	0.8										
	Urban	17,066	1.6										
	Total	25,876	2.4				VL	VL				M	
Total - Category - C		87,109	8.3										
X - Other Materials	Rural	102,612	9.8										
	Urban	13,690	1.3										
	Total	116,302	11.1				VL	VL				M	
Total - Category - X		116,302	11.1										
TOTAL HOUSES*		1,050,105											

ROOF													
R1 - Light Weight Sloping Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
				Area in %				Area in %					
R1 - Light Weight Sloping Roof	Rural	230,348	48.6										
	Urban	50,605	10.7										
	Total	280,953	59.3				L					H	
R2 - Heavy Weight Sloping Roof	Rural	70,821	14.9										
	Urban	4,708	1.0										
	Total	75,529	15.9				L					L	
R3 - Flat Roof	Rural	42,097	8.9										
	Urban	75,193	15.9										
	Total	117,290	24.8										
<i>Damage Risk as per that for the Wall supporting it</i>													
TOTAL HOUSES*		473,772											

ROOF													
R1 - Light Weight Sloping Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
				Area in %				Area in %					
R1 - Light Weight Sloping Roof	Rural	534,089	50.9										
	Urban	126,670	12.1										
	Total	660,759	63.0				L	VL				H	
R2 - Heavy Weight Sloping Roof	Rural	31,589	3.0										
	Urban	14,001	1.3										
	Total	45,590	4.3				L	VL				L	
R3 - Flat Roof	Rural	151,711	14.4										
	Urban	192,045	18.3										
	Total	343,756	32.7										
<i>Damage Risk as per that for the Wall supporting it</i>													
TOTAL HOUSES*		1,050,105											

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. **482 mm**

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. **480 mm**

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
- 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
- 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)

- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
- 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
- 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)

- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : MH 04 State : MAHARASHTRA BULDANA

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
				Area in %				Area in %					
						8.6	91.4					100	
WALL													
A1 - Mud & Unburnt Brick Wall	Rural	180,306	26.9										
	Urban	22,492	3.4										
	Total	202,798	30.3			M	L				M		
A2 - Stone Wall not packed with mortar	Rural	15,850	2.4										
	Urban	2,246	0.3										
	Total	18,096	2.7			M	L				L		
Total - Category - A		220,894	33.0										
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	222,329	33.2										
	Urban	84,590	12.6										
	Total	306,919	45.8			L	VL				L		
Total - Category - B		306,919	45.8										
C1 - Concrete Wall	Rural	18,194	2.7										
	Urban	6,811	1.0										
	Total	25,005	3.7			VL	VL				VL		
C2 - Wood wall	Rural	5,377	0.8										
	Urban	1,764	0.3										
	Total	7,141	1.1			VL	VL				M		
Total - Category - C		32,146	4.8										
X - Other Materials	Rural	93,118	13.9										
	Urban	16,725	2.5										
	Total	109,843	16.4			VL	VL				M		
Total - Category - X		109,843	16.4										
TOTAL HOUSES*		669,802											
ROOF													
R1 - Light Weight Sloping Roof	Rural	426,120	63.6										
	Urban	68,657	10.3										
	Total	494,777	73.9			L	VL				H		
R2 - Heavy Weight Sloping Roof	Rural	32,544	4.9										
	Urban	4,784	0.7										
	Total	37,328	5.6			L	VL				L		
R3 - Flat Roof	Rural	76,510	11.4										
	Urban	61,187	9.1										
	Total	137,697	20.5										
TOTAL HOUSES*		669,802											

Probable Maximum Precipitation at a Station of the district in 24 hrs is 400 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
 - Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
 - Category - C** : Reinforced building, well built wooden structures
 - Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
 - Category - R2** - Heavy Weight (Tiles, Stone/Slate)
 - Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : MH 05 State : MAHARASHTRA AKOLA

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
				Area in %				Area in %					
						18.3	81.7					100	
WALL													
A1 - Mud & Unburnt Brick Wall	Rural	134,193	28.8										
	Urban	44,697	9.6										
	Total	178,890	38.4			M	L				M		
A2 - Stone Wall not packed with mortar	Rural	6,591	1.4										
	Urban	3,462	0.7										
	Total	10,053	2.1			M	L				L		
Total - Category - A		188,943	40.6										
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	101,951	21.9										
	Urban	99,353	21.3										
	Total	201,304	43.2			L	VL				L		
Total - Category - B		201,304	43.2										
C1 - Concrete Wall	Rural	9,784	2.1										
	Urban	12,526	2.7										
	Total	22,310	4.8			VL	VL				VL		
C2 - Wood wall	Rural	982	0.2										
	Urban	1,119	0.2										
	Total	2,101	0.4			VL	VL				M		
Total - Category - C		24,411	5.2										
X - Other Materials	Rural	37,293	8.0										
	Urban	13,904	3.0										
	Total	51,197	11.0			VL	VL				M		
Total - Category - X		51,197	11.0										
TOTAL HOUSES*		465,855											
ROOF													
R1 - Light Weight Sloping Roof	Rural	136,104	29.2										
	Urban	53,551	11.5										
	Total	189,655	40.7			L	VL				H		
R2 - Heavy Weight Sloping Roof	Rural	104,770	22.5										
	Urban	29,716	6.4										
	Total	134,486	28.9			L	VL				L		
R3 - Flat Roof	Rural	49,920	10.7										
	Urban	91,794	19.7										
	Total	141,714	30.4										
TOTAL HOUSES*		465,855											

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 595 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
 - Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
 - Category - C** : Reinforced building, well built wooden structures
 - Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
 - Category - R2** - Heavy Weight (Tiles, Stone/Slate)
 - Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

**Distribution of Houses by Predominant Materials of Roof and Wall
and Level of Damage Risk**

Table No. : MH 08 State : MAHARASHTRA WARDHA

Wall / Roof	Census Houses		Level of Risk under								Flood Prone Area in %
	No. of Houses	%	EQ Zone				Wind Velocity m/s				
			V	IV	III	II	55 & 50	47	44 & 39	33	
			Area in %				Area in %				
WALL					.5	99.5				100	
A1 - Mud & Unburnt Brick Wall	Rural	109,973	30.6								
	Urban	19,624	5.5								
	Total	129,597	36.1		M	L			M		
A2 - Stone Wall not packed with mortar	Rural	6,054	1.7								
	Urban	1,733	0.5								
	Total	7,787	2.2		M	L			L		
Total - Category - A		137,384	38.2								
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	92,849	25.8								
	Urban	75,713	21.1								
	Total	168,562	46.9		L	VL			L		
Total - Category - B		168,562	46.9								
C1 - Concrete Wall	Rural	7,369	2.1								
	Urban	6,076	1.7								
	Total	13,445	3.8		VL	VL			VL		
C2 - Wood wall	Rural	1,251	0.3								
	Urban	428	0.1								
	Total	1,679	0.4		VL	VL			M		
Total - Category - C		15,124	4.2								
X - Other Materials	Rural	33,025	9.2								
	Urban	5,338	1.5								
	Total	38,363	10.7		VL	VL			M		
Total - Category - X		38,363	10.7								
TOTAL HOUSES*		359,433									
ROOF											
R1 - Light Weight Sloping Roof	Rural	88,288	24.6								
	Urban	23,640	6.6								
	Total	111,928	31.2		L	VL			H		
R2 - Heavy Weight Sloping Roof	Rural	109,079	30.3								
	Urban	19,264	5.4								
	Total	128,343	35.7		L	VL			L		
R3 - Flat Roof	Rural	53,154	14.8								
	Urban	66,008	18.4								
	Total	119,162	33.2								
TOTAL HOUSES*		359,433									

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 537 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

**Distribution of Houses by Predominant Materials of Roof and Wall
and Level of Damage Risk**

Table No. : MH 09 State : MAHARASHTRA NAGPUR

Wall / Roof	Census Houses		Level of Risk under								Flood Prone Area in %
	No. of Houses	%	EQ Zone				Wind Velocity m/s				
			V	IV	III	II	55 & 50	47	44 & 39	33	
			Area in %				Area in %				
WALL											
A1 - Mud & Unburnt Brick Wall	Rural	175,345	14.8								
	Urban	93,744	7.9								
	Total	269,089	22.7						L	M	
A2 - Stone Wall not packed with mortar	Rural	8,680	0.7								
	Urban	21,882	1.9								
	Total	30,562	2.6						L	L	
Total - Category - A		299,651	25.4								
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	153,563	13.0								
	Urban	556,523	47.1								
	Total	710,086	60.1						VL	L	
Total - Category - B		710,086	60.1								
C1 - Concrete Wall	Rural	13,962	1.2								
	Urban	79,029	6.7								
	Total	92,991	7.9						VL	VL	
C2 - Wood wall	Rural	2,464	0.2								
	Urban	8,876	0.8								
	Total	11,340	1.0						VL	M	
Total - Category - C		104,331	8.8								
X - Other Materials	Rural	36,129	3.1								
	Urban	31,380	2.7								
	Total	67,509	5.8						VL	M	
Total - Category - X		67,509	5.7								
TOTAL HOUSES*		1,181,577									
ROOF											
R1 - Light Weight Sloping Roof	Rural	59,690	5.1								
	Urban	129,872	11.0								
	Total	189,562	16.1						VL	H	
R2 - Heavy Weight Sloping Roof	Rural	213,971	18.1								
	Urban	159,990	13.5								
	Total	373,961	31.6						VL	L	
R3 - Flat Roof	Rural	116,482	9.9								
	Urban	501,572	42.4								
	Total	618,054	52.3								
TOTAL HOUSES*		1,181,577									

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 537 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : MH 12 State : MAHARASHTRA GADCHIROLI

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
						28.7	71.3				100	
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	127,538	41.1									
	Urban	6,478	2.1									
	Total	134,016	43.2			M	L			M		
A2 - Stone Wall not packed with mortar	Rural	5,803	1.9									
	Urban	1,434	0.5									
	Total	7,237	2.4			M	L			L		
Total - Category - A		141,253	45.6									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	81,987	26.5									
	Urban	21,302	6.9									
	Total	103,289	33.4			L	VL			L		
Total - Category - B		103,289	33.3									
C1 - Concrete Wall	Rural	2,285	0.7									
	Urban	1,780	0.6									
	Total	4,065	1.3			VL	VL			VL		
C2 - Wood wall	Rural	24,193	7.8									
	Urban	265	0.1									
	Total	24,458	7.9			VL	VL			M		
Total - Category - C		28,523	9.2									
X - Other Materials	Rural	35,579	11.5									
	Urban	1,317	0.4									
	Total	36,896	11.9			VL	VL			M		
Total - Category - X		36,896	11.9									
TOTAL HOUSES*		309,961										
ROOF												
R1 - Light Weight Sloping Roof	Rural	25,949	8.4									
	Urban	2,071	0.7									
	Total	28,020	9.1			L	VL			H		
R2 - Heavy Weight Sloping Roof	Rural	221,124	71.3									
	Urban	14,643	4.7									
	Total	235,767	76.0			L	VL			L		
R3 - Flat Roof	Rural	30,312	9.8									
	Urban	15,862	5.1									
	Total	46,174	14.9	<i>Damage Risk as per that for the Wall supporting it</i>								
TOTAL HOUSES*		309,961										

Probable Maximum Precipitation at a Station of the district in 24 hrs is 600 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
 - Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
 - Category - C** : Reinforced building, well built wooden structures
 - Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
 - Category - R2** - Heavy Weight (Tiles, Stone/Slate)
 - Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : MH 13 State : MAHARASHTRA CHANDRAPUR

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
						41.4	58.6				100	
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	188,209	29.8									
	Urban	38,182	6.0									
	Total	226,391	35.8			M	L			M		
A2 - Stone Wall not packed with mortar	Rural	10,289	1.6									
	Urban	6,717	1.1									
	Total	17,006	2.7			M	L			L		
Total - Category - A		243,397	38.5									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	165,449	26.2									
	Urban	134,099	21.2									
	Total	299,548	47.4			L	VL			L		
Total - Category - B		299,548	47.4									
C1 - Concrete Wall	Rural	6,599	1.0									
	Urban	20,971	3.3									
	Total	27,570	4.3			VL	VL			VL		
C2 - Wood wall	Rural	11,084	1.8									
	Urban	1,400	0.2									
	Total	12,484	2.0			VL	VL			M		
Total - Category - C		40,054	6.3									
X - Other Materials	Rural	42,395	6.7									
	Urban	6,707	1.1									
	Total	49,102	7.8			VL	VL			M		
Total - Category - X		49,102	7.8									
TOTAL HOUSES*		632,101										
ROOF												
R1 - Light Weight Sloping Roof	Rural	62,654	9.9									
	Urban	23,768	3.8									
	Total	86,422	13.7			L	VL			H		
R2 - Heavy Weight Sloping Roof	Rural	290,787	46.0									
	Urban	72,082	11.4									
	Total	362,869	57.4			L	VL			L		
R3 - Flat Roof	Rural	70,584	11.2									
	Urban	112,226	17.8									
	Total	182,810	29.0	<i>Damage Risk as per that for the Wall supporting it</i>								
TOTAL HOUSES*		632,101										

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 537 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
 - Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
 - Category - C** : Reinforced building, well built wooden structures
 - Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
 - Category - R2** - Heavy Weight (Tiles, Stone/Slate)
 - Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : MH 14 State : MAHARASHTRA YAVATMAL

Table No. : MH 15 State : MAHARASHTRA NANDED

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
					2.4	97.6					100	
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	229,568	30.4									
	Urban	24,164	3.2									
	Total	253,732	33.6			M	L				M	
A2 - Stone Wall not packed with mortar	Rural	13,649	1.8									
	Urban	2,769	0.4									
	Total	16,418	2.2			M	L				L	
Total - Category - A		270,150	35.8									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	206,788	27.4									
	Urban	91,501	12.1									
	Total	298,289	39.5			L	VL				L	
Total - Category - B		298,289	39.5									
C1 - Concrete Wall	Rural	16,513	2.2									
	Urban	14,187	1.9									
	Total	30,700	4.1			VL	VL				VL	
C2 - Wood wall	Rural	23,773	3.1									
	Urban	9,327	1.2									
	Total	33,100	4.3			VL	VL				M	
Total - Category - C		63,800	8.5									
X - Other Materials	Rural	110,474	14.6									
	Urban	12,050	1.6									
	Total	122,524	16.2			VL	VL				M	
Total - Category - X		122,524	16.2									
TOTAL HOUSES*		754,763										

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
				Area in %				Area in %					
												100	
WALL													
A1 - Mud & Unburnt Brick Wall	Rural	162,685	21.2										
	Urban	45,732	6.0										
	Total	208,417	27.2								L	M	
A2 - Stone Wall not packed with mortar	Rural	40,667	5.3										
	Urban	6,719	0.9										
	Total	47,386	6.2								L	L	
Total - Category - A		255,803	33.4										
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	244,266	31.9										
	Urban	125,417	16.4										
	Total	369,683	48.3								VL	L	
Total - Category - B		369,683	48.2										
C1 - Concrete Wall	Rural	18,663	2.4										
	Urban	17,181	2.2										
	Total	35,844	4.6								VL	VL	
C2 - Wood wall	Rural	16,783	2.2										
	Urban	1,689	0.2										
	Total	18,472	2.4								VL	M	
Total - Category - C		54,316	7.1										
X - Other Materials	Rural	75,720	9.9										
	Urban	10,843	1.4										
	Total	86,563	11.3								VL	M	
Total - Category - X		86,563	11.3										
TOTAL HOUSES*		766,365											

ROOF												
R1 - Light Weight Sloping Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
R2 - Heavy Weight Sloping Roof	Rural	430,546	57.0									
	Urban	64,805	8.6									
	Total	495,351	65.6			L	VL				H	
R3 - Flat Roof	Rural	111,645	14.8									
	Urban	12,387	1.6									
	Total	124,032	16.4			L	VL				L	
Total - Category - C		63,800	8.5									
<i>Damage Risk as per that for the Wall supporting it</i>												
TOTAL HOUSES*		754,763										

ROOF												
R1 - Light Weight Sloping Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
R2 - Heavy Weight Sloping Roof	Rural	350,319	45.7									
	Urban	88,762	11.6									
	Total	439,081	57.3								VL	H
R3 - Flat Roof	Rural	137,990	18.0									
	Urban	19,884	2.6									
	Total	157,874	20.6								VL	L
Total - Category - C		54,316	7.1									
<i>Damage Risk as per that for the Wall supporting it</i>												
TOTAL HOUSES*		766,365										

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 516 mm

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 426 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
- 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
- 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)

- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
- 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
- 3. Source of Housing Data : Census of Housing, GOI, 2011

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : MH 20 State : MAHARASHTRA NASHIK

Wall / Roof	Census Houses		Level of Risk under								Flood Prone Area in %
	No. of Houses	%	EQ Zone				Wind Velocity m/s				
			V	IV	III	II	55 & 50	47	44 & 39	33	
			Area in %				Area in %				
					100					100	
WALL											
A1 - Mud & Unburnt Brick Wall	Rural	279,196	19.3								
	Urban	87,164	6.0								
	Total	366,360	25.3			M				M	
A2 - Stone Wall not packed with mortar	Rural	28,158	1.9								
	Urban	11,668	0.8								
	Total	39,826	2.7			M				L	
Total - Category - A		406,186	28.0								
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	339,698	23.4								
	Urban	385,712	26.6								
	Total	725,410	50.0			L				L	
Total - Category - B		725,410	50.0								
C1 - Concrete Wall	Rural	48,304	3.3								
	Urban	86,179	5.9								
	Total	134,483	9.2			VL				VL	
C2 - Wood wall	Rural	7,291	0.5								
	Urban	33,292	2.3								
	Total	40,583	2.8			VL				M	
Total - Category - C		175,066	12.1								
X - Other Materials	Rural	100,583	6.9								
	Urban	43,087	3.0								
	Total	143,670	9.9			VL				M	
Total - Category - X		143,670	9.9								
TOTAL HOUSES*		1,450,332									
ROOF											
R1 - Light Weight Sloping Roof	Rural	448,544	30.9								
	Urban	248,563	17.1								
	Total	697,107	48.0			L				H	
R2 - Heavy Weight Sloping Roof	Rural	272,380	18.8								
	Urban	65,130	4.5								
	Total	337,510	23.3			L				L	
R3 - Flat Roof	Rural	82,306	5.7								
	Urban	333,409	23.0								
	Total	415,715	28.7								
TOTAL HOUSES*		1,450,332									

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 928 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
 - Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
 - Category - C** : Reinforced building, well built wooden structures
 - Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
 - Category - R2** - Heavy Weight (Tiles, Stone/Slate)
 - Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : MH 21 State : MAHARASHTRA THANE

Wall / Roof	Census Houses		Level of Risk under								Flood Prone Area in %
	No. of Houses	%	EQ Zone				Wind Velocity m/s				
			V	IV	III	II	55 & 50	47	44 & 39	33	
			Area in %				Area in %				
					100					100	
WALL											
A1 - Mud & Unburnt Brick Wall	Rural	100,055	3.3								
	Urban	65,106	2.1								
	Total	165,161	5.4			M				M	
A2 - Stone Wall not packed with mortar	Rural	9,801	0.3								
	Urban	41,082	1.3								
	Total	50,883	1.6			M				L	
Total - Category - A		216,044	7.1								
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	313,842	10.3								
	Urban	1,733,416	56.8								
	Total	2,047,258	67.1			L				L	
Total - Category - B		2,047,258	67.1								
C1 - Concrete Wall	Rural	42,835	1.4								
	Urban	479,790	15.7								
	Total	522,625	17.1			VL				VL	
C2 - Wood wall	Rural	5,665	0.2								
	Urban	9,899	0.3								
	Total	15,564	0.5			VL				M	
Total - Category - C		538,189	17.6								
X - Other Materials	Rural	148,755	4.9								
	Urban	100,294	3.3								
	Total	249,049	8.2			VL				M	
Total - Category - X		249,049	8.2								
TOTAL HOUSES*		3,050,540									
ROOF											
R1 - Light Weight Sloping Roof	Rural	208,961	6.8								
	Urban	741,367	24.3								
	Total	950,328	31.1			L				H	
R2 - Heavy Weight Sloping Roof	Rural	341,191	11.2								
	Urban	268,548	8.8								
	Total	609,739	20.0			L				L	
R3 - Flat Roof	Rural	70,801	2.3								
	Urban	1,419,672	46.5								
	Total	1,490,473	48.8								
TOTAL HOUSES*		3,050,540									

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 1066 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
 - Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
 - Category - C** : Reinforced building, well built wooden structures
 - Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2001

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
 - Category - R2** - Heavy Weight (Tiles, Stone/Slate)
 - Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : MH 26 State : MAHARASHTRA AHMADNAGAR

Table No. : MH 27 State : MAHARASHTRA BID

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
				Area in %				Area in %					
						97.2	2.8					100	
WALL													
A1 - Mud & Unburnt Brick Wall	Rural	175,537	14.8										
	Urban	27,991	2.4										
	Total	203,528	17.2			M	L				M		
A2 - Stone Wall not packed with mortar	Rural	48,388	4.1										
	Urban	6,652	0.6										
	Total	55,040	4.7			M	L				L		
Total - Category - A		258,568	21.9										
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	529,980	44.8										
	Urban	145,622	12.3										
	Total	675,602	57.1			L	VL				L		
Total - Category - B		675,602	57.1										
C1 - Concrete Wall	Rural	78,570	6.6										
	Urban	41,502	3.5										
	Total	120,072	10.1			VL	VL				VL		
C2 - Wood wall	Rural	8,820	0.7										
	Urban	2,160	0.2										
	Total	10,980	0.9			VL	VL				M		
Total - Category - C		131,052	11.1										
X - Other Materials	Rural	98,243	8.3										
	Urban	18,970	1.6										
	Total	117,213	9.9			VL	VL				M		
Total - Category - X		117,213	9.9										
TOTAL HOUSES*		1,182,435											

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
				Area in %				Area in %					
						50.7	49.3					100	
WALL													
A1 - Mud & Unburnt Brick Wall	Rural	109,134	17.0										
	Urban	14,272	2.2										
	Total	123,406	19.2			M	L				M		
A2 - Stone Wall not packed with mortar	Rural	36,441	5.7										
	Urban	3,397	0.5										
	Total	39,838	6.2			M	L				L		
Total - Category - A		163,244	25.4										
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	286,680	44.6										
	Urban	87,348	13.6										
	Total	374,028	58.2			L	VL				L		
Total - Category - B		374,028	58.2										
C1 - Concrete Wall	Rural	16,291	2.5										
	Urban	6,702	1.0										
	Total	22,993	3.5			VL	VL				VL		
C2 - Wood wall	Rural	4,298	0.7										
	Urban	946	0.1										
	Total	5,244	0.8			VL	VL				M		
Total - Category - C		28,237	4.4										
X - Other Materials	Rural	66,604	10.4										
	Urban	10,499	1.6										
	Total	77,103	12.0			VL	VL				M		
Total - Category - X		77,103	12.0										
TOTAL HOUSES*		642,612											

ROOF												
R1 - Light Weight Sloping Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
		Area in %				Area in %						
R1 - Light Weight Sloping Roof	Rural	691,366	58.5									
	Urban	109,611	9.3									
	Total	800,977	67.8			L	VL				H	
R2 - Heavy Weight Sloping Roof	Rural	112,905	9.5									
	Urban	13,406	1.1									
	Total	126,311	10.6			L	VL				L	
R3 - Flat Roof	Rural	135,267	11.4									
	Urban	119,880	10.1									
	Total	255,147	21.5									
<i>Damage Risk as per that for the Wall supporting it</i>												
TOTAL HOUSES*		1,182,435										

ROOF												
R1 - Light Weight Sloping Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
		Area in %				Area in %						
R1 - Light Weight Sloping Roof	Rural	433,568	67.5									
	Urban	61,545	9.6									
	Total	495,113	77.1			L	VL				H	
R2 - Heavy Weight Sloping Roof	Rural	23,732	3.7									
	Urban	5,702	0.9									
	Total	29,434	4.6			L	VL				L	
R3 - Flat Roof	Rural	62,148	9.7									
	Urban	55,917	8.7									
	Total	118,065	18.4									
<i>Damage Risk as per that for the Wall supporting it</i>												
TOTAL HOUSES*		642,612										

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 390 mm

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 410 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
- 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
- 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)

- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
- 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
- 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)

- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

**Distribution of Houses by Predominant Materials of Roof and Wall
and Level of Damage Risk**

Table No. : MH 28 State : MAHARASHTRA LATUR

Wall / Roof	Census Houses		Level of Risk under								Flood Prone Area in %
	No. of Houses	%	EQ Zone				Wind Velocity m/s				
			V	IV	III	II	55 & 50	47	44 & 39	33	
			Area in %				Area in %				
WALL					22.2	77.8				100	
A1 - Mud & Unburnt Brick Wall	Rural	58,447	10.7								
	Urban	14,411	2.6								
	Total	72,858	13.3		M	L			M		
A2 - Stone Wall not packed with mortar	Rural	33,990	6.2								
	Urban	5,566	1.0								
	Total	39,556	7.2		M	L			L		
Total - Category - A		112,414	20.5								
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	260,113	47.4								
	Urban	107,652	19.6								
	Total	367,765	67.0		L	VL			L		
Total - Category - B		367,765	67.1								
C1 - Concrete Wall	Rural	9,604	1.8								
	Urban	8,131	1.5								
	Total	17,735	3.3		VL	VL			VL		
C2 - Wood wall	Rural	4,125	0.8								
	Urban	763	0.1								
	Total	4,888	0.9		VL	VL			M		
Total - Category - C		22,623	4.1								
X - Other Materials	Rural	36,916	6.7								
	Urban	8,533	1.6								
	Total	45,449	8.3		VL	VL			M		
Total - Category - X		45,449	8.3								
TOTAL HOUSES*		548,251									
ROOF											
R1 - Light Weight Sloping Roof	Rural	301,008	54.9								
	Urban	54,137	9.9								
	Total	355,145	64.8		L	VL			H		
R2 - Heavy Weight Sloping Roof	Rural	24,845	4.5								
	Urban	6,913	1.3								
	Total	31,758	5.8		L	VL			L		
R3 - Flat Roof	Rural	77,342	14.1								
	Urban	84,006	15.3								
	Total	161,348	29.4								
TOTAL HOUSES*		548,251									

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. **418 mm**

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

**Distribution of Houses by Predominant Materials of Roof and Wall
and Level of Damage Risk**

Table No. : MH 29 State : MAHARASHTRA OSMANABAD

Wall / Roof	Census Houses		Level of Risk under								Flood Prone Area in %
	No. of Houses	%	EQ Zone				Wind Velocity m/s				
			V	IV	III	II	55 & 50	47	44 & 39	33	
			Area in %				Area in %				
WALL					85.9	14.1				100	
A1 - Mud & Unburnt Brick Wall	Rural	65,086	16.0								
	Urban	7,986	2.0								
	Total	73,072	18.0		M	L			M		
A2 - Stone Wall not packed with mortar	Rural	21,110	5.2								
	Urban	3,816	0.9								
	Total	24,926	6.1		M	L			L		
Total - Category - A		97,998	24.1								
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	190,420	46.8								
	Urban	43,295	10.6								
	Total	233,715	57.4		L	VL			L		
Total - Category - B		233,715	57.4								
C1 - Concrete Wall	Rural	15,659	3.8								
	Urban	4,299	1.1								
	Total	19,958	4.9		VL	VL			VL		
C2 - Wood wall	Rural	3,298	0.8								
	Urban	914	0.2								
	Total	4,212	1.0		VL	VL			M		
Total - Category - C		24,170	5.9								
X - Other Materials	Rural	42,429	10.4								
	Urban	8,957	2.2								
	Total	51,386	12.6		VL	VL			M		
Total - Category - X		51,386	12.6								
TOTAL HOUSES*		407,269									
ROOF											
R1 - Light Weight Sloping Roof	Rural	266,913	65.5								
	Urban	37,546	9.2								
	Total	304,459	74.7		L	VL			H		
R2 - Heavy Weight Sloping Roof	Rural	22,326	5.5								
	Urban	3,987	1.0								
	Total	26,313	6.5		L	VL			L		
R3 - Flat Roof	Rural	48,763	12.0								
	Urban	27,734	6.8								
	Total	76,497	18.8								
TOTAL HOUSES*		407,269									

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. **487 mm**

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : MH 30

State : MAHARASHTRA

SOLAPUR

Table No. : MH 31

State : MAHARASHTRA

SATARA

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %		
		No. of Houses	%	EQ Zone				Wind Velocity m/s						
				V	IV	III	II	55 & 50	47	44 & 39	33			
				Area in %				Area in %						
						93.7	6.3					74.2	25.8	
WALL														
A1 - Mud & Unburnt Brick Wall	Rural	62,602	6.0											
	Urban	36,430	3.5											
	Total	99,032	9.5			M	L					M	L	
A2 - Stone Wall not packed with mortar	Rural	54,475	5.3											
	Urban	11,030	1.1											
	Total	65,505	6.4			M	L					L	VL	
Total - Category - A		164,537	15.9											
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	415,588	40.1											
	Urban	204,549	19.8											
	Total	620,137	59.9				L	VL				L	VL	
Total - Category - B		620,137	59.9											
C1 - Concrete Wall	Rural	34,087	3.3											
	Urban	33,254	3.2											
	Total	67,341	6.5				VL	VL				VL	VL	
C2 - Wood wall	Rural	5,381	0.5											
	Urban	1,502	0.1											
	Total	6,883	0.6				VL	VL				M	L	
Total - Category - C		74,224	7.2											
X - Other Materials	Rural	127,145	12.3											
	Urban	49,170	4.7											
	Total	176,315	17.0				VL	VL				M	L	
Total - Category - X		176,315	17.0											
TOTAL HOUSES*		1,035,213												

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %			
		No. of Houses	%	EQ Zone				Wind Velocity m/s							
				V	IV	III	II	55 & 50	47	44 & 39	33				
				Area in %				Area in %							
						53.0	47.0							73.1	26.9
WALL															
A1 - Mud & Unburnt Brick Wall	Rural	107,762	12.9												
	Urban	14,850	1.8												
	Total	122,612	14.7			H	M							M	L
A2 - Stone Wall not packed with mortar	Rural	38,915	4.7												
	Urban	3,243	0.4												
	Total	42,158	5.1			H	M							L	VL
Total - Category - A		164,770	19.8												
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	390,248	46.9												
	Urban	91,534	11.0												
	Total	481,782	57.9				M	L						L	VL
Total - Category - B		481,782	57.9												
C1 - Concrete Wall	Rural	60,519	7.3												
	Urban	40,691	4.9												
	Total	101,210	12.2				L	VL						VL	VL
C2 - Wood wall	Rural	3,497	0.4												
	Urban	677	0.1												
	Total	4,174	0.5				L	VL						M	L
Total - Category - C		105,384	12.7												
X - Other Materials	Rural	66,741	8.0												
	Urban	14,007	1.7												
	Total	80,748	9.7				VL	VL						M	L
Total - Category - X		80,748	9.7												
TOTAL HOUSES*		832,684													

ROOF																
R1 - Light Weight Sloping Roof	Rural	553,977	53.5													
														Urban	182,779	17.7
R2 - Heavy Weight Sloping Roof	Rural	34,563	3.3													
	Urban	22,161	2.1													
	Total	56,724	5.4				L	VL				L	VL			
R3 - Flat Roof	Rural	110,738	10.7													
	Urban	130,995	12.7													
	Total	241,733	23.4													
TOTAL HOUSES*		1,035,213														

ROOF																
R1 - Light Weight Sloping Roof	Rural	420,701	50.5													
														Urban	76,499	9.2
R2 - Heavy Weight Sloping Roof	Rural	178,805	21.5													
	Urban	10,794	1.3													
	Total	189,599	22.8				M	L					L	VL		
R3 - Flat Roof	Rural	68,176	8.2													
	Urban	77,709	9.3													
	Total	145,885	17.5													
TOTAL HOUSES*		832,684														

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. **487 mm**

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. **551 mm**

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
- 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
- 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)

- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
- 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
- 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)

- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : MH 34 State : MAHARASHTRA KOLHAPUR

Table No. : MH 35 State : MAHARASHTRA SANGLI

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
				3.3	96.7					64.5	35.5	
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	211,236	20.0									
	Urban	43,125	4.1									
	Total	254,361	24.1		H	M				M	L	
A2 - Stone Wall not packed with mortar	Rural	36,492	3.5									
	Urban	12,912	1.2									
	Total	49,404	4.7		H	M				L	VL	
Total - Category - A		303,765	28.7									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	397,643	37.6									
	Urban	213,845	20.2									
	Total	611,488	57.8		M	L				L	VL	
Total - Category - B		611,488	57.9									
C1 - Concrete Wall	Rural	32,988	3.1									
	Urban	54,601	5.2									
	Total	87,589	8.3		L	VL				VL	VL	
C2 - Wood wall	Rural	5,456	0.5									
	Urban	2,452	0.2									
	Total	7,908	0.7		L	VL				M	L	
Total - Category - C		95,497	9.0									
X - Other Materials	Rural	33,620	3.2									
	Urban	12,498	1.2									
	Total	46,118	4.4		VL	VL				M	L	
Total - Category - X		46,118	4.4									
TOTAL HOUSES*		1,056,868										

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
				Area in %				Area in %					
				5.0	95.0							9.9	90.1
WALL													
A1 - Mud & Unburnt Brick Wall	Rural	74,158	9.9										
	Urban	18,885	2.5										
	Total	93,043	12.4		H	M					M	L	
A2 - Stone Wall not packed with mortar	Rural	41,619	5.5										
	Urban	6,915	0.9										
	Total	48,534	6.4		H	M					L	VL	
Total - Category - A		141,577	18.8										
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	337,713	44.9										
	Urban	115,239	15.3										
	Total	452,952	60.2		M	L					L	VL	
Total - Category - B		452,952	60.2										
C1 - Concrete Wall	Rural	41,244	5.5										
	Urban	31,874	4.2										
	Total	73,118	9.7		L	VL					VL	VL	
C2 - Wood wall	Rural	5,652	0.8										
	Urban	2,205	0.3										
	Total	7,857	1.1		L	VL					M	L	
Total - Category - C		80,975	10.8										
X - Other Materials	Rural	56,269	7.5										
	Urban	20,078	2.7										
	Total	76,347	10.2		VL	VL					M	L	
Total - Category - X		76,347	10.2										
TOTAL HOUSES*		751,851											

ROOF												
R1 - Light Weight Sloping Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
R1 - Light Weight Sloping Roof	Rural	107,704	10.2									
	Urban	67,369	6.4									
	Total	175,073	16.6		M	L					H	M
R2 - Heavy Weight Sloping Roof	Rural	527,623	49.9									
	Urban	121,734	11.5									
	Total	649,357	61.4		M	L					L	VL
R3 - Flat Roof	Rural	82,108	7.8									
	Urban	150,330	14.2									
	Total	232,438	22.0									
TOTAL HOUSES*		1,056,868										

ROOF												
R1 - Light Weight Sloping Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
R1 - Light Weight Sloping Roof	Rural	251,687	33.5									
	Urban	61,640	8.2									
	Total	313,327	41.7		M	L					H	M
R2 - Heavy Weight Sloping Roof	Rural	227,087	30.2									
	Urban	51,711	6.9									
	Total	278,798	37.1		M	L					L	VL
R3 - Flat Roof	Rural	77,881	10.4									
	Urban	81,845	10.9									
	Total	159,726	21.3									
TOTAL HOUSES*		751,851										

Probable Maximum Precipitation at a Station of the district in 24 hrs is 520 mm

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 575 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
- 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
- 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)

- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

Housing Category : Wall Types

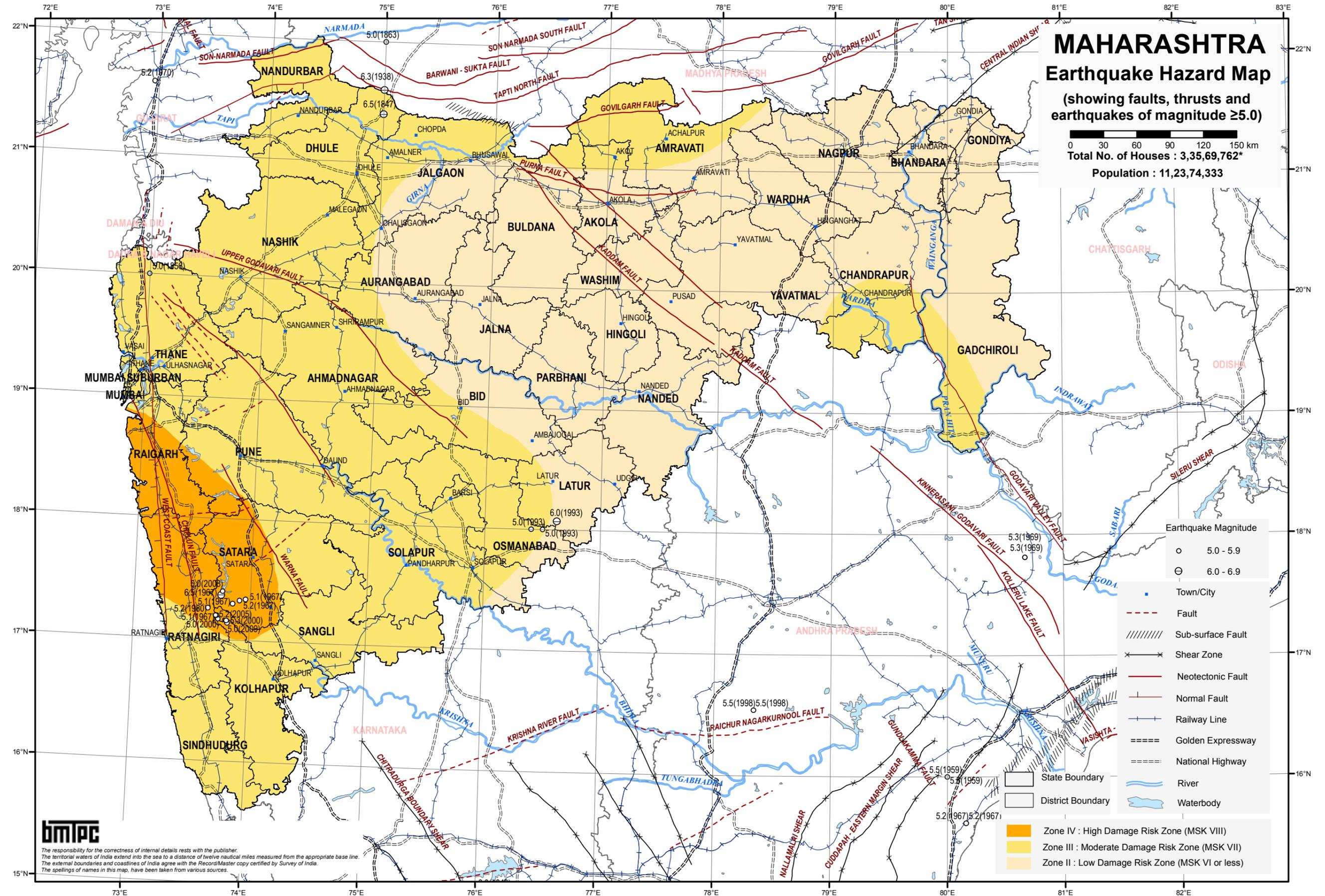
- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
- 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
- 3. Source of Housing Data : Census of Housing, GOI, 2011

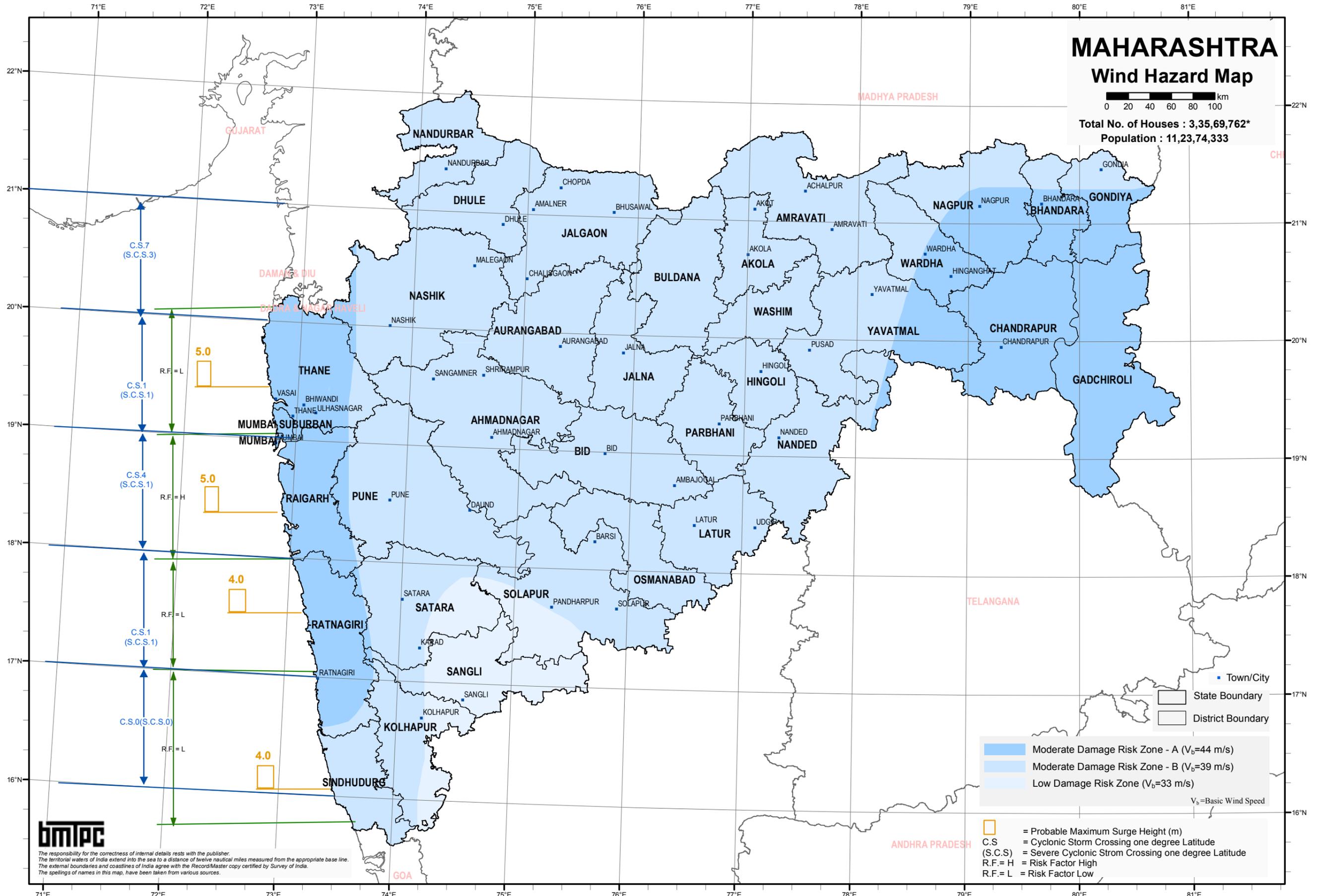
Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)

- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses



BMTPC : Vulnerability Atlas - 3rd Edition : Peer Group, MoHUA, GOI; Map is Based on digitised data of SOI; Seismic Zones of India Map IS: 1893 (Part I): 2002, BIS; Earthquake Epicentre from IMD; Seismotectonic Atlas of India and its Environs, GSI; Houses/Population as per Census 2011; *Houses including vacant & locked houses. Disclaimer: The maps are solely for thematic presentation.



MAHARASHTRA Wind Hazard Map

0 20 40 60 80 100 km

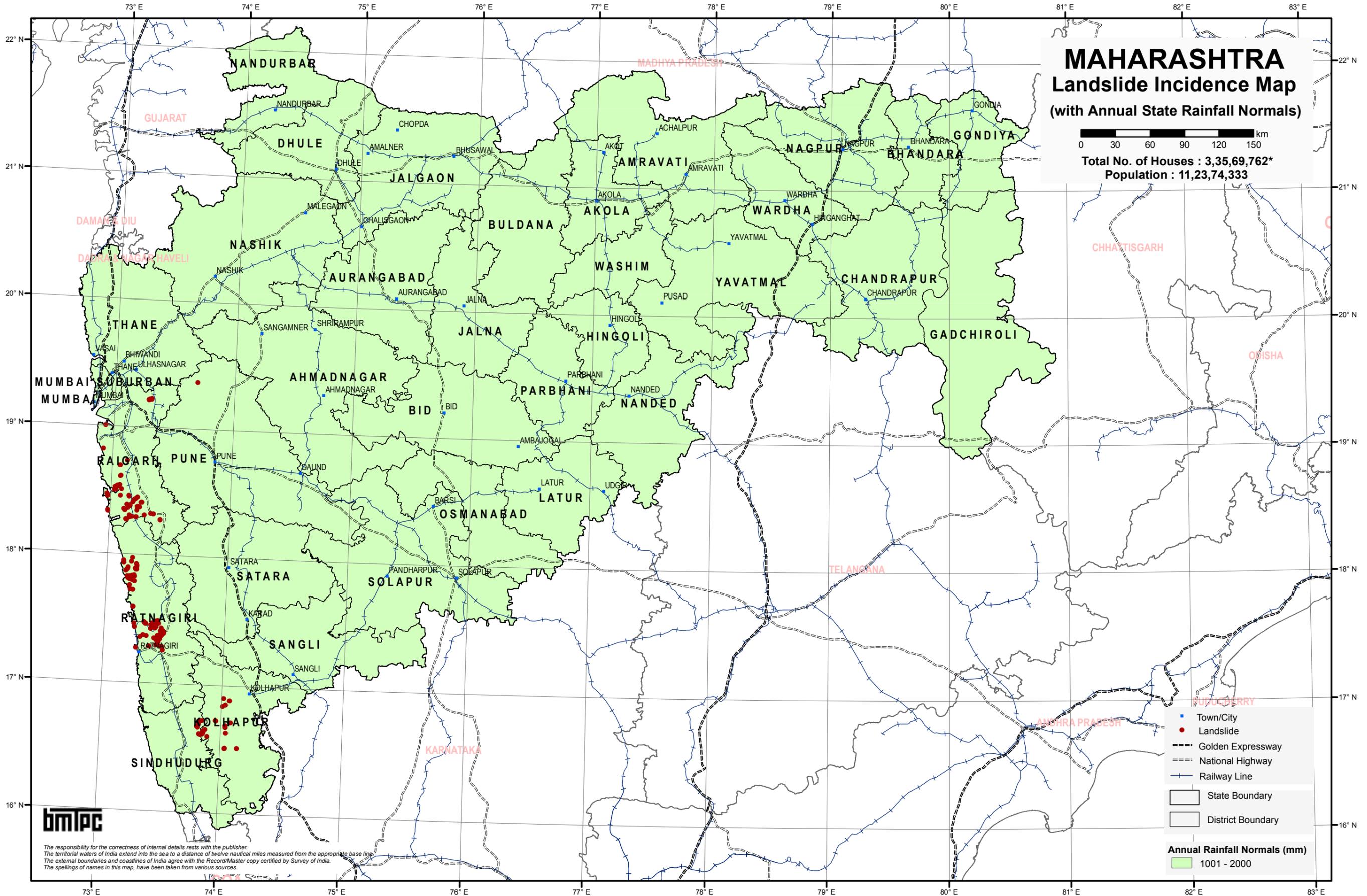
Total No. of Houses : 3,35,69,762*
Population : 11,23,74,333

Moderate Damage Risk Zone - A ($V_b=44$ m/s)
 Moderate Damage Risk Zone - B ($V_b=39$ m/s)
 Low Damage Risk Zone ($V_b=33$ m/s)
 V_b = Basic Wind Speed

= Probable Maximum Surge Height (m)
 C.S = Cyclonic Storm Crossing one degree Latitude
 (S.C.S) = Severe Cyclonic Storm Crossing one degree Latitude
 R.F. = H = Risk Factor High
 R.F. = L = Risk Factor Low



The responsibility for the correctness of internal details rests with the publisher.
The territorial waters of India extend into the sea to a distance of twelve nautical miles measured from the appropriate base line.
The external boundaries and coastlines of India agree with the Record/Master copy certified by Survey of India.
The spellings of names in this map, have been taken from various sources.



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The spellings of names in this map, have been taken from various sources.

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

MANIPUR

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
STATE - MANIPUR				100						34.0		66.0	1.8
WALL													
A1 - Mud & Unburnt Brick Wall	Rural	210,319	35.0										
	Urban	101,919	17.0										
	Total	312,238	52.0							VH		M	VH
A2 - Stone Wall not packed with mortar	Rural	2,338	0.4										
	Urban	2,357	0.4										
	Total	4,695	0.8							VH		L	VH
Total - Category - A		316,933	52.8										
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	26,307	4.4										
	Urban	54,944	9.1										
	Total	81,251	13.5							H		L	H/M
Total - Category - B		81,251	13.5										
C1 - Concrete Wall	Rural	1,421	0.2										
	Urban	4,548	0.8										
	Total	5,969	1.0							M		L	L/VL
C2 - Wood wall	Rural	49,875	8.3										
	Urban	12,825	2.1										
	Total	62,700	10.4							M		VH	M
Total - Category - C		68,669	11.4										
X - Other Materials	Rural	103,451	17.2										
	Urban	30,331	5.0										
	Total	133,782	22.2							M		VH	M
Total - Category - X		133,782	22.3										
TOTAL HOUSES*		600,635											

ROOF													
R1 - Light Weight Sloping Roof	Rural	377,822	62.9										
	Urban	172,386	28.7										
	Total	550,208	91.6							M		VH	H
R2 - Heavy Weight Sloping Roof	Rural	8,659	1.4										
	Urban	9,012	1.5										
	Total	17,671	2.9							H		H	L
R3 - Flat Roof	Rural	7,230	1.2										
	Urban	25,526	4.2										
	Total	32,756	5.4										
TOTAL HOUSES*		600,635											

Housing Category : Wall Types

Category - A : Buildings in field-stone, rural structures, unburnt brick houses, clay houses

Category - B : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone

Category - C : Reinforced building, well built wooden structures

Category - X : Other materials not covered in A,B,C. These are generally light.

Notes : 1. Flood prone area includes that protected area which may have more severe

damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.

2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building

3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

Category - R1 - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene,

GI Metal, Asbestos Sheets, Other Materials)

Category - R2 - Heavy Weight (Tiles, Stone/Slate)

Category - R3 - Flat Roof (Brick, Concrete)

EQ Zone V : Very High Damage Risk Zone (MSK > IX)

EQ Zone IV : High Damage Risk Zone (MSK VIII)

EQ Zone III : Moderate Damage Risk Zone (MSK VII)

EQ Zone II : Low Damage Risk Zone (MSK < VI)

Level of Risk : VH = Very High; H = High;

M = Moderate; L = Low; VL = Very Low

* Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : MN 01

State : MANIPUR

SENAPATI

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area			
		No. of Houses	%	EQ Zone				Wind Velocity m/s							
				V	IV	III	II	55 & 50	47	44 & 39	33				
STATE - MANIPUR				100								.6		99.4	.0
WALL															
A1 - Mud & Unburnt Brick Wall	Rural	23,813	60.2												
	Urban	696	1.8												
	Total	24,509	62.0							VH			VH	M	VH
A2 - Stone Wall not packed with mortar	Rural	1,139	2.9												
	Urban	10	-												
	Total	1,149	2.9							VH			H	L	VH
Total - Category - A		25,658	64.9												
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	1,547	3.9												
	Urban	430	1.1												
	Total	1,977	5.0							H			H	L	H/M
Total - Category - B		1,977	5.0												
C1 - Concrete Wall	Rural	44	0.1												
	Urban	17	-												
	Total	61	0.1							M			L	VL	L/VL
C2 - Wood wall	Rural	2,905	7.3												
	Urban	409	1.0												
	Total	3,314	8.3							M			VH	M	H
Total - Category - C		3,375	8.5												
X - Other Materials	Rural	8,289	21.0												
	Urban	228	0.6												
	Total	8,517	21.6							M			VH	M	VH
Total - Category - X		8,517	21.5												
TOTAL HOUSES*		39,527													

ROOF													
R1 - Light Weight Sloping Roof	Rural	36,747	93.0										
	Urban	1,599	4.0										
	Total	38,346	97.0							M		VH	H
R2 - Heavy Weight Sloping Roof	Rural	705	1.8										
	Urban	10	-										
	Total	715	1.8							H		H	L
R3 - Flat Roof	Rural	285	0.7										
	Urban	181	0.5										
	Total	466	1.2										
TOTAL HOUSES*		39,527											

Probable Maximum Precipitation at a Station of the district in 24 hrs is 480 mm

Housing Category : Wall Types

Category - A : Buildings in field-stone, rural structures, unburnt brick houses, clay houses

Category - B : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone

Category - C : Reinforced building, well built wooden structures

Category - X : Other materials not covered in A,B,C. These are generally light.

Notes : 1. Flood prone area includes that protected area which may have more severe

damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.

2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building

3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

Category - R1 - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene,

GI Metal, Asbestos Sheets, Other Materials)

Category - R2 - Heavy Weight (Tiles, Stone/Slate)

Category - R3 - Flat Roof (Brick, Concrete)

EQ Zone V : Very High Damage Risk Zone (MSK > IX)

EQ Zone IV : High Damage Risk Zone (MSK VIII)

EQ Zone III : Moderate Damage Risk Zone (MSK VII)

EQ Zone II : Low Damage Risk Zone (MSK < VI)

Level of Risk : VH = Very High; H = High;

M = Moderate; L = Low; VL = Very Low

* Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : MN 02 State : MANIPUR TAMENGLONG

Wall / Roof		Census Houses		Level of Risk under								Flood Pron e Area
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
Area in %				Area in %								
				100				81.0		19.0		
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	7,474	27.0									
	Urban	1,197	4.3									
	Total	8,671	31.3	VH				VH		M		
A2 - Stone Wall not packed with mortar	Rural	31	0.1									
	Urban	17	0.1									
	Total	48	0.2	VH				H		L		
Total - Category - A		8,719	31.5									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	450	1.6									
	Urban	599	2.2									
	Total	1,049	3.8	H				H		L		
Total - Category - B		1,049	3.8									
C1 - Concrete Wall	Rural	32	0.1									
	Urban	46	0.2									
	Total	78	0.3	M				L		VL		
C2 - Wood wall	Rural	3,351	12.1									
	Urban	1,117	4.0									
	Total	4,468	16.1	M				VH		M		
Total - Category - C		4,546	16.4									
X - Other Materials	Rural	12,446	44.9									
	Urban	953	3.4									
	Total	13,399	48.3	M				VH		M		
Total - Category - X		13,399	48.3									
TOTAL HOUSES*		27,713										

ROOF												
R1 - Light Weight Sloping Roof	Rural	23,227	83.8									
	Urban	3,586	12.9									
	Total	26,813	96.7	M				VH		H		
R2 - Heavy Weight Sloping Roof	Rural	433	1.6									
	Urban	184	0.7									
	Total	617	2.3	H				H		L		
R3 - Flat Roof	Rural	124	0.4									
	Urban	159	0.6									
	Total	283	1.0									
<i>Damage Risk as per that for the Wall supporting it</i>												
TOTAL HOUSES*		27,713										

Probable Maximum Precipitation at a Station of the district in 24 hrs is 760 mm

Housing Category : Wall Types

- Category - A :** Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B :** Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C :** Reinforced building, well built wooden structures
- Category - X :** Other materials not covered in A,B,C. These are generally light.

- Notes :** 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
- 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
- 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1 -** Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2 -** Heavy Weight (Tiles, Stone/Slate)
- Category - R3 -** Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low

* Total No. of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : MN 03 State : MANIPUR CHURACHANDPUR

Wall / Roof		Census Houses		Level of Risk under								Flood Pron e Area
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
Area in %				Area in %								
				100				84.2		15.8		
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	21,579	37.9									
	Urban	1,654	2.9									
	Total	23,233	40.8	VH				VH		M		
A2 - Stone Wall not packed with mortar	Rural	150	0.3									
	Urban	40	0.1									
	Total	190	0.4	VH				H		L		
Total - Category - A		23,423	41.1									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	4,219	7.4									
	Urban	1,431	2.5									
	Total	5,650	9.9	H				H		L		
Total - Category - B		5,650	9.9									
C1 - Concrete Wall	Rural	737	1.3									
	Urban	393	0.7									
	Total	1,130	2.0	M				L		VL		
C2 - Wood wall	Rural	7,593	13.3									
	Urban	736	1.3									
	Total	8,329	14.6	M				VH		M		
Total - Category - C		9,459	16.6									
X - Other Materials	Rural	17,995	31.6									
	Urban	428	0.8									
	Total	18,423	32.4	M				VH		M		
Total - Category - X		18,423	32.3									
TOTAL HOUSES*		56,955										

ROOF												
R1 - Light Weight Sloping Roof	Rural	49,227	86.4									
	Urban	3,532	6.2									
	Total	52,759	92.6	M				VH		H		
R2 - Heavy Weight Sloping Roof	Rural	1,560	2.7									
	Urban	305	0.5									
	Total	1,865	3.2	H				H		L		
R3 - Flat Roof	Rural	1,486	2.6									
	Urban	845	1.5									
	Total	2,331	4.1									
<i>Damage Risk as per that for the Wall supporting it</i>												
TOTAL HOUSES*		56,955										

Probable Maximum Precipitation at a Station of the district in 24 hrs is 480 mm

Housing Category : Wall Types

- Category - A :** Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B :** Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C :** Reinforced building, well built wooden structures
- Category - X :** Other materials not covered in A,B,C. These are generally light.

- Notes :** 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
- 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
- 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1 -** Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2 -** Heavy Weight (Tiles, Stone/Slate)
- Category - R3 -** Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low

* Total No. of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : MN 04 State : MANIPUR BISHNUPUR

Wall / Roof		Census Houses		Level of Risk under								Flood Pron e Area
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
		100								100		8.7
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	25,094	45.2									
	Urban	13,113	23.6									
	Total	38,207	68.8	VH						M		VH
A2 - Stone Wall not packed with mortar	Rural	118	0.2									
	Urban	152	0.3									
	Total	270	0.5	VH						L		VH
Total - Category - A		38,477	69.4									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	1,759	3.2									
	Urban	3,080	5.6									
	Total	4,839	8.8	H						L		H/M
Total - Category - B		4,839	8.7									
C1 - Concrete Wall	Rural	47	0.1									
	Urban	85	0.2									
	Total	132	0.3	M						VL		L/VL
C2 - Wood wall	Rural	223	0.4									
	Urban	310	0.6									
	Total	533	1.0	M						M		H
Total - Category - C		665	1.2									
X - Other Materials	Rural	7,409	13.4									
	Urban	4,077	7.4									
	Total	11,486	20.8	M						M		VH
Total - Category - X		11,486	20.7									
TOTAL HOUSES*		55,467										

ROOF												
R1 - Light Weight Sloping Roof	Rural	32,937	59.4									
	Urban	19,279	34.8									
	Total	52,216	94.2	M						H		VH
R2 - Heavy Weight Sloping Roof	Rural	1,286	2.3									
	Urban	436	0.8									
	Total	1,722	3.1	H						L		H
R3 - Flat Roof	Rural	427	0.8									
	Urban	1,102	2.0									
	Total	1,529	2.8									Damage Risk as per that for the Wall supporting it
TOTAL HOUSES*		55,467										

Probable Maximum Precipitation at a Station of the district in 24 hrs is 480 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)

- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
 Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low

* Total No.of Houses excluding Vacant/Locked Houses

Table No. : MN 05 State : MANIPUR THOUBAL

Wall / Roof		Census Houses		Level of Risk under								Flood Pron e Area
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
		100								100		24.0
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	44,547	43.3									
	Urban	26,497	25.7									
	Total	71,044	69.0	VH						M		VH
A2 - Stone Wall not packed with mortar	Rural	182	0.2									
	Urban	241	0.2									
	Total	423	0.4	VH						L		VH
Total - Category - A		71,467	69.4									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	3,629	3.5									
	Urban	4,492	4.4									
	Total	8,121	7.9	H						L		H/M
Total - Category - B		8,121	7.9									
C1 - Concrete Wall	Rural	75	0.1									
	Urban	85	0.1									
	Total	160	0.2	M						VL		L/VL
C2 - Wood wall	Rural	452	0.4									
	Urban	464	0.5									
	Total	916	0.9	M						M		H
Total - Category - C		1,076	1.0									
X - Other Materials	Rural	16,489	16.0									
	Urban	5,833	5.7									
	Total	22,322	21.7	M						M		VH
Total - Category - X		22,322	21.7									
TOTAL HOUSES*		102,986										

ROOF												
R1 - Light Weight Sloping Roof	Rural	63,846	62.0									
	Urban	35,239	34.2									
	Total	99,085	96.2	M						H		VH
R2 - Heavy Weight Sloping Roof	Rural	969	0.9									
	Urban	868	0.8									
	Total	1,837	1.7	H						L		H
R3 - Flat Roof	Rural	559	0.5									
	Urban	1,505	1.5									
	Total	2,064	2.0									Damage Risk as per that for the Wall supporting it
TOTAL HOUSES*		102,986										

Probable Maximum Precipitation at a Station of the district in 24 hrs is 280 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)

- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
 Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low

* Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : MN 06 State : MANIPUR IMPHAL WEST

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
				100						100		9.1
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	30,816	23.0									
	Urban	36,693	27.3									
	Total	67,509	50.3	VH						M		VH
A2 - Stone Wall not packed with mortar	Rural	274	0.2									
	Urban	1,054	0.8									
	Total	1,328	1.0	VH						L		VH
Total - Category - A		68,837	51.3									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	7,026	5.2									
	Urban	31,005	23.1									
	Total	38,031	28.3	H						L		H/M
Total - Category - B		38,031	28.3									
C1 - Concrete Wall	Rural	213	0.2									
	Urban	2,593	1.9									
	Total	2,806	2.1	M						VL		L/VL
C2 - Wood wall	Rural	755	0.6									
	Urban	1,699	1.3									
	Total	2,454	1.9	M						M		H
Total - Category - C		5,260	3.9									
X - Other Materials	Rural	11,298	8.4									
	Urban	10,812	8.1									
	Total	22,110	16.5	M						M		VH
Total - Category - X		22,110	16.5									
TOTAL HOUSES*		134,238										

ROOF												
R1 - Light Weight Sloping Roof	Rural	46,749	34.8									
	Urban	64,085	47.7									
	Total	110,834	82.5	M						H		VH
R2 - Heavy Weight Sloping Roof	Rural	1,450	1.1									
	Urban	4,711	3.5									
	Total	6,161	4.6	H						L		H
R3 - Flat Roof	Rural	2,183	1.6									
	Urban	15,060	11.2									
	Total	17,243	12.8									
TOTAL HOUSES*		134,238										

Probable Maximum Precipitation at a Station of the district in 24 hrs is 360 mm

Housing Category : Wall Types

- Category - A :** Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B :** Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C :** Reinforced building, well built wooden structures
- Category - X :** Other materials not covered in A,B,C. These are generally light.

- Notes :** 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
- 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
- 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1 -** Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2 -** Heavy Weight (Tiles, Stone/Slate)
- Category - R3 -** Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low

* Total No. of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : MN 07 State : MANIPUR IMPHAL EAST

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area		
		No. of Houses	%	EQ Zone				Wind Velocity m/s						
				V	IV	III	II	55 & 50	47	44 & 39	33			
				Area in %				Area in %						
				100						29.1		70.9		14.5
WALL														
A1 - Mud & Unburnt Brick Wall	Rural	36,716	33.8											
	Urban	21,367	19.7											
	Total	58,083	53.5	VH						VH		M		VH
A2 - Stone Wall not packed with mortar	Rural	376	0.3											
	Urban	819	0.8											
	Total	1,195	1.1	VH						H		L		VH
Total - Category - A		59,278	54.6											
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	5,780	5.3											
	Urban	12,907	11.9											
	Total	18,687	17.2	H						H		L		H/M
Total - Category - B		18,687	17.2											
C1 - Concrete Wall	Rural	145	0.1											
	Urban	1,185	1.1											
	Total	1,330	1.2	M						L		VL		L/VL
C2 - Wood wall	Rural	531	0.5											
	Urban	1,497	1.4											
	Total	2,028	1.9	M						VH		M		H
Total - Category - C		3,358	3.1											
X - Other Materials	Rural	20,058	18.5											
	Urban	7,211	6.6											
	Total	27,269	25.1	M						VH		M		VH
Total - Category - X		27,269	25.1											
TOTAL HOUSES*		108,592												

ROOF												
R1 - Light Weight Sloping Roof	Rural	60,447	55.7									
	Urban	36,391	33.5									
	Total	96,838	89.2	M						VH		H
R2 - Heavy Weight Sloping Roof	Rural	1,377	1.3									
	Urban	2,341	2.2									
	Total	3,718	3.5	H						H		L
R3 - Flat Roof	Rural	1,782	1.6									
	Urban	6,254	5.8									
	Total	8,036	7.4									
TOTAL HOUSES*		108,592										

Probable Maximum Precipitation at a Station of the district in 24 hrs is 440 mm

Housing Category : Wall Types

- Category - A :** Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B :** Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C :** Reinforced building, well built wooden structures
- Category - X :** Other materials not covered in A,B,C. These are generally light.

- Notes :** 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
- 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
- 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1 -** Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2 -** Heavy Weight (Tiles, Stone/Slate)
- Category - R3 -** Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low

* Total No. of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : MN 08 State : MANIPUR UKHRUL

Wall / Roof		Census Houses		Level of Risk under								Flood Pron e Area
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
		100								100		
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	5,495	13.3									
	Urban	133	0.3									
	Total	5,628	13.6	VH						M		
A2 - Stone Wall not packed with mortar	Rural	40	0.1									
	Urban	12	-									
	Total	52	0.1	VH						L		
Total - Category - A		5,680	13.8									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	1,002	2.4									
	Urban	603	1.5									
	Total	1,605	3.9	H						L		
Total - Category - B		1,605	3.9									
C1 - Concrete Wall	Rural	92	0.2									
	Urban	98	0.2									
	Total	190	0.4	M						VL		
C2 - Wood wall	Rural	25,903	62.8									
	Urban	4,562	11.1									
	Total	30,465	73.9	M						M		
Total - Category - C		30,655	74.3									
X - Other Materials	Rural	3,158	7.7									
	Urban	160	0.4									
	Total	3,318	8.1	M						M		
Total - Category - X		3,318	8.0									
TOTAL HOUSES*		41,258										

ROOF											
R1 - Light Weight Sloping Roof	Rural	35,122	85.1								
	Urban	5,217	12.6								
	Total	40,339	97.7	M						H	
R2 - Heavy Weight Sloping Roof	Rural	362	0.9								
	Urban	66	0.2								
	Total	428	1.1	H						L	
R3 - Flat Roof	Rural	206	0.5								
	Urban	285	0.7								
	Total	491	1.2							Damage Risk as per that for the Wall supporting it	
TOTAL HOUSES*		41,258									

Probable Maximum Precipitation at a Station of the district in 24 hrs is 320 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
- 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
- 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)

- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low

* Total No.of Houses excluding Vacant/Locked Houses

Table No. : MN 09 State : MANIPUR CHANDEL

Wall / Roof		Census Houses		Level of Risk under								Flood Pron e Area
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
		100								100		
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	14,785	43.6									
	Urban	569	1.7									
	Total	15,354	45.3	VH						M	VH	
A2 - Stone Wall not packed with mortar	Rural	28	0.1									
	Urban	12	-									
	Total	40	0.1	VH						L	VH	
Total - Category - A		15,394	45.4									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	895	2.6									
	Urban	397	1.2									
	Total	1,292	3.8	H						L	H/M	
Total - Category - B		1,292	3.8									
C1 - Concrete Wall	Rural	36	0.1									
	Urban	46	0.1									
	Total	82	0.2	M						VL	L/VL	
C2 - Wood wall	Rural	8,162	24.1									
	Urban	2,031	6.0									
	Total	10,193	30.1	M						M	H	
Total - Category - C		10,275	30.3									
X - Other Materials	Rural	6,309	18.6									
	Urban	629	1.9									
	Total	6,938	20.5	M						M	VH	
Total - Category - X		6,938	20.5									
TOTAL HOUSES*		33,899										

ROOF											
R1 - Light Weight Sloping Roof	Rural	29,520	87.1								
	Urban	3,458	10.2								
	Total	32,978	97.3	M						H	VH
R2 - Heavy Weight Sloping Roof	Rural	517	1.5								
	Urban	91	0.3								
	Total	608	1.8	H						L	H
R3 - Flat Roof	Rural	178	0.5								
	Urban	135	0.4								
	Total	313	0.9							Damage Risk as per that for the Wall supporting it	
TOTAL HOUSES*		33,899									

Probable Maximum Precipitation at a Station of the district in 24 hrs is 480 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

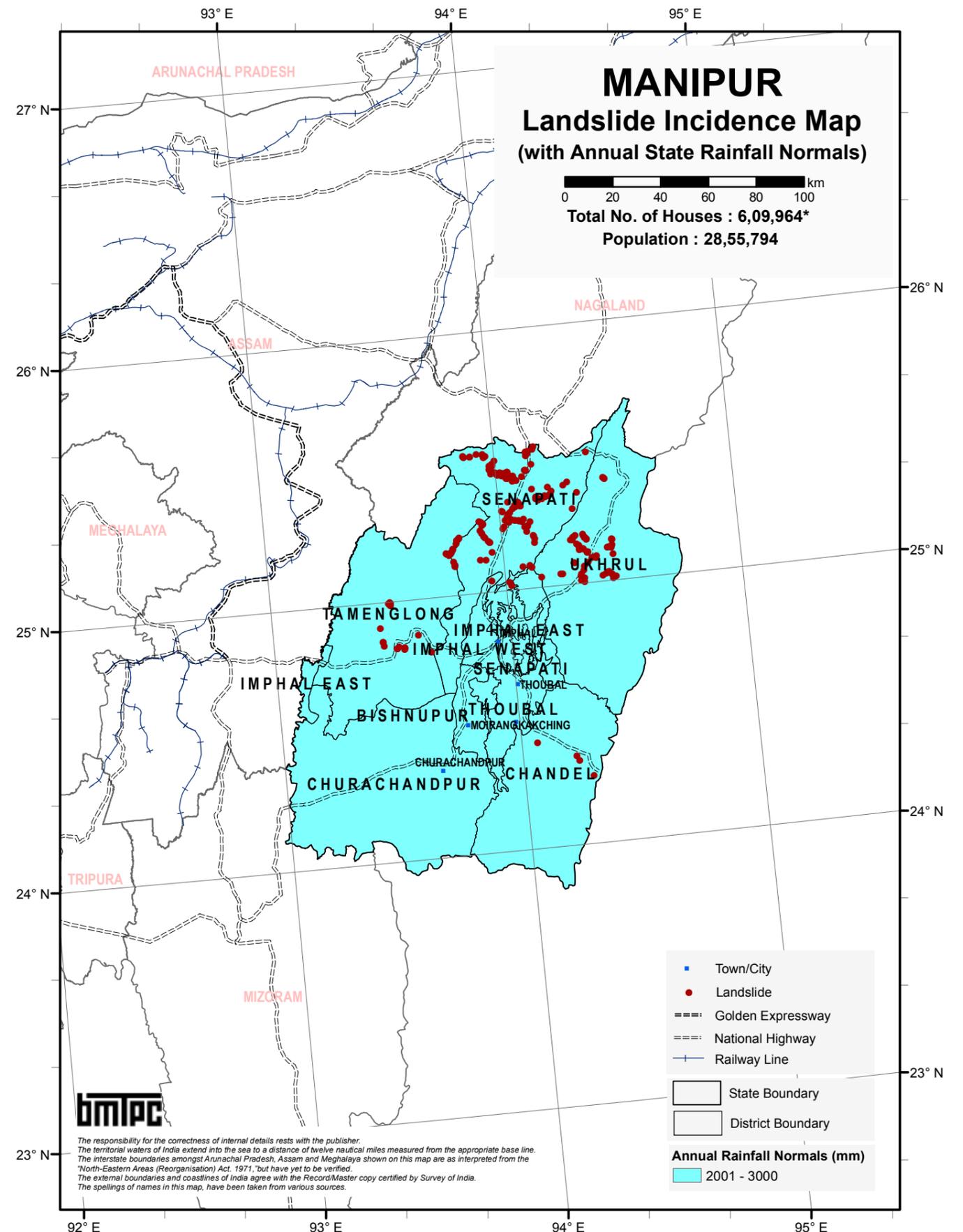
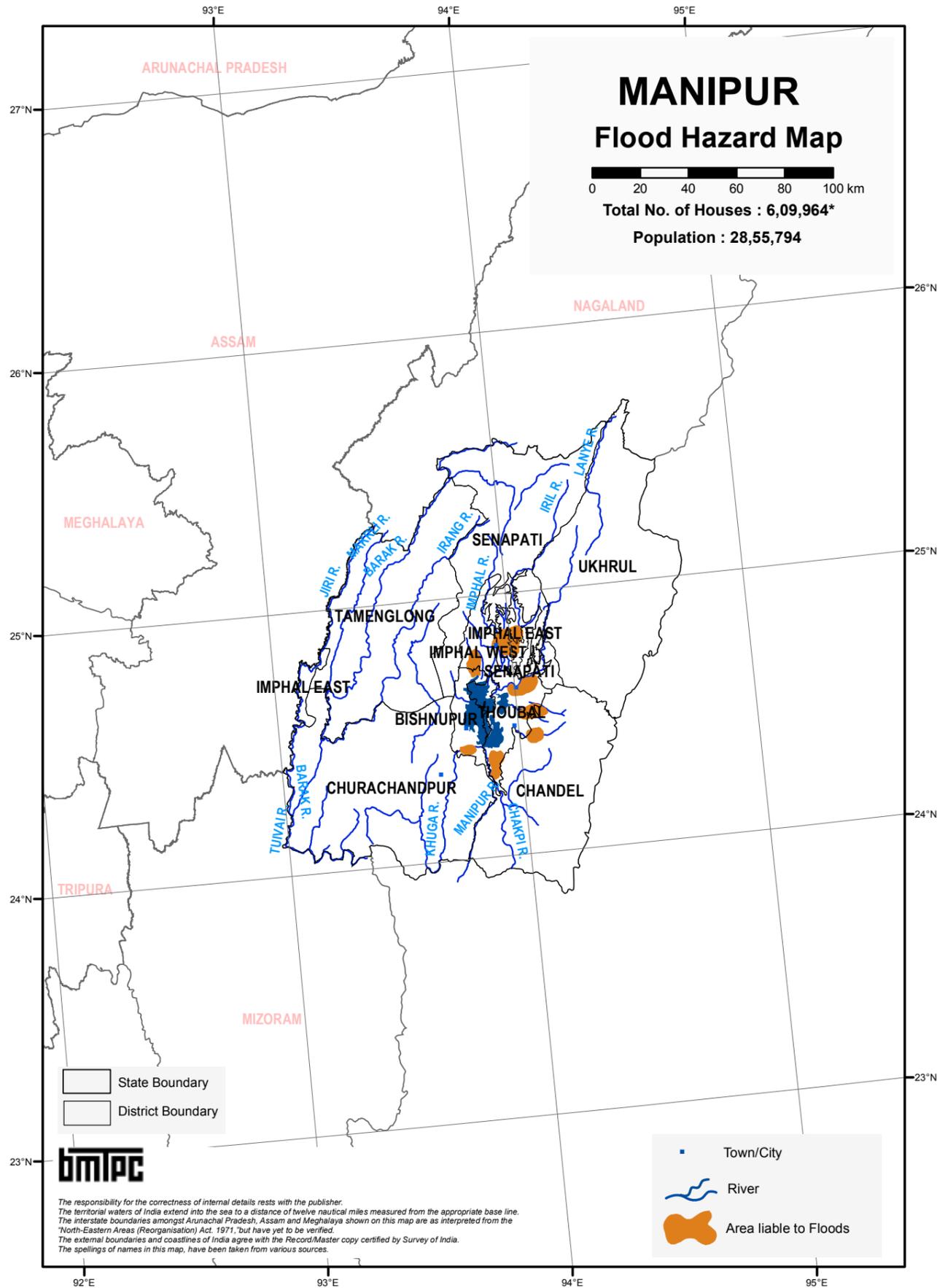
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
- 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
- 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)

- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low

* Total No.of Houses excluding Vacant/Locked Houses



BMTPC : Vulnerability Atlas - 3rd Edition; Peer Group, MoHUA; Map is Based on digitised data of SOI, GOI; Census of India 2011; Flood Atlas(1987), Task Force Report (2004), C.W.C., G.O.I. Houses/Population as per Census 2011; * Houses including vacant & locked houses. Disclaimer: The maps are solely for thematic representation

BMTPC: Vulnerability Atlas - 3rd Edition: Peer Group, MoHUA, GOI; Map is Based on digitised data of SOI; Landslide Incidence data GSI; Annual Rainfall data IMD. Houses/Population as per Census 2011; * Houses including vacant & locked houses. Disclaimer: The maps are solely for thematic presentation.

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

MEGHALAYA

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
				Area in %				Area in %					
STATE - MEGHALAYA				100						98.2	1.8		
WALL													
A1 - Mud & Unburnt Brick Wall	Rural	37,345	5.5										
	Urban	5,381	0.8										
	Total	42,726	6.3							VH	H		
A2 - Stone Wall not packed with mortar	Rural	9,143	1.3										
	Urban	2,918	0.4										
	Total	12,061	1.7							H	M		
Total - Category - A		54,787	8.0										
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	67,658	9.9										
	Urban	31,809	4.7										
	Total	99,467	14.6							H	M		
Total - Category - B		99,467	14.6										
C1 - Concrete Wall	Rural	37,812	5.6										
	Urban	58,542	8.6										
	Total	96,354	14.2							M		L	VL
C2 - Wood wall	Rural	102,570	15.1										
	Urban	23,365	3.4										
	Total	125,935	18.5							M		VH	H
Total - Category - C		222,289	32.7										
X - Other Materials	Rural	276,478	40.6										
	Urban	27,576	4.1										
	Total	304,054	44.7							M		VH	H
Total - Category - X		304,054	44.7										
TOTAL HOUSES*		680,597											
ROOF													
R1 - Light Weight Sloping Roof	Rural	490,990	72.1										
	Urban	90,319	13.3										
	Total	581,309	85.4							M		VH	VH
R2 - Heavy Weight Sloping Roof	Rural	12,865	1.9										
	Urban	3,995	0.6										
	Total	16,860	2.5							H		H	M
R3 - Flat Roof	Rural	27,151	4.0										
	Urban	55,277	8.1										
	Total	82,428	12.1										
TOTAL HOUSES*		680,597											

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
EQ Zone IV : High Damage Risk Zone (MSK VIII)
EQ Zone III : Moderate Damage Risk Zone (MSK VII)
EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : MG 01

State : MEGHALAYA

WEST GARO HILLS

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
				Area in %				Area in %					
				100									
WALL													
A1 - Mud & Unburnt Brick Wall	Rural	14,900	9.7										
	Urban	454	0.3										
	Total	15,354	10.0							VH		VH	H
A2 - Stone Wall not packed with mortar	Rural	875	0.6										
	Urban	331	0.2										
	Total	1,206	0.8							VH		H	M
Total - Category - A		16,560	10.7										
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	19,315	12.5										
	Urban	6,638	4.3										
	Total	25,953	16.8							H		H	M
Total - Category - B		25,953	16.8										
C1 - Concrete Wall	Rural	1,951	1.3										
	Urban	2,127	1.4										
	Total	4,078	2.7							M		L	VL
C2 - Wood wall	Rural	1,600	1.0										
	Urban	239	0.2										
	Total	1,839	1.2							M		VH	H
Total - Category - C		5,917	3.8										
X - Other Materials	Rural	98,110	63.6										
	Urban	7,756	5.0										
	Total	105,866	68.6							M		VH	H
Total - Category - X		105,866	68.6										
TOTAL HOUSES*		154,296											
ROOF													
R1 - Light Weight Sloping Roof	Rural	132,185	85.7										
	Urban	13,096	8.5										
	Total	145,281	94.2							M		VH	VH
R2 - Heavy Weight Sloping Roof	Rural	3,066	2.0										
	Urban	659	0.4										
	Total	3,725	2.4							H		H	M
R3 - Flat Roof	Rural	1,500	1.0										
	Urban	3,790	2.5										
	Total	5,290	3.5										
TOTAL HOUSES*		154,296											

Probable Maximum Precipitation at a Station of the district in 24 hrs is 680 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
EQ Zone IV : High Damage Risk Zone (MSK VIII)
EQ Zone III : Moderate Damage Risk Zone (MSK VII)
EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : MG 02 State : MEGHALAYA EAST GARO HILLS

Table No. : MG 03 State : MEGHALAYA SOUTH GARO HILLS

Wall / Roof	Census Houses		Level of Risk under								Flood Prone Area in %
	No. of Houses	%	EQ Zone				Wind Velocity m/s				
			V	IV	III	II	55 & 50	47	44 & 39	33	
			Area in %				Area in %				
			100					98.3	1.7		
WALL											
A1 - Mud & Unburnt Brick Wall	Rural	1,307	1.8								
	Urban	153	0.2								
	Total	1,460	2.0					VH	H		
A2 - Stone Wall not packed with mortar	Rural	403	0.6								
	Urban	129	0.2								
	Total	532	0.8					VH	H	M	
Total - Category - A		1,992	2.8								
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	6,518	9.1								
	Urban	2,805	3.9								
	Total	9,323	13.0					H	M		
Total - Category - B		9,323	12.9								
C1 - Concrete Wall	Rural	679	0.9								
	Urban	600	0.8								
	Total	1,279	1.7					M	L	VL	
C2 - Wood wall	Rural	619	0.9								
	Urban	90	0.1								
	Total	709	1.0					M	VH	H	
Total - Category - C		1,988	2.8								
X - Other Materials	Rural	52,027	72.2								
	Urban	6,684	9.3								
	Total	58,711	81.5					M	VH	H	
Total - Category - X		58,711	81.5								
TOTAL HOUSES*		72,014									

Wall / Roof	Census Houses		Level of Risk under								Flood Prone Area in %
	No. of Houses	%	EQ Zone				Wind Velocity m/s				
			V	IV	III	II	55 & 50	47	44 & 39	33	
			Area in %				Area in %				
			100					100			
WALL											
A1 - Mud & Unburnt Brick Wall	Rural	1,970	5.2								
	Urban	109	0.3								
	Total	2,079	5.5					VH		VH	
A2 - Stone Wall not packed with mortar	Rural	258	0.7								
	Urban	24	0.1								
	Total	282	0.8					VH		H	
Total - Category - A		2,361	6.2								
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	2,541	6.7								
	Urban	1,052	2.8								
	Total	3,593	9.5					H		H	
Total - Category - B		3,593	9.5								
C1 - Concrete Wall	Rural	582	1.5								
	Urban	109	0.3								
	Total	691	1.8					M		L	
C2 - Wood wall	Rural	903	2.4								
	Urban	80	0.2								
	Total	983	2.6					M		VH	
Total - Category - C		1,674	4.4								
X - Other Materials	Rural	28,311	74.6								
	Urban	2,034	5.4								
	Total	30,345	80.0					M		VH	
Total - Category - X		30,345	79.9								
TOTAL HOUSES*		37,973									

ROOF											
R1 - Light Weight Sloping Roof	Rural	60,218	83.6								
	Urban	9,878	13.7								
	Total	70,096	97.3					M		VH	VH
R2 - Heavy Weight Sloping Roof	Rural	984	1.4								
	Urban	189	0.3								
	Total	1,173	1.7					H		H	M
R3 - Flat Roof	Rural	351	0.5								
	Urban	394	0.5								
	Total	745	1.0								Damage Risk as per that for the Wall supporting it
TOTAL HOUSES*		72,014									

ROOF											
R1 - Light Weight Sloping Roof	Rural	33,687	88.7								
	Urban	3,223	8.5								
	Total	36,910	97.2					M		VH	
R2 - Heavy Weight Sloping Roof	Rural	431	1.1								
	Urban	78	0.2								
	Total	509	1.3					H		H	
R3 - Flat Roof	Rural	447	1.2								
	Urban	107	0.3								
	Total	554	1.5								Damage Risk as per that for the Wall supporting it
TOTAL HOUSES*		37,973									

Probable Maximum Precipitation at a Station of the district in 24 hrs is 600 mm

Probable Maximum Precipitation at a Station of the district in 24 hrs is 1080 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
- 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
- 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)

- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
- 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
- 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)

- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

**Distribution of Houses by Predominant Materials of Roof and Wall
and Level of Damage Risk**

Table No. : MG 04 State : MEGHALAYA WEST KHASI HILLS

Wall / Roof		Census Houses		Level of Risk under										Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s				Area in %	Area in %		Area in %
				V	IV	III	II	55 & 50	47	44 & 39	33				
				Area in %				Area in %							
WALL				100						100					
A1 - Mud & Unburnt Brick Wall	Rural	2,044	2.5												
	Urban	265	0.3												
	Total	2,309	2.8												
A2 - Stone Wall not packed with mortar	Rural	749	0.9												
	Urban	14	-												
	Total	763	0.9												
Total - Category - A		3,072	3.8												
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	4,291	5.3												
	Urban	1,144	1.4												
	Total	5,435	6.7												
Total - Category - B		5,435	6.7												
C1 - Concrete Wall	Rural	5,860	7.2												
	Urban	1,980	2.4												
	Total	7,840	9.6												
C2 - Wood wall	Rural	30,622	37.7												
	Urban	5,277	6.5												
	Total	35,899	44.2												
Total - Category - C		43,739	53.8												
X - Other Materials	Rural	28,357	34.9												
	Urban	704	0.9												
	Total	29,061	35.8												
Total - Category - X		29,061	35.7												
TOTAL HOUSES*		81,307													
ROOF															
R1 - Light Weight Sloping Roof	Rural	66,816	82.2												
	Urban	7,563	9.3												
	Total	74,379	91.5												
R2 - Heavy Weight Sloping Roof	Rural	1,543	1.9												
	Urban	53	0.1												
	Total	1,596	2.0												
R3 - Flat Roof	Rural	3,564	4.4												
	Urban	1,768	2.2												
	Total	5,332	6.6												
TOTAL HOUSES*		81,307													

Probable Maximum Precipitation at a Station of the district in 24 hrs is 1560 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

**Distribution of Houses by Predominant Materials of Roof and Wall
and Level of Damage Risk**

Table No. : MG 05 State : MEGHALAYA RIBHOI

Wall / Roof		Census Houses		Level of Risk under										Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s				Area in %	Area in %		Area in %
				V	IV	III	II	55 & 50	47	44 & 39	33				
				Area in %				Area in %							
WALL				100						100					
A1 - Mud & Unburnt Brick Wall	Rural	3,685	6.2												
	Urban	211	0.4												
	Total	3,896	6.6												
A2 - Stone Wall not packed with mortar	Rural	981	1.6												
	Urban	89	0.1												
	Total	1,070	1.7												
Total - Category - A		4,966	8.3												
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	6,683	11.2												
	Urban	554	0.9												
	Total	7,237	12.1												
Total - Category - B		7,237	12.1												
C1 - Concrete Wall	Rural	6,254	10.5												
	Urban	1,881	3.2												
	Total	8,135	13.7												
C2 - Wood wall	Rural	9,281	15.6												
	Urban	444	0.7												
	Total	9,725	16.3												
Total - Category - C		17,860	30.0												
X - Other Materials	Rural	27,783	46.6												
	Urban	1,754	2.9												
	Total	29,537	49.5												
Total - Category - X		29,537	49.6												
TOTAL HOUSES*		59,600													
ROOF															
R1 - Light Weight Sloping Roof	Rural	50,725	85.1												
	Urban	3,960	6.6												
	Total	54,685	91.7												
R2 - Heavy Weight Sloping Roof	Rural	1,283	2.2												
	Urban	172	0.3												
	Total	1,455	2.5												
R3 - Flat Roof	Rural	2,659	4.5												
	Urban	801	1.3												
	Total	3,460	5.8												
TOTAL HOUSES*		59,600													

Probable Maximum Precipitation at a Station of the district in 24 hrs is 840 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : MG 06 State : MEGHALAYA EAST KHASI HILLS

Table No. : MG 07 State : MEGHALAYA JAINTIA HILLS

Wall / Roof	Census Houses		Level of Risk under								Flood Prone Area in %
	No. of Houses	%	EQ Zone				Wind Velocity m/s				
			V	IV	III	II	55 & 50	47	44 & 39	33	
			Area in %				Area in %				
			100					100			
WALL											
A1 - Mud & Unburnt Brick Wall	Rural	3,919	2.0								
	Urban	3,684	1.9								
	Total	7,603	3.9								
A2 - Stone Wall not packed with mortar	Rural	3,520	1.8								
	Urban	2,274	1.2								
	Total	5,794	3.0								
Total - Category - A		13,397	6.8								
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	17,559	8.9								
	Urban	18,196	9.2								
	Total	35,755	18.1								
Total - Category - B		35,755	18.1								
C1 - Concrete Wall	Rural	14,582	7.4								
	Urban	48,091	24.3								
	Total	62,673	31.7								
C2 - Wood wall	Rural	36,790	18.6								
	Urban	16,713	8.5								
	Total	53,503	27.1								
Total - Category - C		116,176	58.8								
X - Other Materials	Rural	23,877	12.1								
	Urban	8,373	4.2								
	Total	32,250	16.3								
Total - Category - X		32,250	16.3								
TOTAL HOUSES*		197,578									

Wall / Roof	Census Houses		Level of Risk under								Flood Prone Area in %
	No. of Houses	%	EQ Zone				Wind Velocity m/s				
			V	IV	III	II	55 & 50	47	44 & 39	33	
			Area in %				Area in %				
			100					100			
WALL											
A1 - Mud & Unburnt Brick Wall	Rural	9,520	12.2								
	Urban	505	0.6								
	Total	10,025	12.8								
A2 - Stone Wall not packed with mortar	Rural	2,357	3.0								
	Urban	57	0.1								
	Total	2,414	3.1								
Total - Category - A		12,439	16.0								
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	10,751	13.8								
	Urban	1,420	1.8								
	Total	12,171	15.6								
Total - Category - B		12,171	15.6								
C1 - Concrete Wall	Rural	7,904	10.2								
	Urban	3,754	4.8								
	Total	11,658	15.0								
C2 - Wood wall	Rural	22,755	29.2								
	Urban	522	0.7								
	Total	23,277	29.9								
Total - Category - C		34,935	44.9								
X - Other Materials	Rural	18,013	23.1								
	Urban	271	0.3								
	Total	18,284	23.4								
Total - Category - X		18,284	23.5								
TOTAL HOUSES*		77,829									

ROOF											
R1 - Light Weight Sloping Roof	Rural	87,208	44.1								
	Urban	49,990	25.3								
	Total	137,198	69.4								
R2 - Heavy Weight Sloping Roof	Rural	2,157	1.1								
	Urban	2,740	1.4								
	Total	4,897	2.5								
R3 - Flat Roof	Rural	10,882	5.5								
	Urban	44,601	22.6								
	Total	55,483	28.1								
TOTAL HOUSES*		197,578									

ROOF											
R1 - Light Weight Sloping Roof	Rural	60,151	77.3								
	Urban	2,609	3.4								
	Total	62,760	80.7								
R2 - Heavy Weight Sloping Roof	Rural	3,401	4.4								
	Urban	104	0.1								
	Total	3,505	4.5								
R3 - Flat Roof	Rural	7,748	10.0								
	Urban	3,816	4.9								
	Total	11,564	14.9								
TOTAL HOUSES*		77,829									

Probable Maximum Precipitation at a Station of the district in 24 hrs is 1560 mm

Probable Maximum Precipitation at a Station of the district in 24 hrs is 1240 mm

Housing Category : Wall Types

- Category - A :** Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B :** Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C :** Reinforced building, well built wooden structures
- Category - X :** Other materials not covered in A,B,C. These are generally light.

- Notes :** 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
- 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
- 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1 -** Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2 -** Heavy Weight (Tiles, Stone/Slate)
- Category - R3 -** Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)

- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

Housing Category : Wall Types

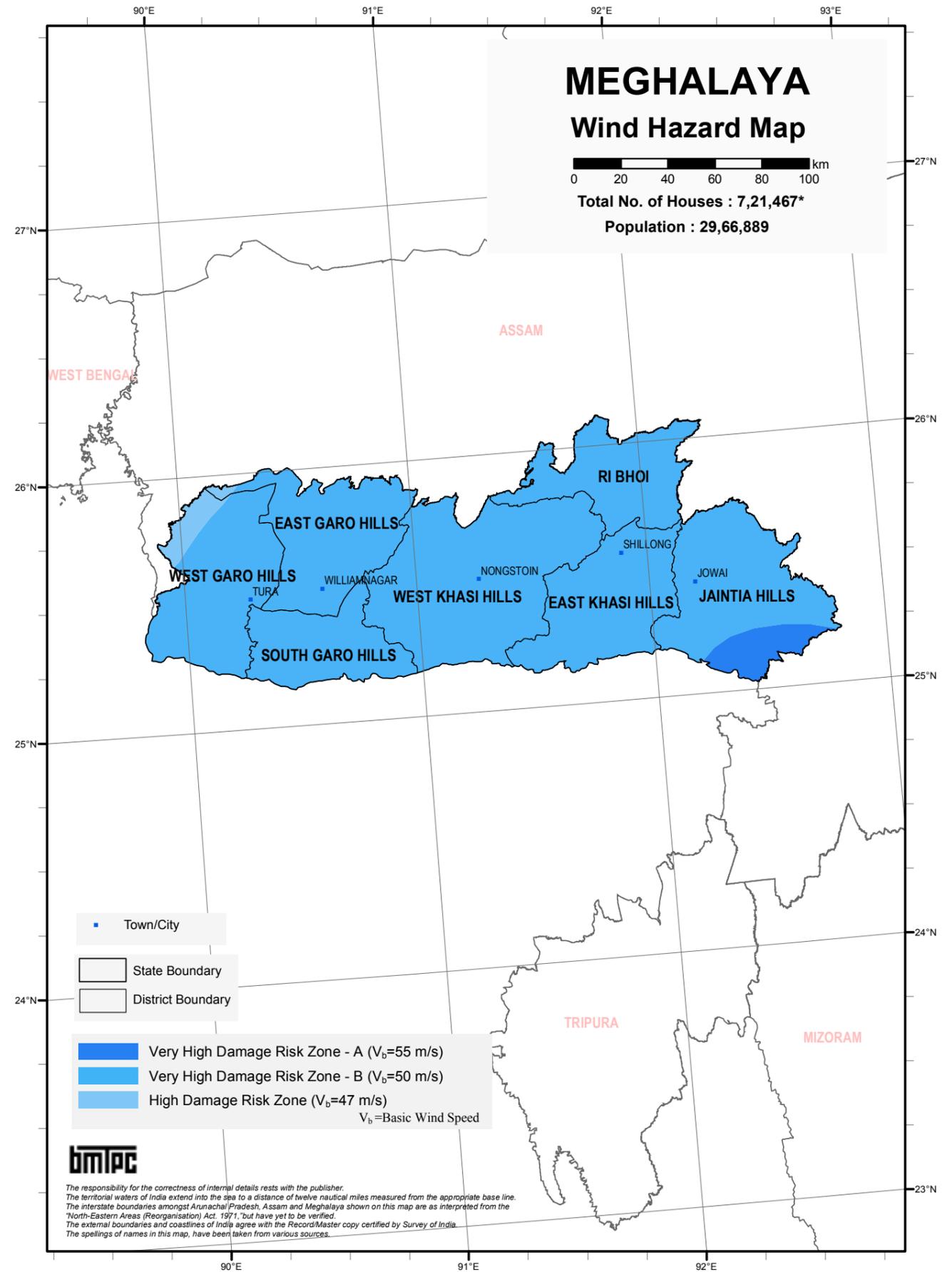
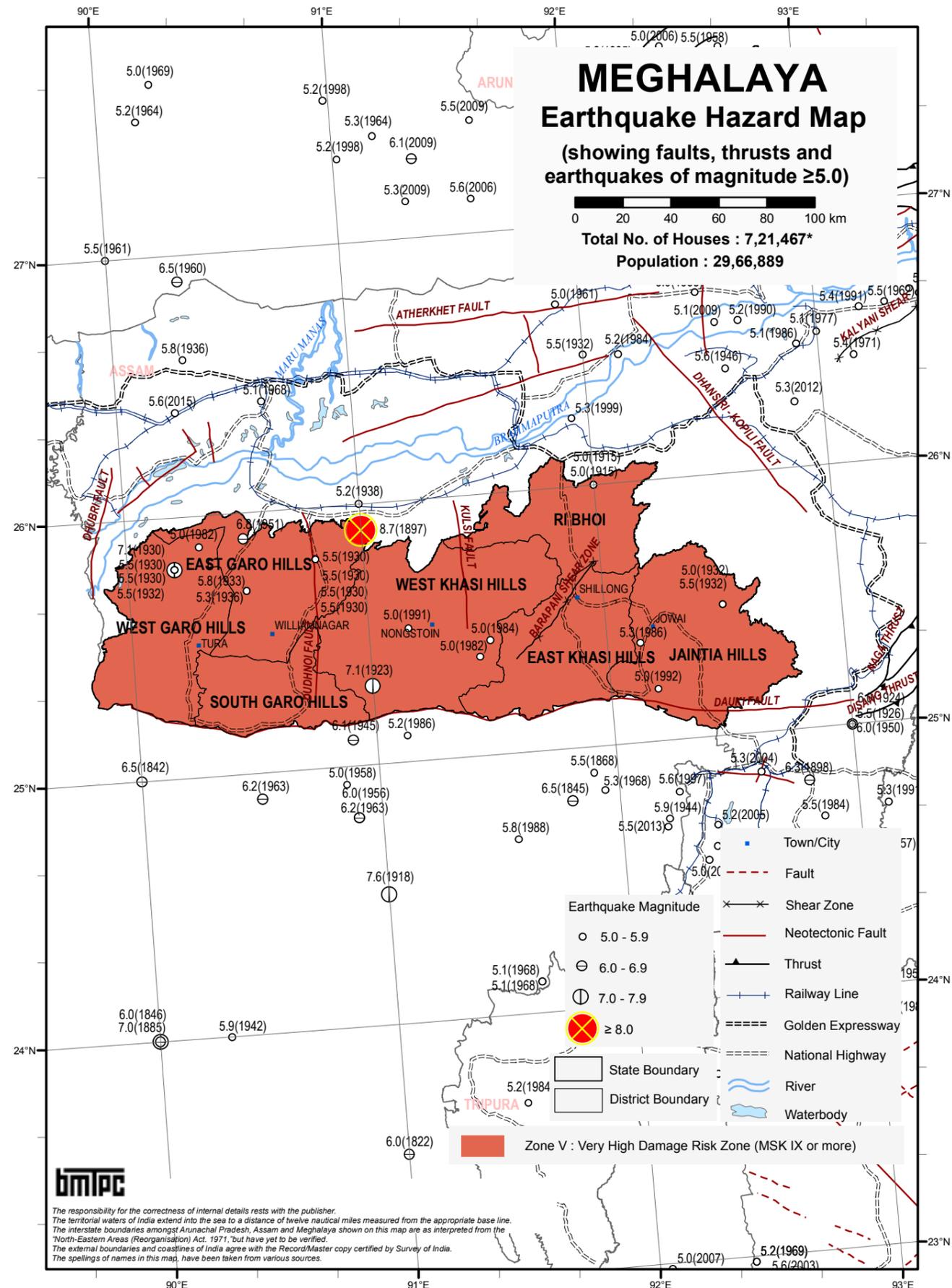
- Category - A :** Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B :** Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C :** Reinforced building, well built wooden structures
- Category - X :** Other materials not covered in A,B,C. These are generally light.

- Notes :** 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
- 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
- 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

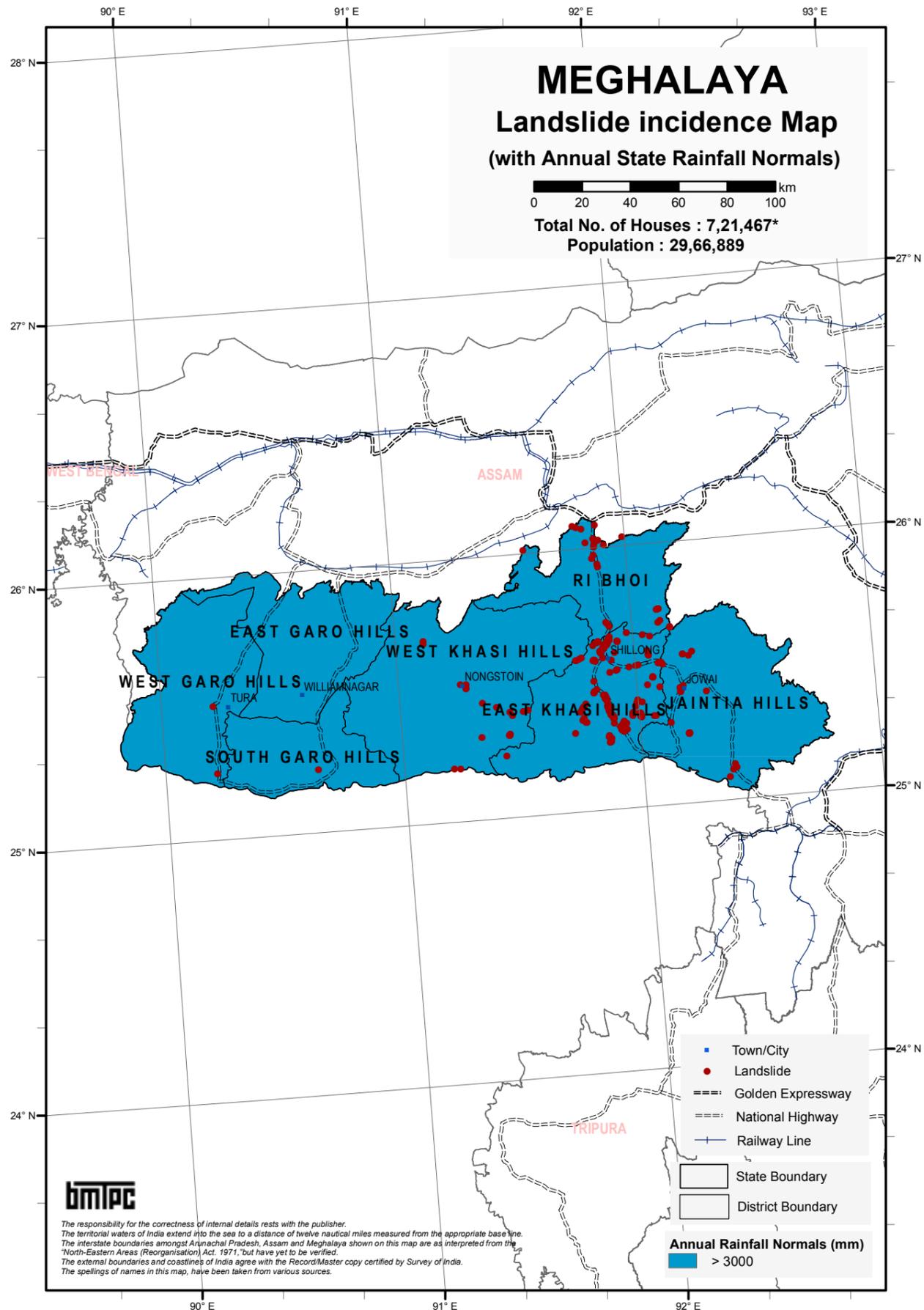
- Category - R1 -** Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2 -** Heavy Weight (Tiles, Stone/Slate)
- Category - R3 -** Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)

- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses



BMTPC : Vulnerability Atlas - 3rd Edition : Peer Group, MoHUA, GOI; Map is Based on digitised data of SOI; Seismic Zones of India Map IS:1893 (Part I): 2002, BIS; Earthquake Epicentre from IMD; Seismotectonic Atlas of India and its Environs, GSI; Houses/Population as per Census 2011; *Houses including vacant & locked houses. Disclaimer: The maps are solely for thematic presentation.

BMTPC : Vulnerability Atlas - 3rd Edition; Peer Group, MoHUA; Map is Based on digitised data of SOI, GOI; Basic Wind Speed Map National Building Code 2016. Houses/Population as per Census 2011; *Houses including vacant & locked houses. Disclaimer: The maps are solely for thematic presentation.



The responsibility for the correctness of internal details rests with the publisher.
 The territorial waters of India extend into the sea to a distance of twelve nautical miles measured from the appropriate base line.
 The interstate boundaries amongst Arunachal Pradesh, Assam and Meghalaya shown on this map are as interpreted from the 'North-Eastern Areas (Reorganisation) Act, 1971', but have yet to be verified.
 The external boundaries and coastlines of India agree with the Record/Master copy certified by Survey of India.
 The spellings of names in this map, have been taken from various sources.

BMTPC: Vulnerability Atlas - 3rd Edition: Peer Group, MoHUA, GOI: Map is Based on digitised data of SOI; Landslide Incidence data GSI; Annual Rainfall data IMD. Houses/Population as per Census 2011; * Houses including vacant & locked houses. Disclaimer: The maps are solely for thematic presentation.

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

MIZORAM

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
				Area in %				Area in %					
STATE - MIZORAM				100						100			
WALL													
A1 - Mud & Unburnt Brick Wall	Rural	286	0.1										
	Urban	375	0.1										
	Total	661	0.2										
A2 - Stone Wall not packed with mortar	Rural	139	0.1										
	Urban	388	0.2										
	Total	527	0.3										
Total - Category - A		1,188	0.5										
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	3,324	1.3										
	Urban	20,293	7.9										
	Total	23,617	9.2										
Total - Category - B		23,617	9.2										
C1 - Concrete Wall	Rural	2,934	1.1										
	Urban	28,047	10.9										
	Total	30,981	12.0										
C2 - Wood wall	Rural	5,623	2.2										
	Urban	2,292	0.9										
	Total	7,915	3.1										
Total - Category - C		38,896	15.1										
X - Other Materials	Rural	106,661	41.5										
	Urban	86,671	33.7										
	Total	193,332	75.2										
Total - Category - X		193,332	75.2										
TOTAL HOUSES*		257,033											

ROOF													
R1 - Light Weight Sloping Roof	Rural	115,781	45.0										
	Urban	97,367	37.9										
	Total	213,148	82.9										
R2 - Heavy Weight Sloping Roof	Rural	1,010	0.4										
	Urban	2,016	0.8										
	Total	3,026	1.2										
R3 - Flat Roof	Rural	2,176	0.8										
	Urban	38,683	15.0										
	Total	40,859	15.8										
TOTAL HOUSES*		257,033											

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : MZ 01

State : MIZORAM

MAMIT

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
				Area in %				Area in %					
STATE - MIZORAM				100						100			
WALL													
A1 - Mud & Unburnt Brick Wall	Rural	32	0.2										
	Urban	2	-										
	Total	34	0.2										
A2 - Stone Wall not packed with mortar	Rural	9	-										
	Urban	4	-										
	Total	13	-										
Total - Category - A		47	0.2										
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	251	1.3										
	Urban	141	0.7										
	Total	392	2.0										
Total - Category - B		392	2.0										
C1 - Concrete Wall	Rural	548	2.8										
	Urban	519	2.6										
	Total	1,067	5.4										
C2 - Wood wall	Rural	440	2.2										
	Urban	32	0.2										
	Total	472	2.4										
Total - Category - C		1,539	7.8										
X - Other Materials	Rural	14,695	74.5										
	Urban	3,043	15.4										
	Total	17,738	89.9										
Total - Category - X		17,738	90.0										
TOTAL HOUSES*		19,716											

ROOF													
R1 - Light Weight Sloping Roof	Rural	15,640	79.3										
	Urban	3,350	17.0										
	Total	18,990	96.3										
R2 - Heavy Weight Sloping Roof	Rural	72	0.4										
	Urban	3	-										
	Total	75	0.4										
R3 - Flat Roof	Rural	263	1.3										
	Urban	388	2.0										
	Total	651	3.3										
TOTAL HOUSES*		19,716											

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 549 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : MZ 02 State : MIZORAM KOLASIB

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %		
		No. of Houses	%	EQ Zone				Wind Velocity m/s						
				V	IV	III	II	55 & 50	47	44 & 39	33			
				Area in %				Area in %						
WALL				100						100				
A1 - Mud & Unburnt Brick Wall	Rural	24	0.1											
	Urban	79	0.4											
	Total	103	0.5	VH					VH					
A2 - Stone Wall not packed with mortar	Rural	44	0.2											
	Urban	45	0.2											
	Total	89	0.4	VH					H					
Total - Category - A		192	0.9											
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	369	1.8											
	Urban	1,286	6.4											
	Total	1,655	8.2	H					H					
Total - Category - B		1,655	8.2											
C1 - Concrete Wall	Rural	395	2.0											
	Urban	1,929	9.5											
	Total	2,324	11.5	M					L					
C2 - Wood wall	Rural	260	1.3											
	Urban	143	0.7											
	Total	403	2.0	M					VH					
Total - Category - C		2,727	13.5											
X - Other Materials	Rural	7,717	38.2											
	Urban	7,922	39.2											
	Total	15,639	77.4	M					VH					
Total - Category - X		15,639	77.4											
TOTAL HOUSES*		20,213												

ROOF														
R1 - Light Weight Sloping Roof	Rural	8,401	41.6											
	Urban	8,822	43.6											
	Total	17,223	85.2	M					VH					
R2 - Heavy Weight Sloping Roof	Rural	119	0.6											
	Urban	270	1.3											
	Total	389	1.9	H					H					
R3 - Flat Roof	Rural	289	1.4											
	Urban	2,312	11.4											
	Total	2,601	12.8											
TOTAL HOUSES*		20,213												

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 508 mm

Housing Category : Wall Types

- Category - A :** Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B :** Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C :** Reinforced building, well built wooden structures
- Category - X :** Other materials not covered in A,B,C. These are generally light.

- Notes :**
- Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 - Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 - Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1 -** Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
 - Category - R2 -** Heavy Weight (Tiles, Stone/Slate)
 - Category - R3 -** Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)

Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
 * Total No.of Houses excluding Vacant/Locked Houses

Table No. : MZ 03 State : MIZORAM AIZAWL

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %		
		No. of Houses	%	EQ Zone				Wind Velocity m/s						
				V	IV	III	II	55 & 50	47	44 & 39	33			
				Area in %				Area in %						
WALL				100						100				
A1 - Mud & Unburnt Brick Wall	Rural	66	0.1											
	Urban	180	0.2											
	Total	246	0.3	VH					VH					
A2 - Stone Wall not packed with mortar	Rural	26	-											
	Urban	248	0.3											
	Total	274	0.3	VH					H					
Total - Category - A		520	0.5											
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	990	1.0											
	Urban	14,513	15.1											
	Total	15,503	16.1	H					H					
Total - Category - B		15,503	16.1											
C1 - Concrete Wall	Rural	874	0.9											
	Urban	19,370	20.1											
	Total	20,244	21.0	M					L					
C2 - Wood wall	Rural	277	0.3											
	Urban	628	0.7											
	Total	905	1.0	M					VH					
Total - Category - C		21,149	22.0											
X - Other Materials	Rural	17,485	18.1											
	Urban	41,692	43.3											
	Total	59,177	61.4	M					VH					
Total - Category - X		59,177	61.4											
TOTAL HOUSES*		96,349												

ROOF														
R1 - Light Weight Sloping Roof	Rural	18,790	19.5											
	Urban	46,295	48.0											
	Total	65,085	67.5	M					VH					
R2 - Heavy Weight Sloping Roof	Rural	96	0.1											
	Urban	1,309	1.4											
	Total	1,405	1.5	H					H					
R3 - Flat Roof	Rural	832	0.9											
	Urban	29,027	30.1											
	Total	29,859	31.0											
TOTAL HOUSES*		96,349												

Probable Maximum Precipitation at a Station of the district in 24 hrs is 640 mm

Housing Category : Wall Types

- Category - A :** Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B :** Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C :** Reinforced building, well built wooden structures
- Category - X :** Other materials not covered in A,B,C. These are generally light.

- Notes :**
- Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 - Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 - Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1 -** Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
 - Category - R2 -** Heavy Weight (Tiles, Stone/Slate)
 - Category - R3 -** Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)

Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
 * Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : MZ 08

State : MIZORAM

SAIHA

Wall / Roof		Census Houses		Level of Risk under					Flood Prone Area in %	
		No. of Houses	%	EQ Zone			Wind Velocity m/s			
				V	IV	III	II	55 & 50		47
				Area in %		Area in %				
WALL										
A1 - Mud & Unburnt Brick Wall	Rural	7	0.1							
	Urban	5	-							
	Total	12	0.1	VH				VH		
A2 - Stone Wall not packed with mortar	Rural	2	-							
	Urban	5	-							
	Total	7	-	VH				H		
Total - Category - A		19	0.2							
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	87	0.7							
	Urban	463	3.7							
	Total	550	4.4	H				H		
Total - Category - B		550	4.4							
C1 - Concrete Wall	Rural	87	0.7							
	Urban	861	7.0							
	Total	948	7.7	M				L		
C2 - Wood wall	Rural	2,302	18.6							
	Urban	833	6.7							
	Total	3,135	25.3	M				VH		
Total - Category - C		4,083	33.0							
X - Other Materials	Rural	4,438	35.9							
	Urban	3,284	26.5							
	Total	7,722	62.4	M				VH		
Total - Category - X		7,722	62.4							
TOTAL HOUSES*		12,374								
ROOF										
R1 - Light Weight Sloping Roof	Rural	6,838	55.3							
	Urban	4,350	35.2							
	Total	11,188	90.5	M				VH		
R2 - Heavy Weight Sloping Roof	Rural	31	0.3							
	Urban	83	0.7							
	Total	114	1.0	H				H		
R3 - Flat Roof	Rural	54	0.4							
	Urban	1,018	8.2							
	Total	1,072	8.6							
TOTAL HOUSES*		12,374								

Probable Maximum Precipitation at a Station of the district in 24 hrs is 640 mm

Housing Category : Wall Types

Category - A : Buildings in field-stone, rural structures, unburnt brick houses, clay houses

Category - B : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone

Category - C : Reinforced building, well built wooden structures

Category - X : Other materials not covered in A,B,C. These are generally light.

Notes : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.

2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building

3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

Category - R1 - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)

Category - R2 - Heavy Weight (Tiles, Stone/Slate)

Category - R3 - Flat Roof (Brick, Concrete)

EQ Zone V : Very High Damage Risk Zone (MSK > IX)

EQ Zone IV : High Damage Risk Zone (MSK VIII)

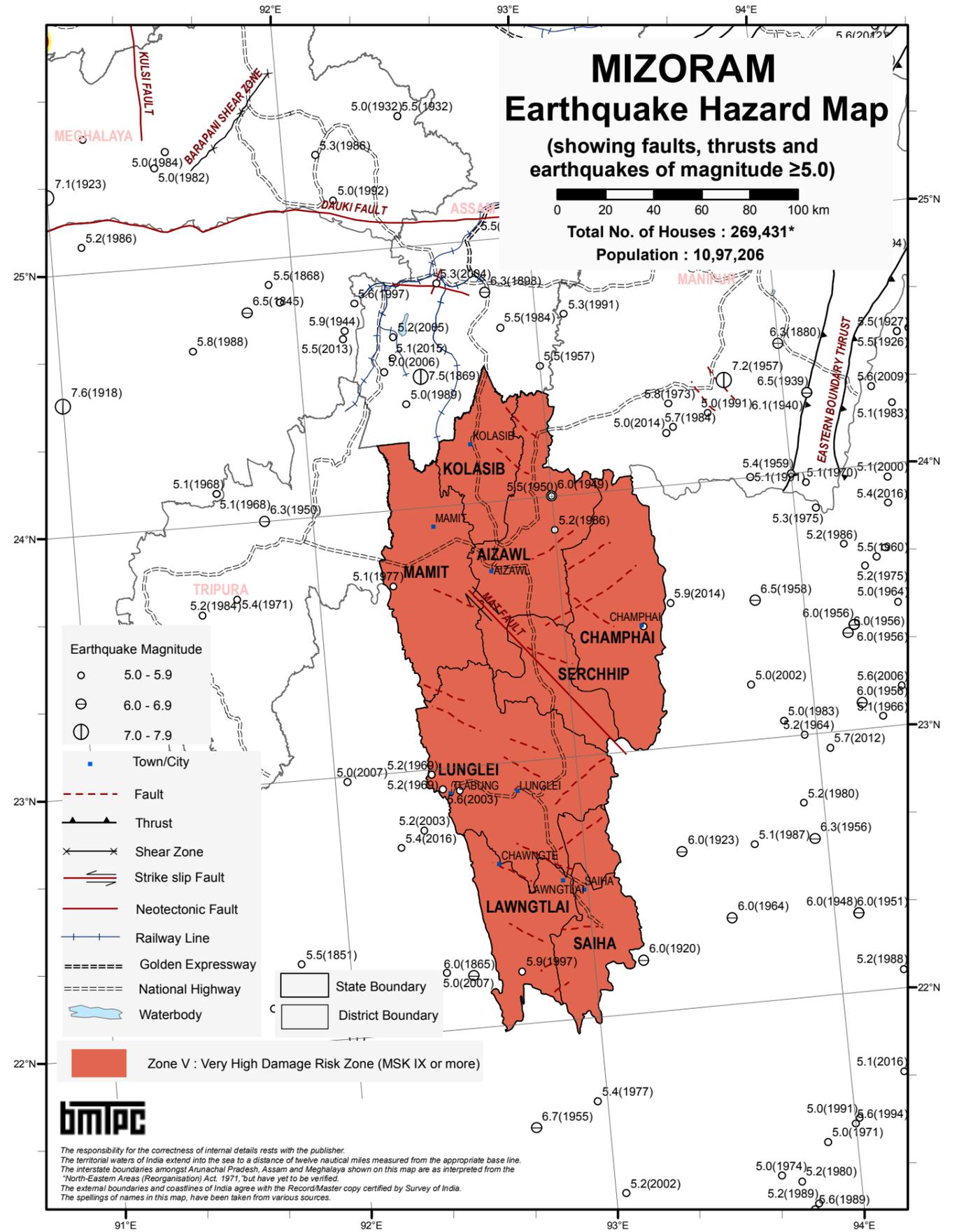
EQ Zone III : Moderate Damage Risk Zone (MSK VII)

EQ Zone II : Low Damage Risk Zone (MSK < VI)

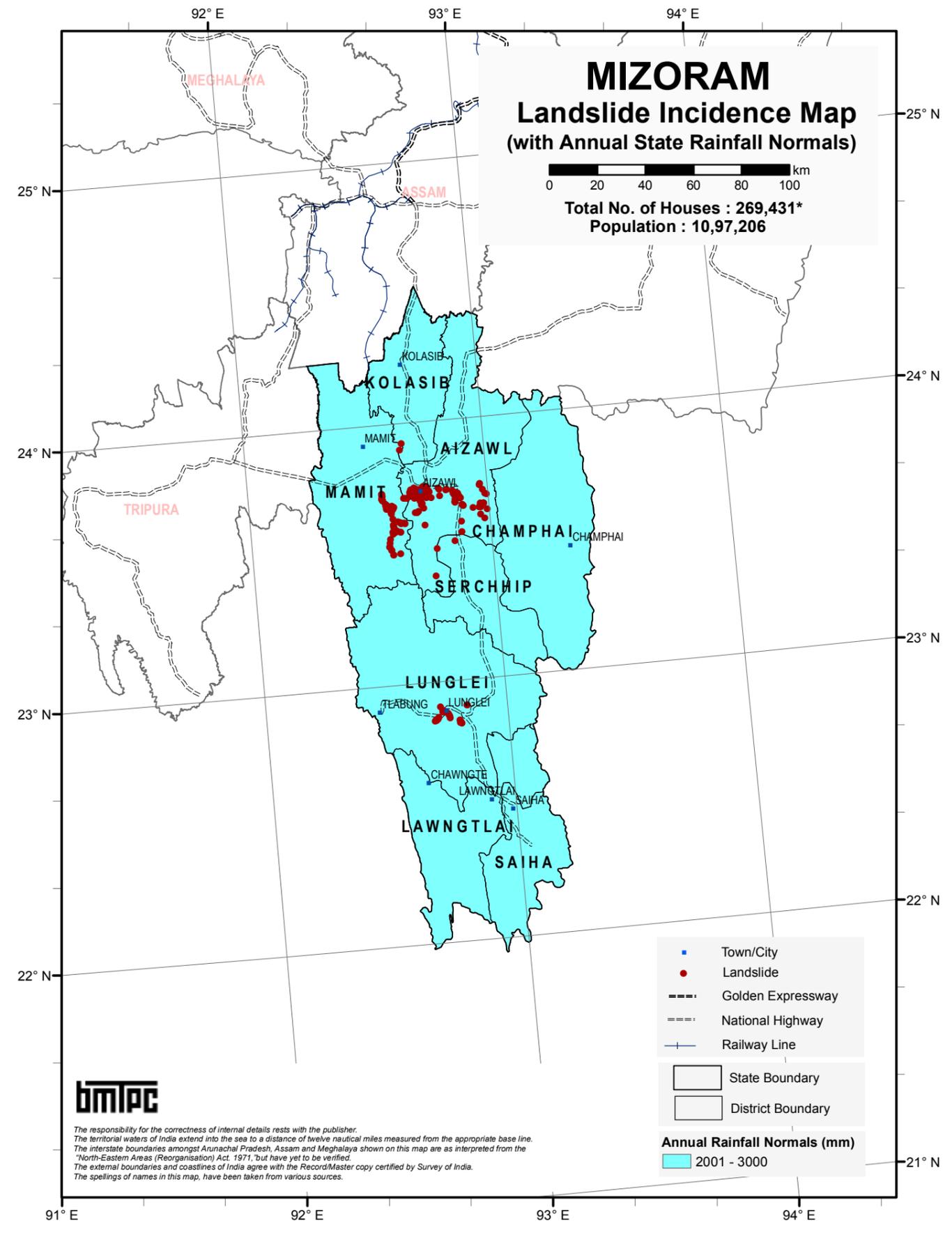
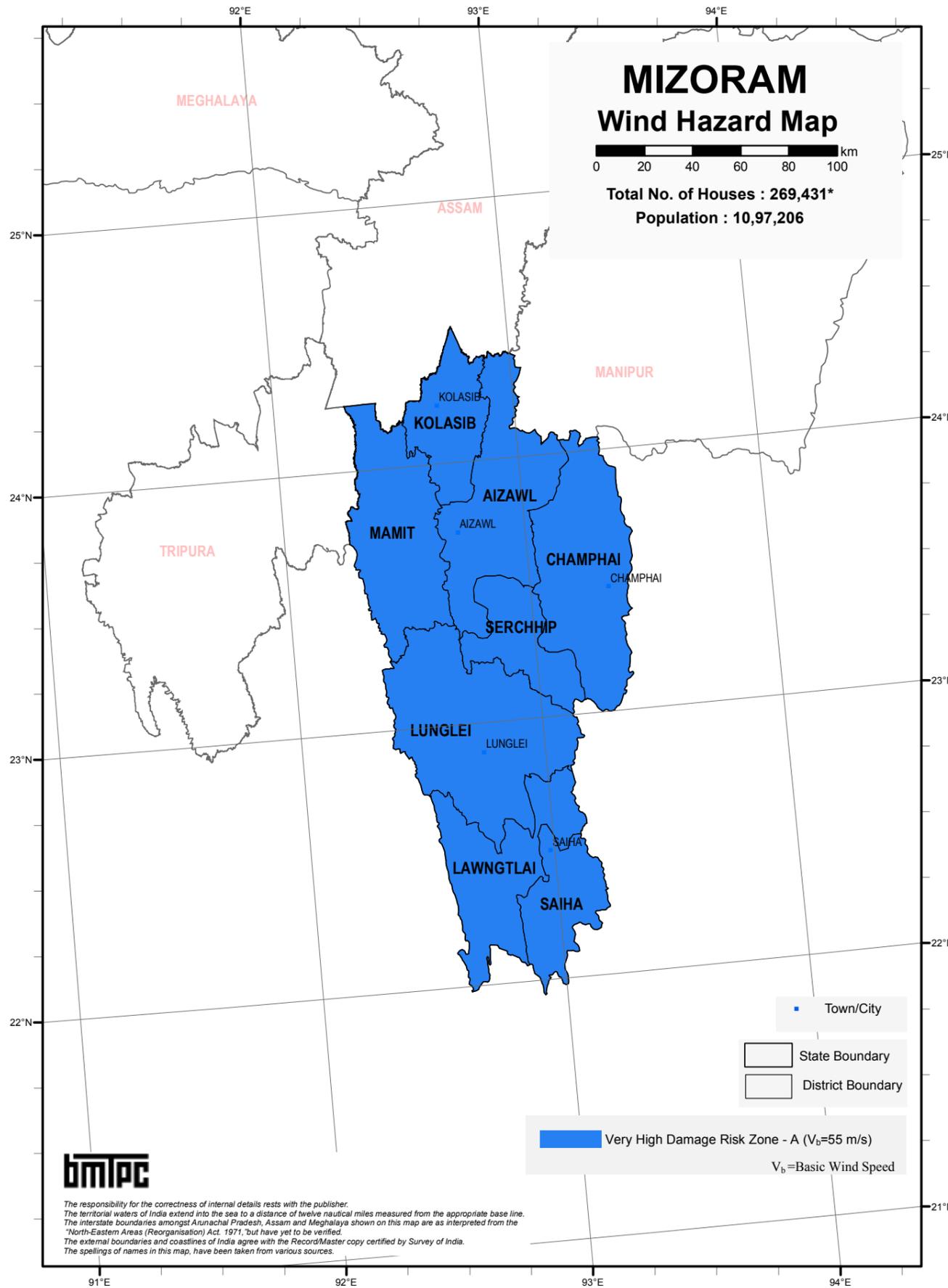
Level of Risk : VH = Very High; H = High;

M = Moderate; L = Low; VL = Very Low

* Total No. of Houses excluding Vacant/Locked Houses



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Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

NAGALAND

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
		Area in %				Area in %							
STATE - NAGALAND				100						22.3		77.7	
WALL													
A1 - Mud & Unburnt Brick Wall	Rural	12,132	2.5										
	Urban	2,604	0.5										
	Total	14,736	3.0	VH					VH		M		
A2 - Stone Wall not packed with mortar	Rural	1,150	0.2										
	Urban	1,347	0.3										
	Total	2,497	0.5	VH					H		L		
Total - Category - A		17,233	3.5										
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	30,280	6.1										
	Urban	49,233	10.0										
	Total	79,513	16.1	H					H		L		
Total - Category - B		79,513	16.1										
C1 - Concrete Wall	Rural	8,740	1.8										
	Urban	22,659	4.6										
	Total	31,399	6.4	M					L		VL		
C2 - Wood wall	Rural	87,904	17.9										
	Urban	19,007	3.9										
	Total	106,911	21.8	M					VH		M		
Total - Category - C		138,310	28.1										
X - Other Materials	Rural	202,353	41.1										
	Urban	54,961	11.2										
	Total	257,314	52.3	M					VH		M		
Total - Category - X		257,314	52.3										
TOTAL HOUSES*		492,370											

ROOF													
R1 - Light Weight Sloping Roof	Rural	332,046	67.4										
	Urban	113,158	23.0										
	Total	445,204	90.4	M					VH		H		
R2 - Heavy Weight Sloping Roof	Rural	4,512	0.9										
	Urban	5,673	1.2										
	Total	10,185	2.1	H					H		L		
R3 - Flat Roof	Rural	6,001	1.2										
	Urban	30,980	6.3										
	Total	36,981	7.5										
<i>Damage Risk as per that for the Wall supporting it</i>													
TOTAL HOUSES*		492,370											

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
EQ Zone IV : High Damage Risk Zone (MSK VIII)
EQ Zone III : Moderate Damage Risk Zone (MSK VII)
EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : NG 01

State : NAGALAND

MON

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %			
		No. of Houses	%	EQ Zone				Wind Velocity m/s							
				V	IV	III	II	55 & 50	47	44 & 39	33				
		Area in %				Area in %									
STATE - NAGALAND				100								11.3		88.7	
WALL															
A1 - Mud & Unburnt Brick Wall	Rural	170	0.3												
	Urban	131	0.3												
	Total	301	0.6	VH					VH		M				
A2 - Stone Wall not packed with mortar	Rural	159	0.3												
	Urban	138	0.3												
	Total	297	0.6	VH					H		L				
Total - Category - A		598	1.2												
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	1,075	2.2												
	Urban	928	1.9												
	Total	2,003	4.1	H					H		L				
Total - Category - B		2,003	4.1												
C1 - Concrete Wall	Rural	528	1.1												
	Urban	705	1.4												
	Total	1,233	2.5	M					L		VL				
C2 - Wood wall	Rural	3,938	8.1												
	Urban	528	1.1												
	Total	4,466	9.2	M					VH		M				
Total - Category - C		5,699	11.7												
X - Other Materials	Rural	36,174	74.3												
	Urban	4,215	8.7												
	Total	40,389	83.0	M					VH		M				
Total - Category - X		40,389	83.0												
TOTAL HOUSES*		48,689													

ROOF															
R1 - Light Weight Sloping Roof	Rural	41,478	85.2												
	Urban	5,728	11.8												
	Total	47,206	97.0	M					VH		H				
R2 - Heavy Weight Sloping Roof	Rural	302	0.6												
	Urban	309	0.6												
	Total	611	1.2	H					H		L				
R3 - Flat Roof	Rural	264	0.5												
	Urban	608	1.2												
	Total	872	1.7												
<i>Damage Risk as per that for the Wall supporting it</i>															
TOTAL HOUSES*		48,689													

Probable Maximum Precipitation at a Station of the district in 24 hrs is 400 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
EQ Zone IV : High Damage Risk Zone (MSK VIII)
EQ Zone III : Moderate Damage Risk Zone (MSK VII)
EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : NG 02 State : NAGALAND MOKOKCHUNG

Table No. : NG 03 State : NAGALAND ZUNHEBOTO

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
		100						30.5		69.5		
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	608	1.2									
	Urban	276	0.5									
	Total	884	1.7	VH				VH		M		
A2 - Stone Wall not packed with mortar	Rural	268	0.5									
	Urban	136	0.3									
	Total	404	0.8	VH				H		L		
Total - Category - A		1,288	2.5									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	2,207	4.3									
	Urban	3,951	7.7									
	Total	6,158	12.0	H				H		L		
Total - Category - B		6,158	12.0									
C1 - Concrete Wall	Rural	1,304	2.5									
	Urban	2,205	4.3									
	Total	3,509	6.8	M				L		VL		
C2 - Wood wall	Rural	8,560	16.6									
	Urban	2,991	5.8									
	Total	11,551	22.4	M				VH		M		
Total - Category - C		15,060	29.2									
X - Other Materials	Rural	22,639	44.0									
	Urban	6,360	12.3									
	Total	28,999	56.3	M				VH		M		
Total - Category - X		28,999	56.3									
TOTAL HOUSES*		51,505										

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
		100								100		
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	153	0.4									
	Urban	44	0.1									
	Total	197	0.5	VH						M		
A2 - Stone Wall not packed with mortar	Rural	76	0.2									
	Urban	36	0.1									
	Total	112	0.3	VH						L		
Total - Category - A		309	0.9									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	1,772	4.9									
	Urban	779	2.2									
	Total	2,551	7.1	H						L		
Total - Category - B		2,551	7.1									
C1 - Concrete Wall	Rural	391	1.1									
	Urban	1,479	4.1									
	Total	1,870	5.2	M						VL		
C2 - Wood wall	Rural	14,127	39.3									
	Urban	1,864	5.2									
	Total	15,991	44.5	M						M		
Total - Category - C		17,861	49.7									
X - Other Materials	Rural	13,767	38.3									
	Urban	1,440	4.0									
	Total	15,207	42.3	M						M		
Total - Category - X		15,207	42.3									
TOTAL HOUSES*		35,928										

ROOF											
R1 - Light Weight Sloping Roof	Rural	34,227	66.5								
	Urban	12,989	25.2								
	Total	47,216	91.7	M				VH		H	
R2 - Heavy Weight Sloping Roof	Rural	677	1.3								
	Urban	246	0.5								
	Total	923	1.8	H				H		L	
R3 - Flat Roof	Rural	682	1.3								
	Urban	2,684	5.2								
	Total	3,366	6.5								<i>Damage Risk as per that for the Wall supporting it</i>
TOTAL HOUSES*		51,505									

ROOF											
R1 - Light Weight Sloping Roof	Rural	29,535	82.2								
	Urban	4,337	12.1								
	Total	33,872	94.3	M						H	
R2 - Heavy Weight Sloping Roof	Rural	449	1.2								
	Urban	120	0.3								
	Total	569	1.5	H						L	
R3 - Flat Roof	Rural	302	0.8								
	Urban	1,185	3.3								
	Total	1,487	4.1								<i>Damage Risk as per that for the Wall supporting it</i>
TOTAL HOUSES*		35,928									

Probable Maximum Precipitation at a Station of the district in 24 hrs is 360 mm

Probable Maximum Precipitation at a Station of the district in 24 hrs is 400 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
- 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
- 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)

- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
- 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
- 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)

- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

**Distribution of Houses by Predominant Materials of Roof and Wall
and Level of Damage Risk**

Table No. : NG 04 State : NAGALAND WOKHA

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
		100					38.0		62.0			
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	3,879	8.7									
	Urban	183	0.4									
	Total	4,062	9.1	VH			VH		M			
A2 - Stone Wall not packed with mortar	Rural	110	0.2									
	Urban	68	0.2									
	Total	178	0.4	VH			H		L			
Total - Category - A		4,240	9.5									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	3,856	8.6									
	Urban	3,689	8.2									
	Total	7,545	16.8	H			H		L			
Total - Category - B		7,545	16.9									
C1 - Concrete Wall	Rural	346	0.8									
	Urban	204	0.5									
	Total	550	1.3	M			L		VL			
C2 - Wood wall	Rural	7,578	16.9									
	Urban	1,200	2.7									
	Total	8,778	19.6	M			VH		M			
Total - Category - C		9,328	20.9									
X - Other Materials	Rural	21,574	48.2									
	Urban	2,051	4.6									
	Total	23,625	52.8	M			VH		M			
Total - Category - X		23,625	52.8									
TOTAL HOUSES*		44,738										
ROOF												
R1 - Light Weight Sloping Roof	Rural	36,768	82.2									
	Urban	6,095	13.6									
	Total	42,863	95.8	M			VH		H			
R2 - Heavy Weight Sloping Roof	Rural	325	0.7									
	Urban	322	0.7									
	Total	647	1.4	H			H		L			
R3 - Flat Roof	Rural	250	0.6									
	Urban	978	2.2									
	Total	1,228	2.8									
TOTAL HOUSES*		44,738										

Probable Maximum Precipitation at a Station of the district in 24 hrs is 400 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

**Distribution of Houses by Predominant Materials of Roof and Wall
and Level of Damage Risk**

Table No. : NG 05 State : NAGALAND DIMAPUR

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
		100					79.9		20.1			
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	1,309	1.3									
	Urban	1,027	1.0									
	Total	2,336	2.3	VH			VH		M			
A2 - Stone Wall not packed with mortar	Rural	204	0.2									
	Urban	503	0.5									
	Total	707	0.7	VH			H		L			
Total - Category - A		3,043	3.1									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	10,692	10.9									
	Urban	23,889	24.3									
	Total	34,581	35.2	H			H		L			
Total - Category - B		34,581	35.2									
C1 - Concrete Wall	Rural	2,750	2.8									
	Urban	7,739	7.9									
	Total	10,489	10.7	M			L		VL			
C2 - Wood wall	Rural	1,346	1.4									
	Urban	652	0.7									
	Total	1,998	2.1	M			VH		M			
Total - Category - C		12,487	12.7									
X - Other Materials	Rural	27,863	28.3									
	Urban	20,331	20.7									
	Total	48,194	49.0	M			VH		M			
Total - Category - X		48,194	49.0									
TOTAL HOUSES*		98,305										
ROOF												
R1 - Light Weight Sloping Roof	Rural	40,824	41.5									
	Urban	37,056	37.7									
	Total	77,880	79.2	M			VH		H			
R2 - Heavy Weight Sloping Roof	Rural	812	0.8									
	Urban	2,298	2.3									
	Total	3,110	3.1	H			H		L			
R3 - Flat Roof	Rural	2,528	2.6									
	Urban	14,787	15.0									
	Total	17,315	17.6									
TOTAL HOUSES*		98,305										

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 761 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : NG 06 State : NAGALAND PHEK

Table No. : NG 07 State : NAGALAND TUENSANG

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
		100								100		
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	414	0.9									
	Urban	131	0.3									
	Total	545	1.2	VH						M		
A2 - Stone Wall not packed with mortar	Rural	90	0.2									
	Urban	28	0.1									
	Total	118	0.3	VH						L		
Total - Category - A		663	1.5									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	3,194	7.3									
	Urban	2,263	5.2									
	Total	5,457	12.5	H						L		
Total - Category - B		5,457	12.5									
C1 - Concrete Wall	Rural	831	1.9									
	Urban	610	1.4									
	Total	1,441	3.3	M						VL		
C2 - Wood wall	Rural	15,894	36.3									
	Urban	1,785	4.1									
	Total	17,679	40.4	M						M		
Total - Category - C		19,120	43.6									
X - Other Materials	Rural	16,984	38.8									
	Urban	1,588	3.6									
	Total	18,572	42.4	M						M		
Total - Category - X		18,572	42.4									
TOTAL HOUSES*		43,812										

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
		100								100		
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	241	0.5									
	Urban	314	0.7									
	Total	555	1.2	VH						M		
A2 - Stone Wall not packed with mortar	Rural	16	-									
	Urban	102	0.2									
	Total	118	0.2	VH						L		
Total - Category - A		673	1.4									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	479	1.0									
	Urban	635	1.3									
	Total	1,114	2.3	H						L		
Total - Category - B		1,114	2.3									
C1 - Concrete Wall	Rural	117	0.2									
	Urban	470	1.0									
	Total	587	1.2	M						VL		
C2 - Wood wall	Rural	15,913	33.3									
	Urban	4,130	8.6									
	Total	20,043	41.9	M						M		
Total - Category - C		20,630	43.1									
X - Other Materials	Rural	22,890	47.8									
	Urban	2,546	5.3									
	Total	25,436	53.1	M						M		
Total - Category - X		25,436	53.2									
TOTAL HOUSES*		47,853										

ROOF												
R1 - Light Weight Sloping Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
		100								100		
R1 - Light Weight Sloping Roof	Rural	36,460	83.2									
	Urban	5,263	12.0									
	Total	41,723	95.2	M						H		
R2 - Heavy Weight Sloping Roof	Rural	360	0.8									
	Urban	636	1.5									
	Total	996	2.3	H						L		
R3 - Flat Roof	Rural	587	1.3									
	Urban	506	1.2									
	Total	1,093	2.5									
<i>Damage Risk as per that for the Wall supporting it</i>												
TOTAL HOUSES*		43,812										

ROOF												
R1 - Light Weight Sloping Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
		100								100		
R1 - Light Weight Sloping Roof	Rural	38,807	81.1									
	Urban	7,039	14.7									
	Total	45,846	95.8	M						H		
R2 - Heavy Weight Sloping Roof	Rural	686	1.4									
	Urban	461	1.0									
	Total	1,147	2.4	H						L		
R3 - Flat Roof	Rural	163	0.3									
	Urban	697	1.5									
	Total	860	1.8									
<i>Damage Risk as per that for the Wall supporting it</i>												
TOTAL HOUSES*		47,853										

Probable Maximum Precipitation at a Station of the district in 24 hrs is 280 mm

Probable Maximum Precipitation at a Station of the district in 24 hrs is 400 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
- 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
- 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)

- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
- 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
- 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)

- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

**Distribution of Houses by Predominant Materials of Roof and Wall
and Level of Damage Risk**

Table No. : NG 08 State : NAGALAND LONGLENG

Wall / Roof		Census Houses		Level of Risk under										Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s					Area in %	
				V	IV	III	II	55 & 50	47	44 & 39	33			
				Area in %				Area in %						
		100					5.7					94.3		
WALL														
A1 - Mud & Unburnt Brick Wall	Rural	50	0.4											
	Urban	10	0.1											
	Total	60	0.5	VH			VH				M			
A2 - Stone Wall not packed with mortar	Rural	24	0.2											
	Urban	3	-											
	Total	27	0.2	VH			H			L				
Total - Category - A		87	0.7											
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	320	2.4											
	Urban	451	3.4											
	Total	771	5.8	H			H			L				
Total - Category - B		771	5.8											
C1 - Concrete Wall	Rural	121	0.9											
	Urban	44	0.3											
	Total	165	1.2	M			L			VL				
C2 - Wood wall	Rural	1,760	13.2											
	Urban	658	4.9											
	Total	2,418	18.1	M			VH			M				
Total - Category - C		2,583	19.4											
X - Other Materials	Rural	8,993	67.4											
	Urban	904	6.8											
	Total	9,897	74.2	M			VH			M				
Total - Category - X		9,897	74.2											
TOTAL HOUSES*		13,338												
ROOF														
R1 - Light Weight Sloping Roof	Rural	11,089	83.1											
	Urban	1,786	13.4											
	Total	12,875	96.5	M			VH			H				
R2 - Heavy Weight Sloping Roof	Rural	66	0.5											
	Urban	61	0.5											
	Total	127	1.0	H			H			L				
R3 - Flat Roof	Rural	113	0.8											
	Urban	223	1.7											
	Total	336	2.5											
TOTAL HOUSES*		13,338												

Probable Maximum Precipitation at a Station of the district in 24 hrs is 400 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
EQ Zone IV : High Damage Risk Zone (MSK VIII)
EQ Zone III : Moderate Damage Risk Zone (MSK VII)
EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

**Distribution of Houses by Predominant Materials of Roof and Wall
and Level of Damage Risk**

Table No. : NG 09 State : NAGALAND KIPHIRE

Wall / Roof		Census Houses		Level of Risk under										Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s					Area in %	
				V	IV	III	II	55 & 50	47	44 & 39	33			
				Area in %				Area in %						
		100											100	
WALL														
A1 - Mud & Unburnt Brick Wall	Rural	63	0.3											
	Urban	61	0.3											
	Total	124	0.6	VH						M				
A2 - Stone Wall not packed with mortar	Rural	10	0.1											
	Urban	16	0.1											
	Total	26	0.2	VH						L				
Total - Category - A		150	0.8											
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	137	0.7											
	Urban	231	1.2											
	Total	368	1.9	H						L				
Total - Category - B		368	1.9											
C1 - Concrete Wall	Rural	69	0.4											
	Urban	196	1.0											
	Total	265	1.4	M						VL				
C2 - Wood wall	Rural	10,104	53.3											
	Urban	2,008	10.6											
	Total	12,112	63.9	M						M				
Total - Category - C		12,377	65.3											
X - Other Materials	Rural	5,027	26.5											
	Urban	1,025	5.4											
	Total	6,052	31.9	M						M				
Total - Category - X		6,052	31.9											
TOTAL HOUSES*		18,947												
ROOF														
R1 - Light Weight Sloping Roof	Rural	15,179	80.1											
	Urban	3,330	17.6											
	Total	18,509	97.7	M						H				
R2 - Heavy Weight Sloping Roof	Rural	167	0.9											
	Urban	30	0.2											
	Total	197	1.1	H						L				
R3 - Flat Roof	Rural	64	0.3											
	Urban	177	0.9											
	Total	241	1.2											
TOTAL HOUSES*		18,947												

Probable Maximum Precipitation at a Station of the district in 24 hrs is 400 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
EQ Zone IV : High Damage Risk Zone (MSK VIII)
EQ Zone III : Moderate Damage Risk Zone (MSK VII)
EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : NG 10 State : NAGALAND KOHIMA

Wall / Roof	Census Houses		Level of Risk under								Flood Prone Area in %
	No. of Houses	%	EQ Zone				Wind Velocity m/s				
			V	IV	III	II	55 & 50	47	44 & 39	33	
			Area in %				Area in %				
			100							100	
WALL											
A1 - Mud & Unburnt Brick Wall	Rural	2,291	3.4								
	Urban	319	0.5								
	Total	2,610	3.9	VH						M	
A2 - Stone Wall not packed with mortar	Rural	149	0.2								
	Urban	287	0.4								
	Total	436	0.6	VH						L	
Total - Category - A		3,046	4.6								
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	5,612	8.4								
	Urban	11,775	17.7								
	Total	17,387	26.1	H						L	
Total - Category - B		17,387	26.2								
C1 - Concrete Wall	Rural	1,860	2.8								
	Urban	8,597	12.9								
	Total	10,457	15.7	M						VL	
C2 - Wood wall	Rural	6,017	9.1								
	Urban	2,745	4.1								
	Total	8,762	13.2	M						M	
Total - Category - C		19,219	28.9								
X - Other Materials	Rural	14,216	21.4								
	Urban	12,612	19.0								
	Total	26,828	40.4	M						M	
Total - Category - X		26,828	40.4								
TOTAL HOUSES*		66,480									

ROOF											
R1 - Light Weight Sloping Roof	Rural	28,786	43.3								
	Urban	26,256	39.5								
	Total	55,042	82.8	M						H	
R2 - Heavy Weight Sloping Roof	Rural	464	0.7								
	Urban	1,124	1.7								
	Total	1,588	2.4	H						L	
R3 - Flat Roof	Rural	895	1.3								
	Urban	8,955	13.5								
	Total	9,850	14.8							<i>Damage Risk as per that for the Wall supporting it</i>	
TOTAL HOUSES*		66,480									

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. **761 mm**

Housing Category : Wall Types

- Category - A :** Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B :** Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C :** Reinforced building, well built wooden structures
- Category - X :** Other materials not covered in A,B,C. These are generally light.

- Notes :** 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
- 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
- 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1 - Light Weight** (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2 - Heavy Weight** (Tiles, Stone/Slate)
- Category - R3 - Flat Roof** (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)

- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

Table No. : NG 11 State : NAGALAND PEREN

Wall / Roof	Census Houses		Level of Risk under								Flood Prone Area in %		
	No. of Houses	%	EQ Zone				Wind Velocity m/s						
			V	IV	III	II	55 & 50	47	44 & 39	33			
			Area in %				Area in %						
			100							95.5		4.5	
WALL													
A1 - Mud & Unburnt Brick Wall	Rural	2,954	13.0										
	Urban	108	0.5										
	Total	3,062	13.5	VH						VH		M	
A2 - Stone Wall not packed with mortar	Rural	44	0.2										
	Urban	30	0.1										
	Total	74	0.3	VH						H		L	
Total - Category - A		3,136	13.8										
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	936	4.1										
	Urban	642	2.8										
	Total	1,578	6.9	H						H		L	
Total - Category - B		1,578	6.9										
C1 - Concrete Wall	Rural	423	1.9										
	Urban	410	1.8										
	Total	833	3.7	M						L		VL	
C2 - Wood wall	Rural	2,667	11.7										
	Urban	446	2.0										
	Total	3,113	13.7	M						VH		M	
Total - Category - C		3,946	17.3										
X - Other Materials	Rural	12,226	53.7										
	Urban	1,889	8.3										
	Total	14,115	62.0	M						VH		M	
Total - Category - X		14,115	62.0										
TOTAL HOUSES*		22,775											

ROOF												
R1 - Light Weight Sloping Roof	Rural	18,893	83.0									
	Urban	3,279	14.4									
	Total	22,172	97.4	M						VH		H
R2 - Heavy Weight Sloping Roof	Rural	204	0.9									
	Urban	66	0.3									
	Total	270	1.2	H						H		L
R3 - Flat Roof	Rural	153	0.7									
	Urban	180	0.8									
	Total	333	1.5							<i>Damage Risk as per that for the Wall supporting it</i>		
TOTAL HOUSES*		22,775										

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. **760 mm**

Housing Category : Wall Types

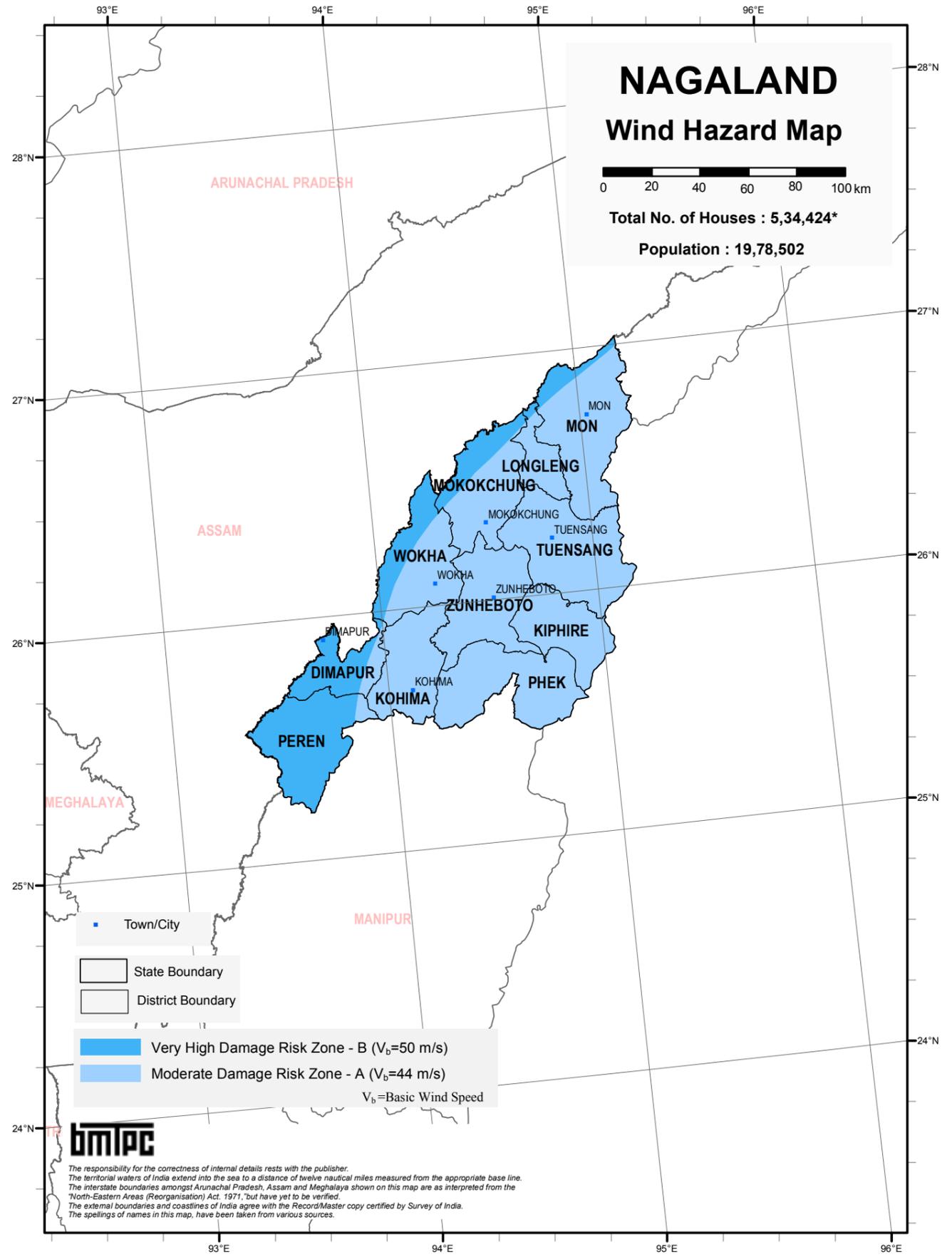
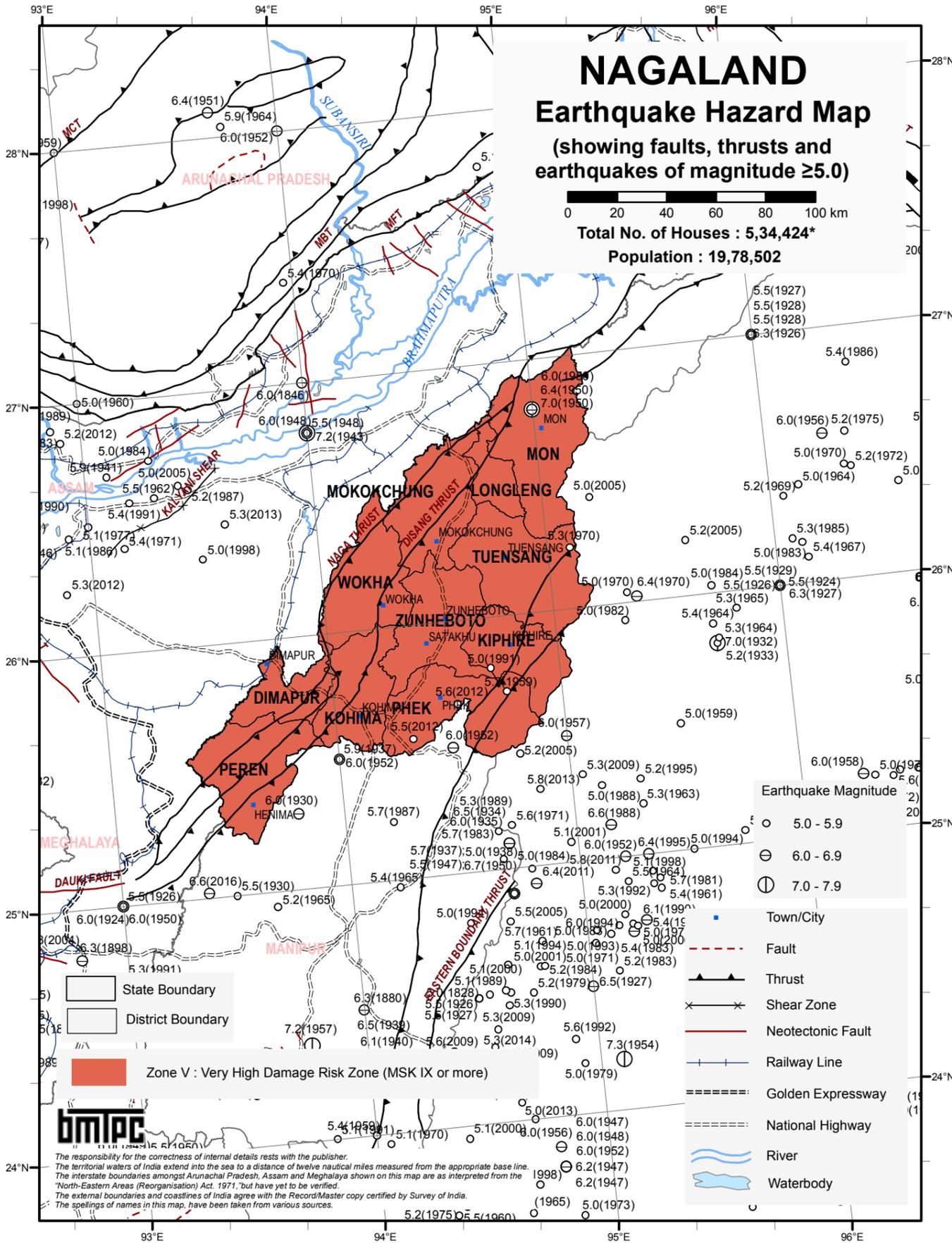
- Category - A :** Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B :** Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C :** Reinforced building, well built wooden structures
- Category - X :** Other materials not covered in A,B,C. These are generally light.

- Notes :** 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
- 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
- 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1 - Light Weight** (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2 - Heavy Weight** (Tiles, Stone/Slate)
- Category - R3 - Flat Roof** (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)

- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses



BMTPC : Vulnerability Atlas - 3rd Edition : Peer Group, MoHUA, GOI; Map is Based on digitised data of SOI; Seismic Zones of India Map IS:1893 (Part I); 2002, BIS; Earthquake Epicentre from IMD; Seismotectonic Atlas of India and its Environs, GSI; Houses/Population as per Census 2011; *Houses including vacant & locked houses. Disclaimer: The maps are solely for thematic presentation.

BMTPC : Vulnerability Atlas - 3rd Edition; Peer Group, MoHUA, GOI; Basic Wind Speed Map National Building Code 2016. Houses/Population as per Census 2011; *Houses including vacant & locked houses. Disclaimer: The maps are solely for thematic presentation.

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

ODISHA

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
STATE - ODISHA												
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	4,883,041	40.6									
	Urban	334,112	2.8									
	Total	5,217,153	43.4		M	L	VH	H	M			VH
A2 - Stone Wall not packed with mortar	Rural	155,681	1.3									
	Urban	27,780	0.2									
	Total	183,461	1.5		M	L	H	M	L			VH
Total - Category - A		5,400,614	44.9									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	3,685,752	30.7									
	Urban	1,400,296	11.7									
	Total	5,086,048	42.4		L	VL	H	M	L			H/M
Total - Category - B		5,086,048	42.3									
C1 - Concrete Wall	Rural	118,647	1.0									
	Urban	87,545	0.7									
	Total	206,192	1.7		VL	VL	L	VL	VL			L/VL
C2 - Wood wall	Rural	294,534	2.5									
	Urban	32,928	0.3									
	Total	327,462	2.8		VL	VL	VH	H	M			H
Total - Category - C		533,654	4.4									
X - Other Materials	Rural	910,213	7.6									
	Urban	88,160	0.7									
	Total	998,373	8.3		VL	VL	VH	H	M			VH
Total - Category - X		998,373	8.3									
TOTAL HOUSES*		12,018,689										

ROOF												
R1 - Light Weight Sloping Roof	Rural	5,177,844	43.1									
	Urban	761,014	6.3									
	Total	5,938,858	49.4		L	VL	VH	VH	H			VH
R2 - Heavy Weight Sloping Roof	Rural	2,957,391	24.6									
	Urban	259,301	2.2									
	Total	3,216,692	26.8		L	VL	H	M	L			H
R3 - Flat Roof	Rural	1,912,633	15.9									
	Urban	950,506	7.9									
	Total	2,863,139	23.8									
<i>Damage Risk as per that for the Wall supporting it</i>												
TOTAL HOUSES*		12,018,689										

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : OR 01

State : ODISHA

BARGARH

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
STATE - ODISHA												
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	225,176	51.7									
	Urban	11,238	2.6									
	Total	236,414	54.3		M	L			M			
A2 - Stone Wall not packed with mortar	Rural	3,147	0.7									
	Urban	407	0.1									
	Total	3,554	0.8		M	L			L			
Total - Category - A		239,968	55.1									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	129,699	29.8									
	Urban	24,551	5.6									
	Total	154,250	35.4		L	VL			L			
Total - Category - B		154,250	35.4									
C1 - Concrete Wall	Rural	17,200	3.9									
	Urban	5,901	1.4									
	Total	23,101	5.3		VL	VL			VL			
C2 - Wood wall	Rural	2,635	0.6									
	Urban	362	0.1									
	Total	2,997	0.7		VL	VL			M			
Total - Category - C		26,098	6.0									
X - Other Materials	Rural	14,813	3.4									
	Urban	611	0.1									
	Total	15,424	3.5		VL	VL			M			
Total - Category - X		15,424	3.5									
TOTAL HOUSES*		435,740										

ROOF												
R1 - Light Weight Sloping Roof	Rural	83,552	19.2									
	Urban	6,309	1.4									
	Total	89,861	20.6		L	VL			H			
R2 - Heavy Weight Sloping Roof	Rural	232,481	53.4									
	Urban	15,603	3.6									
	Total	248,084	57.0		L	VL			L			
R3 - Flat Roof	Rural	76,637	17.6									
	Urban	21,158	4.9									
	Total	97,795	22.5									
<i>Damage Risk as per that for the Wall supporting it</i>												
TOTAL HOUSES*		435,740										

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 640 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : OR 02 State : ODISHA JHARSUGUDA

Table No. : OR 03 State : ODISHA SAMBALPUR

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
WALL						40.0	60.0				100	
A1 - Mud & Unburnt Brick Wall	Rural	60,901	38.0									
	Urban	17,077	10.7									
	Total	77,978	48.7			M	L			M		
A2 - Stone Wall not packed with mortar	Rural	1,863	1.2									
	Urban	775	0.5									
	Total	2,638	1.7			M	L			L		
Total - Category - A		80,616	50.3									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	29,603	18.5									
	Urban	38,318	23.9									
	Total	67,921	42.4			L	VL			L		
Total - Category - B		67,921	42.4									
C1 - Concrete Wall	Rural	2,085	1.3									
	Urban	6,160	3.8									
	Total	8,245	5.1			VL	VL			VL		
C2 - Wood wall	Rural	363	0.2									
	Urban	301	0.2									
	Total	664	0.4			VL	VL			M		
Total - Category - C		8,909	5.6									
X - Other Materials	Rural	1,697	1.1									
	Urban	1,186	0.7									
	Total	2,883	1.8			VL	VL			M		
Total - Category - X		2,883	1.8									
TOTAL HOUSES*		160,329										

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
				Area in %				Area in %					
WALL						34.7	65.3				5.9	94.1	
A1 - Mud & Unburnt Brick Wall	Rural	107,570	36.4										
	Urban	19,367	6.6										
	Total	126,937	43.0			M	L			H	M		
A2 - Stone Wall not packed with mortar	Rural	4,756	1.6										
	Urban	1,530	0.5										
	Total	6,286	2.1			M	L			M	L		
Total - Category - A		133,223	45.1										
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	70,317	23.8										
	Urban	50,460	17.1										
	Total	120,777	40.9			L	VL			M	L		
Total - Category - B		120,777	40.9										
C1 - Concrete Wall	Rural	6,170	2.1										
	Urban	10,740	3.6										
	Total	16,910	5.7			VL	VL			VL	VL		
C2 - Wood wall	Rural	8,212	2.8										
	Urban	2,289	0.8										
	Total	10,501	3.6			VL	VL			H	M		
Total - Category - C		27,411	9.3										
X - Other Materials	Rural	11,342	3.8										
	Urban	2,609	0.9										
	Total	13,951	4.7			VL	VL			H	M		
Total - Category - X		13,951	4.7										
TOTAL HOUSES*		295,362											

ROOF									
R1 - Light Weight Sloping Roof	Rural	15,731	9.8						
	Urban	19,343	12.1						
	Total	35,074	21.9			L	VL		H
R2 - Heavy Weight Sloping Roof	Rural	67,976	42.4						
	Urban	19,760	12.3						
	Total	87,736	54.7			L	VL		L
R3 - Flat Roof	Rural	12,805	8.0						
	Urban	24,714	15.4						
	Total	37,519	23.4						
TOTAL HOUSES*		160,329							

ROOF									
R1 - Light Weight Sloping Roof	Rural	58,363	19.8						
	Urban	29,953	10.1						
	Total	88,316	29.9			L	VL		VH
R2 - Heavy Weight Sloping Roof	Rural	131,453	44.5						
	Urban	21,850	7.4						
	Total	153,303	51.9			L	VL		M
R3 - Flat Roof	Rural	18,551	6.3						
	Urban	35,192	11.9						
	Total	53,743	18.2						
TOTAL HOUSES*		295,362							

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 665 mm

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 667 mm

Housing Category : Wall Types

- Category - A :** Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B :** Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C :** Reinforced building, well built wooden structures
- Category - X :** Other materials not covered in A,B,C. These are generally light.

- Notes :** 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
- 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
- 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1 -** Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2 -** Heavy Weight (Tiles, Stone/Slate)
- Category - R3 -** Flat Roof (Brick, Concrete)
- EQ Zone V :** Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV :** High Damage Risk Zone (MSK VIII)
- EQ Zone III :** Moderate Damage Risk Zone (MSK VII)
- EQ Zone II :** Low Damage Risk Zone (MSK < VI)

- Level of Risk :** VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

Housing Category : Wall Types

- Category - A :** Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B :** Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C :** Reinforced building, well built wooden structures
- Category - X :** Other materials not covered in A,B,C. These are generally light.

- Notes :** 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
- 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
- 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1 -** Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2 -** Heavy Weight (Tiles, Stone/Slate)
- Category - R3 -** Flat Roof (Brick, Concrete)
- EQ Zone V :** Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV :** High Damage Risk Zone (MSK VIII)
- EQ Zone III :** Moderate Damage Risk Zone (MSK VII)
- EQ Zone II :** Low Damage Risk Zone (MSK < VI)

- Level of Risk :** VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : OR 04 State : ODISHA DEBAGARH

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
WALL						3.7	96.3			74.9	25.1	
A1 - Mud & Unburnt Brick Wall	Rural	28,524	30.1									
	Urban	1,490	1.6									
	Total	30,014	31.7			M	L			H	M	
A2 - Stone Wall not packed with mortar	Rural	4,184	4.4									
	Urban	45	-									
	Total	4,229	4.4			M	L			M	L	
Total - Category - A		34,243	36.1									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	34,247	36.1									
	Urban	4,328	4.6									
	Total	38,575	40.7			L	VL			M	L	
Total - Category - B		38,575	40.6									
C1 - Concrete Wall	Rural	628	0.7									
	Urban	214	0.2									
	Total	842	0.9			VL	VL			VL	VL	
C2 - Wood wall	Rural	9,258	9.8									
	Urban	188	0.2									
	Total	9,446	10.0			VL	VL			H	M	
Total - Category - C		10,288	10.8									
X - Other Materials	Rural	11,287	11.9									
	Urban	503	0.5									
	Total	11,790	12.4			VL	VL			H	M	
Total - Category - X		11,790	12.4									
TOTAL HOUSES*		94,896										
ROOF												
R1 - Light Weight Sloping Roof	Rural	25,584	27.0									
	Urban	1,586	1.7									
	Total	27,170	28.7			L	VL			VH	H	
R2 - Heavy Weight Sloping Roof	Rural	58,602	61.8									
	Urban	3,380	3.6									
	Total	61,982	65.4			L	VL			M	L	
R3 - Flat Roof	Rural	3,942	4.2									
	Urban	1,802	1.9									
	Total	5,744	6.1									
TOTAL HOUSES*		94,896										

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 633 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
 - Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
 - Category - C** : Reinforced building, well built wooden structures
 - Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
 - Category - R2** - Heavy Weight (Tiles, Stone/Slate)
 - Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : OR 05 State : ODISHA SUNDARGARH

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
WALL						3.7	96.3			3.0	97.0	
A1 - Mud & Unburnt Brick Wall	Rural	236,421	41.0									
	Urban	35,276	6.1									
	Total	271,697	47.1			M	L			H	M	
A2 - Stone Wall not packed with mortar	Rural	13,619	2.4									
	Urban	3,187	0.6									
	Total	16,806	3.0			M	L			M	L	
Total - Category - A		288,503	50.1									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	98,310	17.1									
	Urban	156,575	27.2									
	Total	254,885	44.3			L	VL			M	L	
Total - Category - B		254,885	44.2									
C1 - Concrete Wall	Rural	7,763	1.3									
	Urban	7,348	1.3									
	Total	15,111	2.6			VL	VL			VL	VL	
C2 - Wood wall	Rural	4,144	0.7									
	Urban	1,777	0.3									
	Total	5,921	1.0			VL	VL			H	M	
Total - Category - C		21,032	3.7									
X - Other Materials	Rural	7,115	1.2									
	Urban	4,666	0.8									
	Total	11,781	2.0			VL	VL			H	M	
Total - Category - X		11,781	2.0									
TOTAL HOUSES*		576,201										
ROOF												
R1 - Light Weight Sloping Roof	Rural	40,118	7.0									
	Urban	85,482	14.8									
	Total	125,600	21.8			L	VL			VH	H	
R2 - Heavy Weight Sloping Roof	Rural	304,130	52.8									
	Urban	42,621	7.4									
	Total	346,751	60.2			L	VL			M	L	
R3 - Flat Roof	Rural	23,124	4.0									
	Urban	80,726	14.0									
	Total	103,850	18.0									
TOTAL HOUSES*		576,201										

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 665 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
 - Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
 - Category - C** : Reinforced building, well built wooden structures
 - Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
 - Category - R2** - Heavy Weight (Tiles, Stone/Slate)
 - Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : OR 08 State : ODISHA BALESHWAR

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %		
		No. of Houses	%	EQ Zone				Wind Velocity m/s						
				V	IV	III	II	55 & 50	47	44 & 39	33			
				Area in %				Area in %						
						28.1	71.9	100					28.1	
WALL														
A1 - Mud & Unburnt Brick Wall	Rural	331,390	50.4											
	Urban	20,543	3.1											
	Total	351,933	53.5			M	L	VH						VH
A2 - Stone Wall not packed with mortar	Rural	2,646	0.4											
	Urban	710	0.1											
	Total	3,356	0.5			M	L	H						VH
Total - Category - A		355,289	54.0											
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	137,243	20.9											
	Urban	45,915	7.0											
	Total	183,158	27.9			L	VL	H						H/M
Total - Category - B		183,158	27.8											
C1 - Concrete Wall	Rural	5,809	0.9											
	Urban	1,791	0.3											
	Total	7,600	1.2			VL	VL	L						L/VL
C2 - Wood wall	Rural	3,333	0.5											
	Urban	1,168	0.2											
	Total	4,501	0.7			VL	VL	VH						H
Total - Category - C		12,101	1.8											
X - Other Materials	Rural	101,995	15.5											
	Urban	5,438	0.8											
	Total	107,433	16.3			VL	VL	VH						VH
Total - Category - X		107,433	16.3											
TOTAL HOUSES*		657,981												
ROOF														
R1 - Light Weight Sloping Roof	Rural	415,212	63.1											
	Urban	32,560	4.9											
	Total	447,772	68.0			L	VL	VH						VH
R2 - Heavy Weight Sloping Roof	Rural	68,925	10.5											
	Urban	5,059	0.8											
	Total	73,984	11.3			L	VL	H						H
R3 - Flat Roof	Rural	98,279	14.9											
	Urban	37,946	5.8											
	Total	136,225	20.7											
TOTAL HOUSES*		657,981												

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. **729 mm**

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
 - Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
 - Category - C** : Reinforced building, well built wooden structures
 - Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes :**
1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2001

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
 - Category - R2** - Heavy Weight (Tiles, Stone/Slate)
 - Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : OR 09 State : ODISHA BHADRAK

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %		
		No. of Houses	%	EQ Zone				Wind Velocity m/s						
				V	IV	III	II	55 & 50	47	44 & 39	33			
				Area in %				Area in %						
WALL														
A1 - Mud & Unburnt Brick Wall	Rural	234,589	57.2											
	Urban	18,207	4.4											
	Total	252,796	61.6			L	VH							VH
A2 - Stone Wall not packed with mortar	Rural	1,347	0.3											
	Urban	443	0.1											
	Total	1,790	0.4			L	H							VH
Total - Category - A		254,586	62.1											
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	81,951	20.0											
	Urban	24,557	6.0											
	Total	106,508	26.0			VL	H							H/M
Total - Category - B		106,508	26.0											
C1 - Concrete Wall	Rural	2,333	0.6											
	Urban	774	0.2											
	Total	3,107	0.8			VL	L							L/VL
C2 - Wood wall	Rural	2,732	0.7											
	Urban	1,156	0.3											
	Total	3,888	1.0			VL	VH							H
Total - Category - C		6,995	1.7											
X - Other Materials	Rural	37,826	9.2											
	Urban	4,259	1.0											
	Total	42,085	10.2			VL	VH							VH
Total - Category - X		42,085	10.3											
TOTAL HOUSES*		410,174												
ROOF														
R1 - Light Weight Sloping Roof	Rural	295,195	72.0											
	Urban	29,876	7.3											
	Total	325,071	79.3			VL	VH							VH
R2 - Heavy Weight Sloping Roof	Rural	5,801	1.4											
	Urban	1,142	0.3											
	Total	6,943	1.7			VL	H							H
R3 - Flat Roof	Rural	59,782	14.6											
	Urban	18,378	4.5											
	Total	78,160	19.1											
TOTAL HOUSES*		410,174												

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. **735 mm**

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
 - Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
 - Category - C** : Reinforced building, well built wooden structures
 - Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes :**
1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
 - Category - R2** - Heavy Weight (Tiles, Stone/Slate)
 - Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : OR 10 State : ODISHA KENDRAPARA

Table No. : OR 11 State : ODISHA JAGATSINGHAPUR

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %		
		No. of Houses	%	EQ Zone				Wind Velocity m/s						
				V	IV	III	II	55 & 50	47	44 & 39	33			
				Area in %				Area in %						
						87.0	13.0	100					48.4	
WALL														
A1 - Mud & Unburnt Brick Wall	Rural	237,793	56.4											
	Urban	6,136	1.5											
	Total	243,929	57.9			M	L	VH						VH
A2 - Stone Wall not packed with mortar	Rural	976	0.2											
	Urban	38	-											
	Total	1,014	0.2			M	L	H						VH
Total - Category - A		244,943	58.1											
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	139,540	33.1											
	Urban	14,240	3.4											
	Total	153,780	36.5			L	VL	H						H/M
Total - Category - B		153,780	36.5											
C1 - Concrete Wall	Rural	1,451	0.3											
	Urban	286	0.1											
	Total	1,737	0.4			VL	VL	L						L/VL
C2 - Wood wall	Rural	3,866	0.9											
	Urban	434	0.1											
	Total	4,300	1.0			VL	VL	VH						H
Total - Category - C		6,037	1.4											
X - Other Materials	Rural	16,090	3.8											
	Urban	680	0.2											
	Total	16,770	4.0			VL	VL	VH						VH
Total - Category - X		16,770	4.0											
TOTAL HOUSES*		421,530												
ROOF														
R1 - Light Weight Sloping Roof	Rural	289,583	68.7											
	Urban	10,984	2.6											
	Total	300,567	71.3			L	VL	VH						VH
R2 - Heavy Weight Sloping Roof	Rural	4,484	1.1											
	Urban	456	0.1											
	Total	4,940	1.2			L	VL	H						H
R3 - Flat Roof	Rural	105,649	25.1											
	Urban	10,374	2.5											
	Total	116,023	27.6											
TOTAL HOUSES*		421,530												

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %		
		No. of Houses	%	EQ Zone				Wind Velocity m/s						
				V	IV	III	II	55 & 50	47	44 & 39	33			
				Area in %				Area in %						
						100								57.4
WALL														
A1 - Mud & Unburnt Brick Wall	Rural	105,196	31.5											
	Urban	6,708	2.0											
	Total	111,904	33.5			M		VH						VH
A2 - Stone Wall not packed with mortar	Rural	1,486	0.4											
	Urban	320	0.1											
	Total	1,806	0.5			M		H						VH
Total - Category - A		113,710	34.0											
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	164,204	49.2											
	Urban	23,211	6.9											
	Total	187,415	56.1			L		H						H/M
Total - Category - B		187,415	56.1											
C1 - Concrete Wall	Rural	3,296	1.0											
	Urban	960	0.3											
	Total	4,256	1.3			VL		L						L/VL
C2 - Wood wall	Rural	3,180	1.0											
	Urban	813	0.2											
	Total	3,993	1.2			VL		VH						H
Total - Category - C		8,249	2.5											
X - Other Materials	Rural	19,953	6.0											
	Urban	4,649	1.4											
	Total	24,602	7.4			VL		VH						VH
Total - Category - X		24,602	7.4											
TOTAL HOUSES*		333,976												
ROOF														
R1 - Light Weight Sloping Roof	Rural	160,772	48.1											
	Urban	22,148	6.6											
	Total	182,920	54.7			L		VH						VH
R2 - Heavy Weight Sloping Roof	Rural	6,011	1.8											
	Urban	853	0.3											
	Total	6,864	2.1			L		H						H
R3 - Flat Roof	Rural	130,532	39.1											
	Urban	13,660	4.1											
	Total	144,192	43.2											
TOTAL HOUSES*		333,976												

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 716 mm

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 801 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
- 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
- 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V** : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV** : High Damage Risk Zone (MSK VIII)
- EQ Zone III** : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II** : Low Damage Risk Zone (MSK < VI)

- Level of Risk** : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
- 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
- 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V** : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV** : High Damage Risk Zone (MSK VIII)
- EQ Zone III** : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II** : Low Damage Risk Zone (MSK < VI)

- Level of Risk** : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : OR 12 State : ODISHA CUTTACK

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
						75.0	25.0	83.5	16.5			22.1
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	161,954	21.7									
	Urban	12,466	1.7									
	Total	174,420	23.4			M	L	VH	H			VH
A2 - Stone Wall not packed with mortar	Rural	15,612	2.1									
	Urban	3,510	0.5									
	Total	19,122	2.6			M	L	H	M			VH
Total - Category - A		193,542	25.9									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	295,446	39.5									
	Urban	159,241	21.3									
	Total	454,687	60.8			L	VL	H	M			H/M
Total - Category - B		454,687	60.8									
C1 - Concrete Wall	Rural	2,821	0.4									
	Urban	7,644	1.0									
	Total	10,465	1.4			VL	VL	L	VL			L/VL
C2 - Wood wall	Rural	9,320	1.2									
	Urban	3,433	0.5									
	Total	12,753	1.7			VL	VL	VH	H			H
Total - Category - C		23,218	3.1									
X - Other Materials	Rural	70,547	9.4									
	Urban	5,986	0.8									
	Total	76,533	10.2			VL	VL	VH	H			VH
Total - Category - X		76,533	10.2									
TOTAL HOUSES*		747,980										
ROOF												
R1 - Light Weight Sloping Roof	Rural	335,450	44.8									
	Urban	66,459	8.9									
	Total	401,909	53.7			L	VL	VH	VH			VH
R2 - Heavy Weight Sloping Roof	Rural	32,430	4.3									
	Urban	6,754	0.9									
	Total	39,184	5.2			L	VL	H	M			H
R3 - Flat Roof	Rural	187,820	25.1									
	Urban	119,067	15.9									
	Total	306,887	41.0									
TOTAL HOUSES*		747,980										

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. **760 mm**

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : OR 13 State : ODISHA JAJAPUR

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
						43.3	56.7	100				38.1
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	184,003	35.6									
	Urban	7,688	1.5									
	Total	191,691	37.1			M	L	VH				VH
A2 - Stone Wall not packed with mortar	Rural	7,277	1.4									
	Urban	546	0.1									
	Total	7,823	1.5			M	L	H				VH
Total - Category - A		199,514	38.6									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	208,286	40.3									
	Urban	28,326	5.5									
	Total	236,612	45.8			L	VL	H				H/M
Total - Category - B		236,612	45.8									
C1 - Concrete Wall	Rural	2,680	0.5									
	Urban	252	-									
	Total	2,932	0.5			VL	VL	L				L/VL
C2 - Wood wall	Rural	5,995	1.2									
	Urban	717	0.1									
	Total	6,712	1.3			VL	VL	VH				H
Total - Category - C		9,644	1.9									
X - Other Materials	Rural	68,454	13.2									
	Urban	2,930	0.6									
	Total	71,384	13.8			VL	VL	VH				VH
Total - Category - X		71,384	13.8									
TOTAL HOUSES*		517,154										
ROOF												
R1 - Light Weight Sloping Roof	Rural	309,627	59.9									
	Urban	18,232	3.5									
	Total	327,859	63.4			L	VL	VH				VH
R2 - Heavy Weight Sloping Roof	Rural	13,249	2.6									
	Urban	1,709	0.3									
	Total	14,958	2.9			L	VL	H				H
R3 - Flat Roof	Rural	153,819	29.7									
	Urban	20,518	4.0									
	Total	174,337	33.7									
TOTAL HOUSES*		517,154										

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. **719 mm**

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : OR 14 State : ODISHA DHENKANAL

Table No. : OR 15 State : ODISHA ANUGUL

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
				Area in %				Area in %					
WALL						79.7	20.3			87.2	12.8		
A1 - Mud & Unburnt Brick Wall	Rural	130,276	39.0										
	Urban	5,227	1.6										
	Total	135,503	40.6			M	L	VH	H				
A2 - Stone Wall not packed with mortar	Rural	10,152	3.0										
	Urban	607	0.2										
	Total	10,759	3.2			M	L	H	M				
Total - Category - A		146,262	43.8										
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	121,878	36.5										
	Urban	25,153	7.5										
	Total	147,031	44.0			L	VL	H	M				
Total - Category - B		147,031	44.0										
C1 - Concrete Wall	Rural	1,460	0.4										
	Urban	217	0.1										
	Total	1,677	0.5			VL	VL	L	VL				
C2 - Wood wall	Rural	8,529	2.6										
	Urban	1,259	0.4										
	Total	9,788	3.0			VL	VL	VH	H				
Total - Category - C		11,465	3.4										
X - Other Materials	Rural	28,019	8.4										
	Urban	1,506	0.5										
	Total	29,525	8.9			VL	VL	VH	H				
Total - Category - X		29,525	8.8										
TOTAL HOUSES*		334,283											

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
				Area in %				Area in %					
WALL													
A1 - Mud & Unburnt Brick Wall	Rural	114,279	29.7										
	Urban	8,566	2.2										
	Total	122,845	31.9			M	L	H	M				
A2 - Stone Wall not packed with mortar	Rural	5,634	1.5										
	Urban	402	0.1										
	Total	6,036	1.6			M	L	M	L				
Total - Category - A		128,881	33.4										
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	140,753	36.5										
	Urban	48,069	12.5										
	Total	188,822	49.0			L	VL	M	L				
Total - Category - B		188,822	49.0										
C1 - Concrete Wall	Rural	2,571	0.7										
	Urban	1,363	0.4										
	Total	3,934	1.1			VL	VL	VL	VL				
C2 - Wood wall	Rural	21,647	5.6										
	Urban	821	0.2										
	Total	22,468	5.8			VL	VL	H	M				
Total - Category - C		26,402	6.9										
X - Other Materials	Rural	38,222	9.9										
	Urban	3,094	0.8										
	Total	41,316	10.7			VL	VL	H	M				
Total - Category - X		41,316	10.7										
TOTAL HOUSES*		385,421											

ROOF																
R1 - Light Weight Sloping Roof	Rural	182,851	54.7													
														Urban	11,867	3.5
						L	VL	VH	VH							
R2 - Heavy Weight Sloping Roof	Rural	28,310	8.5													
	Urban	3,422	1.0													
	Total	31,732	9.5			L	VL	H	M							
R3 - Flat Roof	Rural	89,153	26.7													
	Urban	18,680	5.6													
	Total	107,833	32.3													
TOTAL HOUSES*		334,283														

ROOF																
R1 - Light Weight Sloping Roof	Rural	194,689	50.5													
														Urban	26,081	6.8
						L	VL	VH	H							
R2 - Heavy Weight Sloping Roof	Rural	73,457	19.1													
	Urban	5,615	1.5													
	Total	79,072	20.6			L	VL	M	L							
R3 - Flat Roof	Rural	54,960	14.3													
	Urban	30,619	7.9													
	Total	85,579	22.2													
TOTAL HOUSES*		385,421														

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 706 mm

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 694 mm

Housing Category : Wall Types

- Category - A :** Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B :** Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C :** Reinforced building, well built wooden structures
- Category - X :** Other materials not covered in A,B,C. These are generally light.

- Notes :** 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
- 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
- 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1 -** Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2 -** Heavy Weight (Tiles, Stone/Slate)
- Category - R3 -** Flat Roof (Brick, Concrete)
- EQ Zone V :** Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV :** High Damage Risk Zone (MSK VIII)
- EQ Zone III :** Moderate Damage Risk Zone (MSK VII)
- EQ Zone II :** Low Damage Risk Zone (MSK < VI)

- Level of Risk :** VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

Housing Category : Wall Types

- Category - A :** Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B :** Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C :** Reinforced building, well built wooden structures
- Category - X :** Other materials not covered in A,B,C. These are generally light.

- Notes :** 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
- 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
- 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1 -** Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2 -** Heavy Weight (Tiles, Stone/Slate)
- Category - R3 -** Flat Roof (Brick, Concrete)
- EQ Zone V :** Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV :** High Damage Risk Zone (MSK VIII)
- EQ Zone III :** Moderate Damage Risk Zone (MSK VII)
- EQ Zone II :** Low Damage Risk Zone (MSK < VI)

- Level of Risk :** VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : OR 16 State : ODISHA NAYAGARH

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %								
		No. of Houses	%	EQ Zone				Wind Velocity m/s												
				V	IV	III	II	55 & 50	47	44 & 39	33									
				Area in %				Area in %												
WALL																				
A1 - Mud & Unburnt Brick Wall	Rural	83,442	30.6																	
	Urban	4,136	1.5																	
	Total	87,578	32.1				L	VH	H											
A2 - Stone Wall not packed with mortar	Rural	7,670	2.8																	
	Urban	503	0.2																	
	Total	8,173	3.0				L	H	M											
Total - Category - A		95,751	35.1																	
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	111,621	41.0																	
	Urban	17,654	6.5																	
	Total	129,275	47.5				VL	H	M											
Total - Category - B		129,275	47.4																	
C1 - Concrete Wall	Rural	1,525	0.6																	
	Urban	262	0.1																	
	Total	1,787	0.7				VL	L	VL											
C2 - Wood wall	Rural	9,131	3.4																	
	Urban	611	0.2																	
	Total	9,742	3.6				VL	VH	H											
Total - Category - C		11,529	4.2																	
X - Other Materials	Rural	35,187	12.9																	
	Urban	715	0.3																	
	Total	35,902	13.2				VL	VH	H											
Total - Category - X		35,902	13.2																	
TOTAL HOUSES*		272,457																		
ROOF																				
R1 - Light Weight Sloping Roof	Rural	149,482	54.9																	
	Urban	9,443	3.5																	
	Total	158,925	58.4				VL	VH	VH											
R2 - Heavy Weight Sloping Roof	Rural	32,156	11.8																	
	Urban	2,234	0.8																	
	Total	34,390	12.6				VL	H	M											
R3 - Flat Roof	Rural	66,938	24.6																	
	Urban	12,204	4.5																	
	Total	79,142	29.1																	
TOTAL HOUSES*		272,457																		

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. **726 mm**

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
 - Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
 - Category - C** : Reinforced building, well built wooden structures
 - Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes :** 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
 - Category - R2** - Heavy Weight (Tiles, Stone/Slate)
 - Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : OR 17 State : ODISHA KHORDHA

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %								
		No. of Houses	%	EQ Zone				Wind Velocity m/s												
				V	IV	III	II	55 & 50	47	44 & 39	33									
				Area in %				Area in %												
WALL																				
A1 - Mud & Unburnt Brick Wall	Rural	116,830	18.7																	
	Urban	35,239	5.6																	
	Total	152,069	24.3				M	L	VH	H	M									VH
A2 - Stone Wall not packed with mortar	Rural	17,128	2.7																	
	Urban	6,835	1.1																	
	Total	23,963	3.8				M	L	H	M	L									VH
Total - Category - A		176,032	28.1																	
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	146,146	23.4																	
	Urban	240,919	38.5																	
	Total	387,065	61.9				L	VL	H	M	L									H/M
Total - Category - B		387,065	61.9																	
C1 - Concrete Wall	Rural	2,863	0.5																	
	Urban	10,853	1.7																	
	Total	13,716	2.2				VL	VL	L	VL	VL									L/VL
C2 - Wood wall	Rural	4,141	0.7																	
	Urban	6,091	1.0																	
	Total	10,232	1.7				VL	VL	VH	H	M									H
Total - Category - C		23,948	3.8																	
X - Other Materials	Rural	24,217	3.9																	
	Urban	14,139	2.3																	
	Total	38,356	6.2				VL	VL	VH	H	M									VH
Total - Category - X		38,356	6.1																	
TOTAL HOUSES*		625,401																		
ROOF																				
R1 - Light Weight Sloping Roof	Rural	205,401	32.8																	
	Urban	126,095	20.2																	
	Total	331,496	53.0				L	VL	VH	VH	H									VH
R2 - Heavy Weight Sloping Roof	Rural	15,061	2.4																	
	Urban	9,980	1.6																	
	Total	25,041	4.0				L	VL	H	M	L									H
R3 - Flat Roof	Rural	90,863	14.5																	
	Urban	178,001	28.5																	
	Total	268,864	43.0																	
TOTAL HOUSES*		625,401																		

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. **763 mm**

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
 - Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
 - Category - C** : Reinforced building, well built wooden structures
 - Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes :** 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
 - Category - R2** - Heavy Weight (Tiles, Stone/Slate)
 - Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : OR 18 State : ODISHA PURI

Table No. : OR 19 State : ODISHA GANJAM

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %		
		No. of Houses	%	EQ Zone				Wind Velocity m/s						
				V	IV	III	II	55 & 50	47	44 & 39	33			
				Area in %				Area in %						
						75.3	24.7	100					32.5	
WALL														
A1 - Mud & Unburnt Brick Wall	Rural	141,284	31.4											
	Urban	5,480	1.2											
	Total	146,764	32.6			M	L	VH						VH
A2 - Stone Wall not packed with mortar	Rural	6,814	1.5											
	Urban	993	0.2											
	Total	7,807	1.7			M	L	H						VH
Total - Category - A		154,571	34.3											
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	186,976	41.5											
	Urban	51,826	11.5											
	Total	238,802	53.0			L	VL	H						H/M
Total - Category - B		238,802	53.1											
C1 - Concrete Wall	Rural	2,725	0.6											
	Urban	2,841	0.6											
	Total	5,566	1.2			VL	VL	L						L/VL
C2 - Wood wall	Rural	6,579	1.5											
	Urban	1,562	0.3											
	Total	8,141	1.8			VL	VL	VH						H
Total - Category - C		13,707	3.0											
X - Other Materials	Rural	39,289	8.7											
	Urban	3,662	0.8											
	Total	42,951	9.5			VL	VL	VH						VH
Total - Category - X		42,951	9.5											
TOTAL HOUSES*		450,031												
ROOF														
R1 - Light Weight Sloping Roof	Rural	285,650	63.5											
	Urban	29,914	6.6											
	Total	315,564	70.1			L	VL	VH						VH
R2 - Heavy Weight Sloping Roof	Rural	7,098	1.6											
	Urban	1,425	0.3											
	Total	8,523	1.9			L	VL	H						H
R3 - Flat Roof	Rural	90,919	20.2											
	Urban	35,025	7.8											
	Total	125,944	28.0											
TOTAL HOUSES*		450,031												

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %		
		No. of Houses	%	EQ Zone				Wind Velocity m/s						
				V	IV	III	II	55 & 50	47	44 & 39	33			
				Area in %				Area in %						
														4.7
WALL														
A1 - Mud & Unburnt Brick Wall	Rural	127,879	14.1											
	Urban	16,800	1.9											
	Total	144,679	16.0			L	VH	H						VH
A2 - Stone Wall not packed with mortar	Rural	6,886	0.8											
	Urban	1,526	0.2											
	Total	8,412	1.0			L	H	M						VH
Total - Category - A		153,091	16.9											
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	469,247	51.8											
	Urban	158,725	17.5											
	Total	627,972	69.3			VL	H	M						H/M
Total - Category - B		627,972	69.3											
C1 - Concrete Wall	Rural	8,964	1.0											
	Urban	6,110	0.7											
	Total	15,074	1.7			VL	L	VL						L/VL
C2 - Wood wall	Rural	28,356	3.1											
	Urban	2,549	0.3											
	Total	30,905	3.4			VL	VH	H						H
Total - Category - C		45,979	5.1											
X - Other Materials	Rural	71,891	7.9											
	Urban	7,024	0.8											
	Total	78,915	8.7			VL	VH	H						VH
Total - Category - X		78,915	8.7											
TOTAL HOUSES*		905,957												
ROOF														
R1 - Light Weight Sloping Roof	Rural	341,073	37.6											
	Urban	59,732	6.6											
	Total	400,805	44.2			VL	VH	VH						VH
R2 - Heavy Weight Sloping Roof	Rural	26,137	2.9											
	Urban	8,630	1.0											
	Total	34,767	3.9			VL	H	M						H
R3 - Flat Roof	Rural	346,013	38.2											
	Urban	124,372	13.7											
	Total	470,385	51.9											
TOTAL HOUSES*		905,957												

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 801 mm

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 726 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
- 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
- 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)

- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
- 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
- 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)

- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : OR 20 State : ODISHA GAJAPATI

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %								
		No. of Houses	%	EQ Zone				Wind Velocity m/s												
				V	IV	III	II	55 & 50	47	44 & 39	33									
				Area in %				Area in %												
WALL																				
A1 - Mud & Unburnt Brick Wall	Rural	43,499	27.6																	
	Urban	2,951	1.9																	
	Total	46,450	29.5				L	VH	H	M										
A2 - Stone Wall not packed with mortar	Rural	9,932	6.3																	
	Urban	295	0.2																	
	Total	10,227	6.5				L	H	M	L										
Total - Category - A		56,677	36.0																	
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	48,129	30.6																	
	Urban	14,447	9.2																	
	Total	62,576	39.8				VL	H	M	L										
Total - Category - B		62,576	39.8																	
C1 - Concrete Wall	Rural	886	0.6																	
	Urban	420	0.3																	
	Total	1,306	0.9				VL	L	VL	VL										
C2 - Wood wall	Rural	19,659	12.5																	
	Urban	578	0.4																	
	Total	20,237	12.9				VL	VH	H	M										
Total - Category - C		21,543	13.7																	
X - Other Materials	Rural	15,274	9.7																	
	Urban	1,271	0.8																	
	Total	16,545	10.5				VL	VH	H	M										
Total - Category - X		16,545	10.5																	
TOTAL HOUSES*		157,341																		
ROOF																				
R1 - Light Weight Sloping Roof	Rural	107,282	68.2																	
	Urban	9,236	5.9																	
	Total	116,518	74.1				VL	VH	VH	H										
R2 - Heavy Weight Sloping Roof	Rural	4,044	2.6																	
	Urban	1,147	0.7																	
	Total	5,191	3.3				VL	H	M	L										
R3 - Flat Roof	Rural	26,053	16.6																	
	Urban	9,579	6.1																	
	Total	35,632	22.7																	
TOTAL HOUSES*		157,341																		

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 669 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
 - Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
 - Category - C** : Reinforced building, well built wooden structures
 - Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes :** 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
 - Category - R2** - Heavy Weight (Tiles, Stone/Slate)
 - Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
EQ Zone IV : High Damage Risk Zone (MSK VIII)
EQ Zone III : Moderate Damage Risk Zone (MSK VII)
EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : OR 21 State : ODISHA KANDHAMAL

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %								
		No. of Houses	%	EQ Zone				Wind Velocity m/s												
				V	IV	III	II	55 & 50	47	44 & 39	33									
				Area in %				Area in %												
WALL																				
A1 - Mud & Unburnt Brick Wall	Rural	73,438	32.6																	
	Urban	4,431	2.0																	
	Total	77,869	34.6				L	H	M											
A2 - Stone Wall not packed with mortar	Rural	1,803	0.8																	
	Urban	326	0.1																	
	Total	2,129	0.9				L	M	L											
Total - Category - A		79,998	35.5																	
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	62,692	27.8																	
	Urban	14,549	6.5																	
	Total	77,241	34.3				VL	M	L											
Total - Category - B		77,241	34.3																	
C1 - Concrete Wall	Rural	1,208	0.5																	
	Urban	124	0.1																	
	Total	1,332	0.6				VL	VL	VL											
C2 - Wood wall	Rural	49,847	22.1																	
	Urban	1,125	0.5																	
	Total	50,972	22.6				VL	H	M											
Total - Category - C		52,304	23.2																	
X - Other Materials	Rural	14,848	6.6																	
	Urban	813	0.4																	
	Total	15,661	7.0				VL	H	M											
Total - Category - X		15,661	7.0																	
TOTAL HOUSES*		225,204																		
ROOF																				
R1 - Light Weight Sloping Roof	Rural	171,595	76.2																	
	Urban	13,867	6.2																	
	Total	185,462	82.4				VL	VH	H											
R2 - Heavy Weight Sloping Roof	Rural	23,663	10.5																	
	Urban	1,027	0.5																	
	Total	24,690	11.0				VL	M	L											
R3 - Flat Roof	Rural	8,578	3.8																	
	Urban	6,474	2.9																	
	Total	15,052	6.7																	
TOTAL HOUSES*		225,204																		

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 606 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
 - Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
 - Category - C** : Reinforced building, well built wooden structures
 - Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes :** 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
 - Category - R2** - Heavy Weight (Tiles, Stone/Slate)
 - Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
EQ Zone IV : High Damage Risk Zone (MSK VIII)
EQ Zone III : Moderate Damage Risk Zone (MSK VII)
EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : OR 30 State : ODISHA MALKANGIRI

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
							100			16.5	83.5	
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	88,350	50.0									
	Urban	3,712	2.1									
	Total	92,062	52.1				L			H	M	
A2 - Stone Wall not packed with mortar	Rural	1,071	0.6									
	Urban	141	0.1									
	Total	1,212	0.7				L			M	L	
Total - Category - A		93,274	52.8									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	30,435	17.2									
	Urban	7,805	4.4									
	Total	38,240	21.6				VL			M	L	
Total - Category - B		38,240	21.6									
C1 - Concrete Wall	Rural	794	0.4									
	Urban	107	0.1									
	Total	901	0.5				VL			VL	VL	
C2 - Wood wall	Rural	9,860	5.6									
	Urban	339	0.2									
	Total	10,199	5.8				VL			H	M	
Total - Category - C		11,100	6.3									
X - Other Materials	Rural	32,100	18.2									
	Urban	2,096	1.2									
	Total	34,196	19.4				VL			H	M	
Total - Category - X		34,196	19.3									
TOTAL HOUSES*		176,810										
ROOF												
R1 - Light Weight Sloping Roof	Rural	98,746	55.8									
	Urban	9,660	5.5									
	Total	108,406	61.3				VL			VH	H	
R2 - Heavy Weight Sloping Roof	Rural	58,723	33.2									
	Urban	1,510	0.9									
	Total	60,233	34.1				VL			M	L	
R3 - Flat Roof	Rural	5,141	2.9									
	Urban	3,030	1.7									
	Total	8,171	4.6									
TOTAL HOUSES*		176,810										

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 754 mm

Housing Category : Wall Types

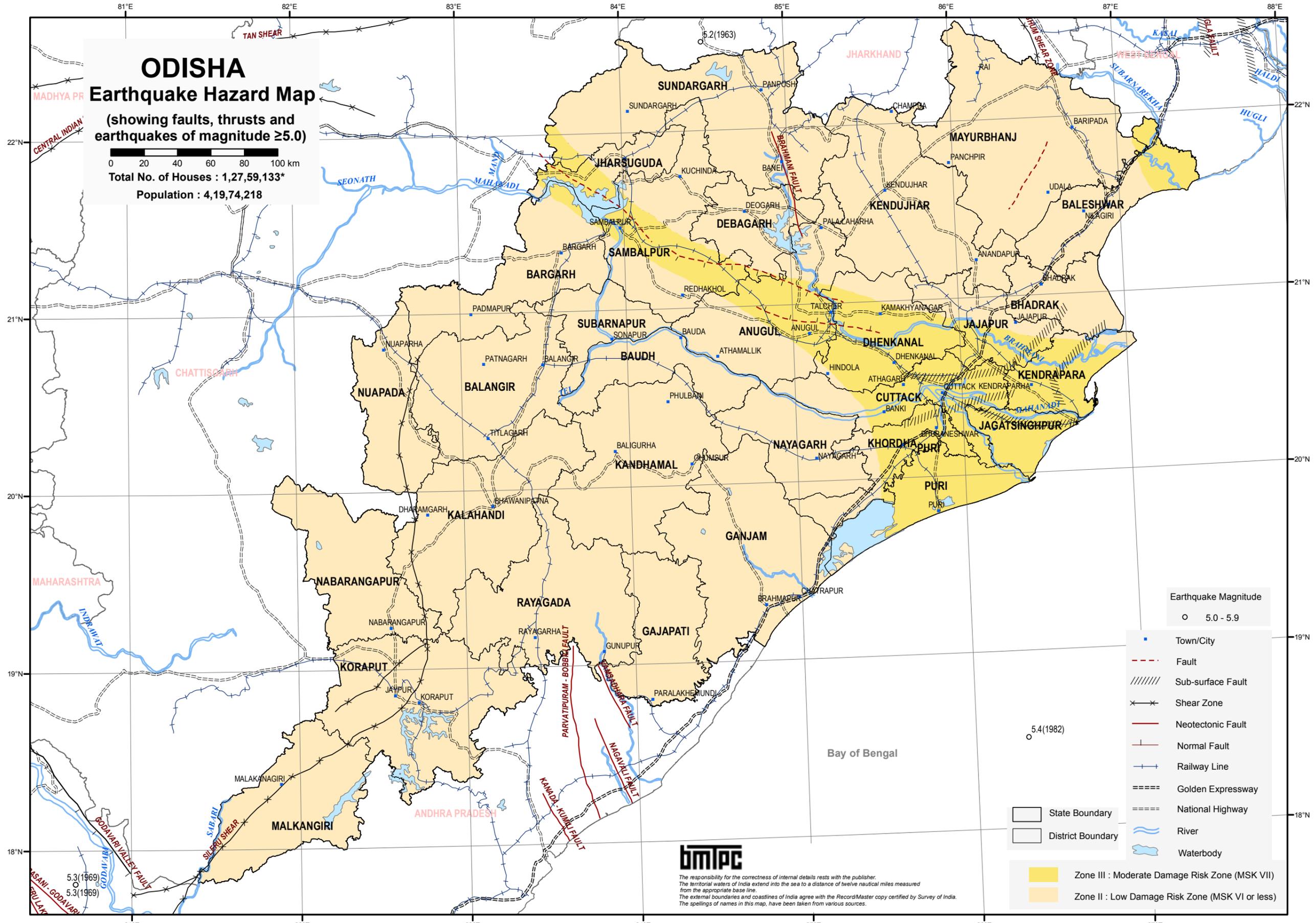
- Category - A :** Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B :** Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C :** Reinforced building, well built wooden structures
- Category - X :** Other materials not covered in A,B,C. These are generally light.

- Notes :**
1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1 -** Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
 - Category - R2 -** Heavy Weight (Tiles, Stone/Slate)
 - Category - R3 -** Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)

Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
 * Total No. of Houses excluding Vacant/Locked Houses



ODISHA
Earthquake Hazard Map
 (showing faults, thrusts and earthquakes of magnitude ≥ 5.0)

0 20 40 60 80 100 km

Total No. of Houses : 1,27,59,133*

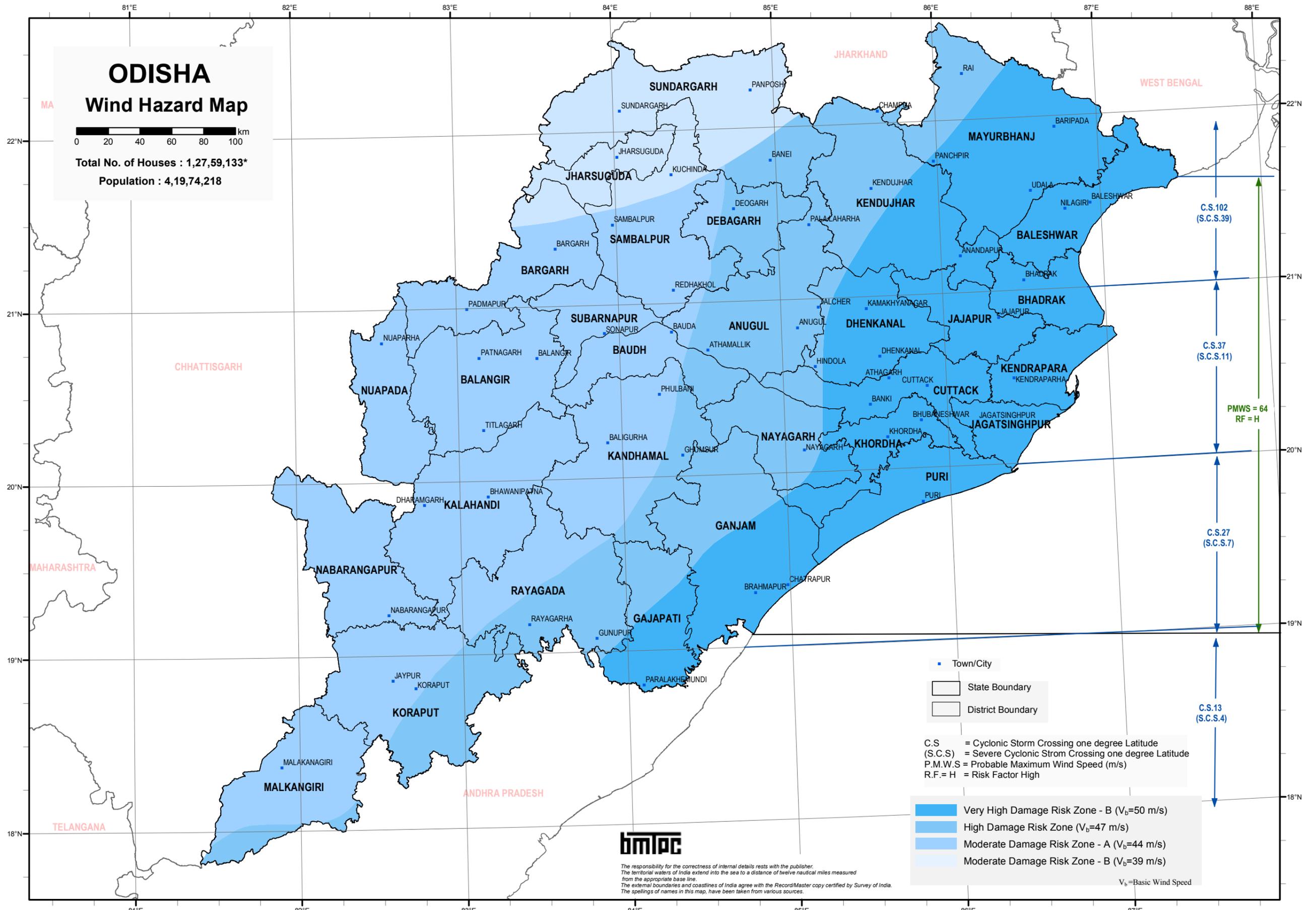
Population : 4,19,74,218

- Earthquake Magnitude
- 5.0 - 5.9
 - Town/City
 - - - Fault
 - //// Sub-surface Fault
 - × × Shear Zone
 - - - Neotectonic Fault
 - | - Normal Fault
 - + + Railway Line
 - ==== Golden Expressway
 - ==== National Highway
 - ~ ~ ~ River
 - ~ ~ ~ Waterbody
- State Boundary
- District Boundary
- Zone III : Moderate Damage Risk Zone (MSK VII)
- Zone II : Low Damage Risk Zone (MSK VI or less)

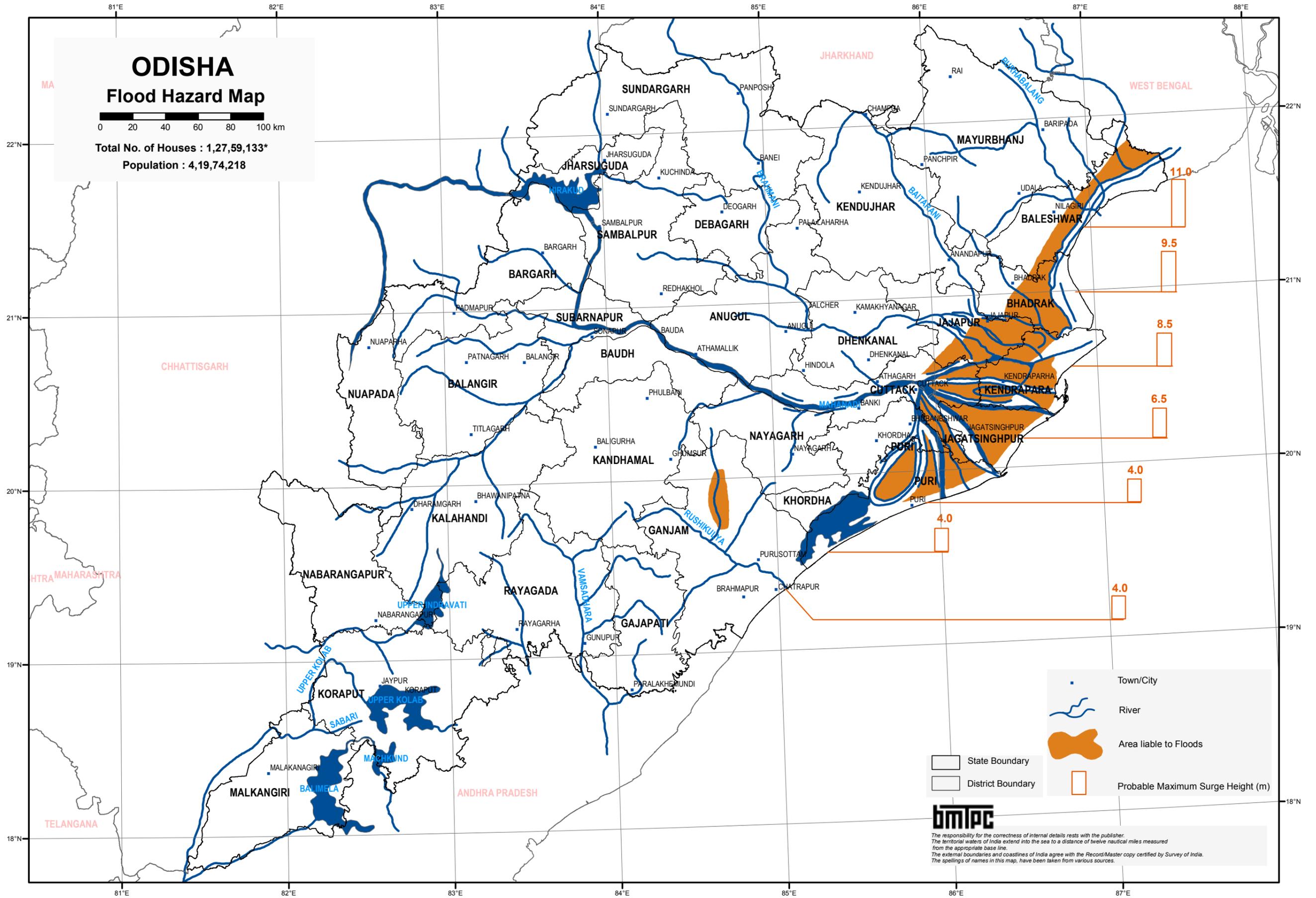
bmtpc

The responsibility for the correctness of internal details rests with the publisher.
 The territorial waters of India extend into the sea to a distance of twelve nautical miles measured from the appropriate base line.
 The external boundaries and coastlines of India agree with the Record/Master copy certified by Survey of India.
 The spellings of names in this map, have been taken from various sources.

BMTPC : Vulnerability Atlas - 3rd Edition : Peer Group, MoHUA, GOI; Map is Based on digitised data of SOI; Seismic Zones of India Map IS: 1893 (Part I); 2002, BIS; Earthquake Epicentre from IMD; Seismotectonic Atlas of India and its Environs, GSI; Houses/Population as per Census 2011; *Houses including vacant & locked houses. Disclaimer: The maps are solely for thematic presentation.



BMTPC : Vulnerability Atlas - 3rd Edition; Peer Group, MoHUA; Map is Based on digitised data of SOI, GOI; Basic Wind Speed Map National Building Code 2016; Cyclone Data, 1891-2015, IMD, GOI. Houses/Population as per Census 2011; *Houses including vacant & locked houses. Disclaimer: The maps are solely for thematic presentation.



bmtpc

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BMTPC : Vulnerability Atlas - 3rd Edition; Peer Group, MoHUA; Map is Based on digitised data of SOI, GOI; Census of India 2011; Flood Atlas (1987), Task Force Report (2004), C.W.C., G.O.I. Houses/Population as per Census 2011; * Houses including vacant & locked houses.
Disclaimer: The maps are solely for thematic presentation.

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

PUNJAB

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
STATE - PUNJAB				.9	48.1	46.0	5.0	68.1	27.8	4.1	72.3	
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	250,891	3.5									
	Urban	65,070	0.9									
	Total	315,961	4.4	VH	H	M	L	VH	H	M	VH	
A2 - Stone Wall not packed with mortar	Rural	39,840	0.6									
	Urban	23,036	0.3									
	Total	62,876	0.9	VH	H	M	L	H	M	L	VH	
Total - Category - A		378,837	5.3									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	3,804,171	53.3									
	Urban	2,509,639	35.2									
	Total	6,313,810	88.5	H	M	L	VL	H	M	L	H/M	
Total - Category - B		6,313,810	88.4									
C1 - Concrete Wall	Rural	173,252	2.4									
	Urban	185,463	2.6									
	Total	358,715	5.0	M	L	VL	VL	L	VL	VL	L/VL	
C2 - Wood wall	Rural	3,204	-									
	Urban	3,590	0.1									
	Total	6,794	0.1	M	L	VL	VL	VH	H	M	H	
Total - Category - C		365,509	5.1									
X - Other Materials	Rural	54,619	0.8									
	Urban	26,992	0.4									
	Total	81,611	1.2	M	VL	VL	VL	VH	H	M	VH	
Total - Category - X		81,611	1.1									
TOTAL HOUSES*		7,139,767										

ROOF											
R1 - Light Weight Sloping Roof	Rural	592,099	8.3								
	Urban	205,980	2.9								
	Total	798,079	11.2	M	M	L	VL	VH	VH	H	VH
R2 - Heavy Weight Sloping Roof	Rural	893,953	12.5								
	Urban	171,975	2.4								
	Total	1,065,928	14.9	H	M	L	VL	H	M	L	H
R3 - Flat Roof	Rural	2,839,925	39.8								
	Urban	2,435,835	34.1								
	Total	5,275,760	73.9	Damage Risk as per that for the Wall supporting it							
TOTAL HOUSES*		7,139,767									

Housing Category : Wall Types

Category - A : Buildings in field-stone, rural structures, unburnt brick houses, clay houses

Category - B : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone

Category - C : Reinforced building, well built wooden structures

Category - X : Other materials not covered in A,B,C. These are generally light.

Notes : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.

2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building

3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

Category - R1 - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)

Category - R2 - Heavy Weight (Tiles, Stone/Slate)

Category - R3 - Flat Roof (Brick, Concrete)

EQ Zone V : Very High Damage Risk Zone (MSK > IX)

EQ Zone IV : High Damage Risk Zone (MSK VIII)

EQ Zone III : Moderate Damage Risk Zone (MSK VII)

EQ Zone II : Low Damage Risk Zone (MSK < VI)

Level of Risk : VH = Very High; H = High;

M = Moderate; L = Low; VL = Very Low

* Total No. of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : PN 01

State : PUNJAB

GURDASPUR

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %		
		No. of Houses	%	EQ Zone				Wind Velocity m/s						
				V	IV	III	II	55 & 50	47	44 & 39	33			
				Area in %				Area in %						
				8.7	91.3					71.5		28.5		67.2
WALL														
A1 - Mud & Unburnt Brick Wall	Rural	27,039	4.8											
	Urban	4,079	0.7											
	Total	31,118	5.5	VH	H			VH		M		VH		
A2 - Stone Wall not packed with mortar	Rural	3,608	0.6											
	Urban	1,368	0.2											
	Total	4,976	0.8	VH	H			H		L		VH		
Total - Category - A		36,094	6.4											
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	332,185	59.1											
	Urban	150,921	26.8											
	Total	483,106	85.9	H	M			H		L		H/M		
Total - Category - B		483,106	85.9											
C1 - Concrete Wall	Rural	27,182	4.8											
	Urban	7,720	1.4											
	Total	34,902	6.2	M	L			L		VL		L/VL		
C2 - Wood wall	Rural	320	0.1											
	Urban	373	0.1											
	Total	693	0.2	M	L			VH		M		H		
Total - Category - C		35,595	6.3											
X - Other Materials	Rural	6,201	1.1											
	Urban	1,425	0.3											
	Total	7,626	1.4	M	VL			VH		M		VH		
Total - Category - X		7,626	1.4											
TOTAL HOUSES*		562,421												

ROOF											
R1 - Light Weight Sloping Roof	Rural	61,911	11.0								
	Urban	13,706	2.4								
	Total	75,617	13.4	M	M			VH		H	VH
R2 - Heavy Weight Sloping Roof	Rural	61,310	10.9								
	Urban	6,160	1.1								
	Total	67,470	12.0	H	M			H		L	H
R3 - Flat Roof	Rural	273,314	48.6								
	Urban	146,020	26.0								
	Total	419,334	74.6	Damage Risk as per that for the Wall supporting it							
TOTAL HOUSES*		562,421									

Probable Maximum Precipitation at a Station of the district in 24 hrs is 480 mm

Housing Category : Wall Types

Category - A : Buildings in field-stone, rural structures, unburnt brick houses, clay houses

Category - B : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone

Category - C : Reinforced building, well built wooden structures

Category - X : Other materials not covered in A,B,C. These are generally light.

Notes : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.

2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building

3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

Category - R1 - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)

Category - R2 - Heavy Weight (Tiles, Stone/Slate)

Category - R3 - Flat Roof (Brick, Concrete)

EQ Zone V : Very High Damage Risk Zone (MSK > IX)

EQ Zone IV : High Damage Risk Zone (MSK VIII)

EQ Zone III : Moderate Damage Risk Zone (MSK VII)

EQ Zone II : Low Damage Risk Zone (MSK < VI)

Level of Risk : VH = Very High; H = High;

M = Moderate; L = Low; VL = Very Low

* Total No. of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : PN 02 State : PUNJAB KAPURTHALA

Wall / Roof	Census Houses		Level of Risk under								Flood Prone Area in %											
	No. of Houses	%	EQ Zone				Wind Velocity m/s															
			V	IV	III	II	55 & 50	47	44 & 39	33												
			Area in %				Area in %															
											100									65.5		
WALL																						
A1 - Mud & Unburnt Brick Wall	Rural	5,638	2.5																			
	Urban	1,623	0.7																			
	Total	7,261	3.2																			
A2 - Stone Wall not packed with mortar	Rural	1,225	0.5																			
	Urban	378	0.2																			
	Total	1,603	0.7																			
Total - Category - A		8,864	3.9																			
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	134,373	58.5																			
	Urban	73,470	32.0																			
	Total	207,843	90.5																			
Total - Category - B		207,843	90.5																			
C1 - Concrete Wall	Rural	5,730	2.5																			
	Urban	4,686	2.0																			
	Total	10,416	4.5																			
C2 - Wood wall	Rural	91	-																			
	Urban	79	-																			
	Total	170	-																			
Total - Category - C		10,586	4.6																			
X - Other Materials	Rural	1,768	0.8																			
	Urban	600	0.3																			
	Total	2,368	1.1																			
Total - Category - X		2,368	1.0																			
TOTAL HOUSES*		229,661																				

ROOF	Census Houses		Level of Risk under								Flood Prone Area in %											
	No. of Houses	%	EQ Zone				Wind Velocity m/s															
			V	IV	III	II	55 & 50	47	44 & 39	33												
			Area in %				Area in %															
WALL																						
R1 - Light Weight Sloping Roof	Rural	13,885	6.0																			
	Urban	5,763	2.5																			
	Total	19,648	8.5																			
R2 - Heavy Weight Sloping Roof	Rural	29,846	13.0																			
	Urban	5,374	2.3																			
	Total	35,220	15.3																			
R3 - Flat Roof	Rural	105,094	45.8																			
	Urban	69,699	30.3																			
	Total	174,793	76.1																			
TOTAL HOUSES*		229,661																				

Probable Maximum Precipitation at a Station of the district in 24 hrs is 480 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
 - Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
 - Category - C** : Reinforced building, well built wooden structures
 - Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
 - Category - R2** - Heavy Weight (Tiles, Stone/Slate)
 - Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
 Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
 * Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : PN 03 State : PUNJAB JALANDHAR

Wall / Roof	Census Houses		Level of Risk under								Flood Prone Area in %											
	No. of Houses	%	EQ Zone				Wind Velocity m/s															
			V	IV	III	II	55 & 50	47	44 & 39	33												
			Area in %				Area in %															
WALL																						
A1 - Mud & Unburnt Brick Wall	Rural	11,328	1.9																			
	Urban	8,017	1.3																			
	Total	19,345	3.2																			
A2 - Stone Wall not packed with mortar	Rural	2,819	0.5																			
	Urban	2,854	0.5																			
	Total	5,673	1.0																			
Total - Category - A		25,018	4.1																			
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	254,658	41.7																			
	Urban	290,241	47.5																			
	Total	544,899	89.2																			
Total - Category - B		544,899	89.2																			
C1 - Concrete Wall	Rural	12,801	2.1																			
	Urban	23,239	3.8																			
	Total	36,040	5.9																			
C2 - Wood wall	Rural	191	-																			
	Urban	385	0.1																			
	Total	576	0.1																			
Total - Category - C		36,616	6.0																			
X - Other Materials	Rural	2,479	0.4																			
	Urban	2,147	0.4																			
	Total	4,626	0.8																			
Total - Category - X		4,626	0.8																			
TOTAL HOUSES*		611,159																				

ROOF	Census Houses		Level of Risk under								Flood Prone Area in %											
	No. of Houses	%	EQ Zone				Wind Velocity m/s															
			V	IV	III	II	55 & 50	47	44 & 39	33												
			Area in %				Area in %															
WALL																						
R1 - Light Weight Sloping Roof	Rural	26,488	4.3																			
	Urban	21,766	3.6																			
	Total	48,254	7.9																			
R2 - Heavy Weight Sloping Roof	Rural	50,036	8.2																			
	Urban	19,819	3.2																			
	Total	69,855	11.4																			
R3 - Flat Roof	Rural	207,752	34.0																			
	Urban	285,298	46.7																			
	Total	493,050	80.7																			
TOTAL HOUSES*		611,159																				

Probable Maximum Precipitation at a Station of the district in 24 hrs is 440 mm

Housing Category : Wall Types

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : PN 04 State : PUNJAB HOSHIARPUR

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %		
		No. of Houses	%	EQ Zone				Wind Velocity m/s						
				V	IV	III	II	55 & 50	47	44 & 39	33			
				Area in %				Area in %						
				4.1	95.9					79.6		20.4		81.7
WALL														
A1 - Mud & Unburnt Brick Wall	Rural	19,884	4.1											
	Urban	2,480	0.5											
	Total	22,364	4.6	VH	H			VH		M			VH	
A2 - Stone Wall not packed with mortar	Rural	3,064	0.6											
	Urban	735	0.2											
	Total	3,799	0.8	VH	H			H		L			VH	
Total - Category - A		26,163	5.4											
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	340,793	70.0											
	Urban	99,187	20.4											
	Total	439,980	90.4	H	M			H		L			H/M	
Total - Category - B		439,980	90.4											
C1 - Concrete Wall	Rural	10,820	2.2											
	Urban	3,860	0.8											
	Total	14,680	3.0	M	L			L		VL			L/VL	
C2 - Wood wall	Rural	286	0.1											
	Urban	170	-											
	Total	456	0.1	M	L			VH		M			H	
Total - Category - C		15,136	3.1											
X - Other Materials	Rural	4,174	0.9											
	Urban	1,165	0.2											
	Total	5,339	1.1	M	VL			VH		M			VH	
Total - Category - X		5,339	1.1											
TOTAL HOUSES*		486,618												

ROOF														
R1 - Light Weight Sloping Roof	Rural	58,494	12.0											
	Urban	8,139	1.7											
	Total	66,633	13.7	M	M			VH		H			VH	
R2 - Heavy Weight Sloping Roof	Rural	52,441	10.8											
	Urban	6,676	1.4											
	Total	59,117	12.2	H	M			H		L			H	
R3 - Flat Roof	Rural	268,086	55.1											
	Urban	92,782	19.1											
	Total	360,868	74.2	Damage Risk as per that for the Wall supporting it										
TOTAL HOUSES*		486,618												

Probable Maximum Precipitation at a Station of the district in 24 hrs is 400 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
 - Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
 - Category - C** : Reinforced building, well built wooden structures
 - Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
 - Category - R2** - Heavy Weight (Tiles, Stone/Slate)
 - Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
 Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
 * Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : PN 05 State : PUNJAB SHAHID BHAGAT SINGH NAGAR

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %		
		No. of Houses	%	EQ Zone				Wind Velocity m/s						
				V	IV	III	II	55 & 50	47	44 & 39	33			
				Area in %				Area in %						
WALL														
A1 - Mud & Unburnt Brick Wall	Rural	4,395	2.2											
	Urban	968	0.5											
	Total	5,363	2.7					H		VH			VH	
A2 - Stone Wall not packed with mortar	Rural	1,662	0.8											
	Urban	564	0.3											
	Total	2,226	1.1					H		H			VH	
Total - Category - A		7,589	3.9											
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	145,931	74.2											
	Urban	34,607	17.6											
	Total	180,538	91.8					M		H			H/M	
Total - Category - B		180,538	91.8											
C1 - Concrete Wall	Rural	5,093	2.6											
	Urban	1,409	0.7											
	Total	6,502	3.3					L		L			L/VL	
C2 - Wood wall	Rural	124	0.1											
	Urban	19	-											
	Total	143	0.1					L		VH			H	
Total - Category - C		6,645	3.4											
X - Other Materials	Rural	1,523	0.8											
	Urban	394	0.2											
	Total	1,917	1.0					VL		VH			VH	
Total - Category - X		1,917	1.0											
TOTAL HOUSES*		196,689												

ROOF														
R1 - Light Weight Sloping Roof	Rural	15,676	8.0											
	Urban	3,477	1.8											
	Total	19,153	9.8					M		VH			VH	
R2 - Heavy Weight Sloping Roof	Rural	15,737	8.0											
	Urban	2,886	1.5											
	Total	18,623	9.5					M		H			H	
R3 - Flat Roof	Rural	127,315	64.7											
	Urban	31,598	16.1											
	Total	158,913	80.8	Damage Risk as per that for the Wall supporting it										
TOTAL HOUSES*		196,689												

Probable Maximum Precipitation at a Station of the district in 24 hrs is 400 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
 - Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
 - Category - C** : Reinforced building, well built wooden structures
 - Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
 - Category - R2** - Heavy Weight (Tiles, Stone/Slate)
 - Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
 Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
 * Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : PN 06 State : PUNJAB FATEHGARH SAHIB

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %				
		No. of Houses	%	EQ Zone				Wind Velocity m/s								
				V	IV	III	II	55 & 50	47	44 & 39	33					
				Area in %				Area in %								
					99.4	.6				100					100	
WALL																
A1 - Mud & Unburnt Brick Wall	Rural	3,350	2.1													
	Urban	906	0.6													
	Total	4,256	2.7		H	M				VH						VH
A2 - Stone Wall not packed with mortar	Rural	817	0.5													
	Urban	254	0.2													
	Total	1,071	0.7		H	M				H						VH
Total - Category - A		5,327	3.3													
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	99,823	62.3													
	Urban	47,298	29.5													
	Total	147,121	91.8		M	L				H						H/M
Total - Category - B		147,121	91.9													
C1 - Concrete Wall	Rural	4,074	2.5													
	Urban	2,309	1.4													
	Total	6,383	3.9		L	VL				L						L/VL
C2 - Wood wall	Rural	57	-													
	Urban	56	-													
	Total	113	-		L	VL				VH						H
Total - Category - C		6,496	4.1													
X - Other Materials	Rural	731	0.5													
	Urban	441	0.3													
	Total	1,172	0.8		VL	VL				VH						VH
Total - Category - X		1,172	0.7													
TOTAL HOUSES*		160,116														

ROOF		Rural	Urban	Total	No. of Houses	%	Level of Risk under				Flood Prone Area in %
							V	IV	III	II	
R1 - Light Weight Sloping Roof	Rural	14,104	8.8								
	Urban	3,254	2.0								
	Total	17,358	10.8		M	L				VH	
R2 - Heavy Weight Sloping Roof	Rural	8,633	5.4								
	Urban	1,755	1.1								
	Total	10,388	6.5		M	L				H	
R3 - Flat Roof	Rural	86,115	53.8								
	Urban	46,255	28.9								
	Total	132,370	82.7								
TOTAL HOUSES*		160,116									

Probable Maximum Precipitation at a Station of the district in 24 hrs is 440 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
 - Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
 - Category - C** : Reinforced building, well built wooden structures
 - Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
 - Category - R2** - Heavy Weight (Tiles, Stone/Slate)
 - Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
 Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
 * Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : PN 07 State : PUNJAB LUDHIANA

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %				
		No. of Houses	%	EQ Zone				Wind Velocity m/s								
				V	IV	III	II	55 & 50	47	44 & 39	33					
				Area in %				Area in %								
					79.5	20.5				100					89.5	
WALL																
A1 - Mud & Unburnt Brick Wall	Rural	13,476	1.4													
	Urban	11,475	1.2													
	Total	24,951	2.6		H	M				VH						VH
A2 - Stone Wall not packed with mortar	Rural	3,740	0.4													
	Urban	6,369	0.7													
	Total	10,109	1.1		H	M				H						VH
Total - Category - A		35,060	3.8													
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	318,993	34.1													
	Urban	498,603	53.4													
	Total	817,596	87.5		M	L				H						H/M
Total - Category - B		817,596	87.5													
C1 - Concrete Wall	Rural	18,196	1.9													
	Urban	52,792	5.7													
	Total	70,988	7.6		L	VL				L						L/VL
C2 - Wood wall	Rural	241	-													
	Urban	754	0.1													
	Total	995	0.1		L	VL				VH						H
Total - Category - C		71,983	7.7													
X - Other Materials	Rural	2,929	0.3													
	Urban	6,554	0.7													
	Total	9,483	1.0		VL	VL				VH						VH
Total - Category - X		9,483	1.0													
TOTAL HOUSES*		934,122														

ROOF		Rural	Urban	Total	No. of Houses	%	Level of Risk under				Flood Prone Area in %
							V	IV	III	II	
R1 - Light Weight Sloping Roof	Rural	27,808	3.0								
	Urban	32,630	3.5								
	Total	60,438	6.5		M	L				VH	
R2 - Heavy Weight Sloping Roof	Rural	47,797	5.1								
	Urban	22,719	2.4								
	Total	70,516	7.5		M	L				H	
R3 - Flat Roof	Rural	281,970	30.2								
	Urban	521,198	55.8								
	Total	803,168	86.0								
TOTAL HOUSES*		934,122									

Probable Maximum Precipitation at a Station of the district in 24 hrs is 400 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
 - Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
 - Category - C** : Reinforced building, well built wooden structures
 - Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
 - Category - R2** - Heavy Weight (Tiles, Stone/Slate)
 - Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
 Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
 * Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : PN 08 State : PUNJAB MOGA

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
				7.9	92.1			84.9	15.1			98.5
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	8,948	3.3									
	Urban	1,656	0.6									
	Total	10,604	3.9		H	M		VH	H			VH
A2 - Stone Wall not packed with mortar	Rural	1,910	0.7									
	Urban	455	0.2									
	Total	2,365	0.9		H	M		H	M			VH
Total - Category - A		12,969	4.8									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	183,320	68.3									
	Urban	60,117	22.4									
	Total	243,437	90.7		M	L		H	M			H/M
Total - Category - B		243,437	90.6									
C1 - Concrete Wall	Rural	5,145	1.9									
	Urban	3,774	1.4									
	Total	8,919	3.3		L	VL		L	VL			L/VL
C2 - Wood wall	Rural	104	-									
	Urban	148	0.1									
	Total	252	0.1		L	VL		VH	H			H
Total - Category - C		9,171	3.4									
X - Other Materials	Rural	2,121	0.8									
	Urban	879	0.3									
	Total	3,000	1.1		VL	VL		VH	H			VH
Total - Category - X		3,000	1.1									
TOTAL HOUSES*		268,577										

ROOF											
R1 - Light Weight Sloping Roof	Rural	28,909	10.8								
	Urban	4,942	1.8								
	Total	33,851	12.6		M	L		VH	VH		VH
R2 - Heavy Weight Sloping Roof	Rural	74,437	27.7								
	Urban	8,764	3.3								
	Total	83,201	31.0		M	L		H	M		H
R3 - Flat Roof	Rural	98,202	36.6								
	Urban	53,323	19.9								
	Total	151,525	56.5								
TOTAL HOUSES*		268,577									

Probable Maximum Precipitation at a Station of the district in 24 hrs is 440 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
 - Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
 - Category - C** : Reinforced building, well built wooden structures
 - Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
 - Category - R2** - Heavy Weight (Tiles, Stone/Slate)
 - Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
 Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
 * Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : PN 09 State : PUNJAB FIROZPUR

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
				1.3	67.1	31.5		16.8	83.2			51.4
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	50,492	10.7									
	Urban	5,729	1.2									
	Total	56,221	11.9		H	M	L	VH	H			VH
A2 - Stone Wall not packed with mortar	Rural	1,996	0.4									
	Urban	1,058	0.2									
	Total	3,054	0.6		H	M	L	H	M			VH
Total - Category - A		59,275	12.5									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	269,179	56.9									
	Urban	122,820	25.9									
	Total	391,999	82.8		M	L	VL	H	M			H/M
Total - Category - B		391,999	82.8									
C1 - Concrete Wall	Rural	6,317	1.3									
	Urban	7,681	1.6									
	Total	13,998	2.9		L	VL	VL	L	VL			L/VL
C2 - Wood wall	Rural	155	-									
	Urban	159	-									
	Total	314	-		L	VL	VL	VH	H			H
Total - Category - C		14,312	3.0									
X - Other Materials	Rural	6,672	1.4									
	Urban	1,043	0.2									
	Total	7,715	1.6		VL	VL	VL	VH	H			VH
Total - Category - X		7,715	1.6									
TOTAL HOUSES*		473,301										

ROOF											
R1 - Light Weight Sloping Roof	Rural	63,394	13.4								
	Urban	12,655	2.7								
	Total	76,049	16.1		M	L	VL	VH	VH		VH
R2 - Heavy Weight Sloping Roof	Rural	93,956	19.9								
	Urban	19,896	4.2								
	Total	113,852	24.1		M	L	VL	H	M		H
R3 - Flat Roof	Rural	177,461	37.5								
	Urban	105,939	22.4								
	Total	283,400	59.9								
TOTAL HOUSES*		473,301									

Probable Maximum Precipitation at a Station of the district in 24 hrs is 480 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
 - Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
 - Category - C** : Reinforced building, well built wooden structures
 - Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
 - Category - R2** - Heavy Weight (Tiles, Stone/Slate)
 - Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
 Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
 * Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : PN 10 State : PUNJAB MUKTSAR

Wall / Roof	Census Houses		Level of Risk under								Flood Prone Area in %	
	No. of Houses	%	EQ Zone				Wind Velocity m/s					
			V	IV	III	II	55 & 50	47	44 & 39	33		
			Area in %				Area in %					
					77.8	22.2			100			37.8
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	11,622	5.5									
	Urban	1,952	0.9									
	Total	13,574	6.4		M	L			H			VH
A2 - Stone Wall not packed with mortar	Rural	1,208	0.6									
	Urban	733	0.3									
	Total	1,941	0.9		M	L			M			VH
Total - Category - A		15,515	7.3									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	127,121	60.1									
	Urban	60,613	28.7									
	Total	187,734	88.8		L	VL			M			H/M
Total - Category - B		187,734	88.8									
C1 - Concrete Wall	Rural	2,031	1.0									
	Urban	2,860	1.4									
	Total	4,891	2.4			VL	VL		VL			L/VL
C2 - Wood wall	Rural	75	-									
	Urban	43	-									
	Total	118	-			VL	VL		H			H
Total - Category - C		5,009	2.4									
X - Other Materials	Rural	2,445	1.2									
	Urban	753	0.4									
	Total	3,198	1.6			VL	VL		H			VH
Total - Category - X		3,198	1.5									
TOTAL HOUSES*		211,456										

ROOF													
R1 - Light Weight Sloping Roof	Rural	28,212	13.3										
	Urban	4,616	2.2										
	Total	32,828	15.5			L	VL		VH			VH	
R2 - Heavy Weight Sloping Roof	Rural	26,188	12.4										
	Urban	8,792	4.2										
	Total	34,980	16.6			L	VL		M			H	
R3 - Flat Roof	Rural	90,102	42.6										
	Urban	53,546	25.3										
	Total	143,648	67.9										
TOTAL HOUSES*		211,456											

Probable Maximum Precipitation at a Station of the district in 24 hrs is **320 mm**

Housing Category : Wall Types

- Category - A :** Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B :** Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C :** Reinforced building, well built wooden structures
- Category - X :** Other materials not covered in A,B,C. These are generally light.
- Notes :** 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1 -** Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2 -** Heavy Weight (Tiles, Stone/Slate)
- Category - R3 -** Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
EQ Zone IV : High Damage Risk Zone (MSK VIII)
EQ Zone III : Moderate Damage Risk Zone (MSK VII)
EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : PN 11 State : PUNJAB FARIDKOT

Wall / Roof	Census Houses		Level of Risk under								Flood Prone Area in %	
	No. of Houses	%	EQ Zone				Wind Velocity m/s					
			V	IV	III	II	55 & 50	47	44 & 39	33		
			Area in %				Area in %					
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	4,797	3.2									
	Urban	1,287	0.9									
	Total	6,084	4.1			M			H			VH
A2 - Stone Wall not packed with mortar	Rural	516	0.3									
	Urban	340	0.2									
	Total	856	0.5			M			M			VH
Total - Category - A		6,940	4.6									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	87,414	58.5									
	Urban	50,411	33.7									
	Total	137,825	92.2			L			M			H/M
Total - Category - B		137,825	92.2									
C1 - Concrete Wall	Rural	1,242	0.8									
	Urban	1,629	1.1									
	Total	2,871	1.9			VL			VL			L/VL
C2 - Wood wall	Rural	48	-									
	Urban	49	-									
	Total	97	-			VL			H			H
Total - Category - C		2,968	2.0									
X - Other Materials	Rural	1,296	0.9									
	Urban	460	0.3									
	Total	1,756	1.2			VL			H			VH
Total - Category - X		1,756	1.2									
TOTAL HOUSES*		149,489										

ROOF													
R1 - Light Weight Sloping Roof	Rural	9,400	6.3										
	Urban	3,444	2.3										
	Total	12,844	8.6			L			VH			VH	
R2 - Heavy Weight Sloping Roof	Rural	38,912	26.0										
	Urban	7,204	4.8										
	Total	46,116	30.8			L			M			H	
R3 - Flat Roof	Rural	47,001	31.4										
	Urban	43,528	29.1										
	Total	90,529	60.5										
TOTAL HOUSES*		149,489											

Probable Maximum Precipitation at a Station of the district in 24 hrs is **400 mm**

Housing Category : Wall Types

- Category - A :** Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B :** Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C :** Reinforced building, well built wooden structures
- Category - X :** Other materials not covered in A,B,C. These are generally light.
- Notes :** 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1 -** Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2 -** Heavy Weight (Tiles, Stone/Slate)
- Category - R3 -** Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
EQ Zone IV : High Damage Risk Zone (MSK VIII)
EQ Zone III : Moderate Damage Risk Zone (MSK VII)
EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : PN 12 State : PUNJAB BATHINDA

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
						98.3	1.7	3.8	96.2			27.5
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	10,265	3.1									
	Urban	3,258	1.0									
	Total	13,523	4.1			M	L	VH	H			VH
A2 - Stone Wall not packed with mortar	Rural	1,888	0.6									
	Urban	920	0.3									
	Total	2,808	0.9			M	L	H	M			VH
Total - Category - A		16,331	5.0									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	184,896	56.6									
	Urban	110,235	33.7									
	Total	295,131	90.3			L	VL	H	M			H/M
Total - Category - B		295,131	90.3									
C1 - Concrete Wall	Rural	5,059	1.5									
	Urban	6,232	1.9									
	Total	11,291	3.4			VL	VL	L	VL			L/VL
C2 - Wood wall	Rural	169	0.1									
	Urban	105	-									
	Total	274	0.1			VL	VL	VH	H			H
Total - Category - C		11,565	3.5									
X - Other Materials	Rural	2,717	0.8									
	Urban	1,171	0.4									
	Total	3,888	1.2			VL	VL	VH	H			VH
Total - Category - X		3,888	1.2									
TOTAL HOUSES*		326,915										

ROOF												
R1 - Light Weight Sloping Roof	Rural	24,527	7.5									
	Urban	7,615	2.3									
	Total	32,142	9.8			L	VL	VH	VH			VH
R2 - Heavy Weight Sloping Roof	Rural	27,460	8.4									
	Urban	4,072	1.2									
	Total	31,532	9.6			L	VL	H	M			H
R3 - Flat Roof	Rural	153,007	46.8									
	Urban	110,234	33.7									
	Total	263,241	80.5									
TOTAL HOUSES*		326,915										

Probable Maximum Precipitation at a Station of the district in 24 hrs is 400 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
- 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
- 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)

- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : PN 13 State : PUNJAB MANSANA

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
						90.5	9.5	10.6	89.4			39.2
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	5,704	3.1									
	Urban	950	0.5									
	Total	6,654	3.6			M	L	VH	H			VH
A2 - Stone Wall not packed with mortar	Rural	904	0.5									
	Urban	446	0.2									
	Total	1,350	0.7			M	L	H	M			VH
Total - Category - A		8,004	4.4									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	128,095	69.8									
	Urban	40,604	22.1									
	Total	168,699	91.9			L	VL	H	M			H/M
Total - Category - B		168,699	92.0									
C1 - Concrete Wall	Rural	2,801	1.5									
	Urban	2,271	1.2									
	Total	5,072	2.7			VL	VL	L	VL			L/VL
C2 - Wood wall	Rural	75	-									
	Urban	32	-									
	Total	107	-			VL	VL	VH	H			H
Total - Category - C		5,179	2.8									
X - Other Materials	Rural	1,169	0.6									
	Urban	384	0.2									
	Total	1,553	0.8			VL	VL	VH	H			VH
Total - Category - X		1,553	0.8									
TOTAL HOUSES*		183,435										

ROOF												
R1 - Light Weight Sloping Roof	Rural	22,619	12.3									
	Urban	3,523	1.9									
	Total	26,142	14.2			L	VL	VH	VH			VH
R2 - Heavy Weight Sloping Roof	Rural	28,994	15.8									
	Urban	2,158	1.2									
	Total	31,152	17.0			L	VL	H	M			H
R3 - Flat Roof	Rural	87,135	47.5									
	Urban	39,006	21.3									
	Total	126,141	68.8									
TOTAL HOUSES*		183,435										

Probable Maximum Precipitation at a Station of the district in 24 hrs is 400 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
- 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
- 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)

- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : PN 16 State : PUNJAB TARN TARAN

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %			
		No. of Houses	%	EQ Zone				Wind Velocity m/s							
				V	IV	III	II	55 & 50	47	44 & 39	33				
				Area in %				Area in %							
					74.1	25.9				100				77.5	
WALL															
A1 - Mud & Unburnt Brick Wall	Rural	18,636	7.4												
	Urban	1,558	0.6												
	Total	20,194	8.0		H	M				VH					VH
A2 - Stone Wall not packed with mortar	Rural	2,483	1.0												
	Urban	369	0.1												
	Total	2,852	1.1		H	M				H					VH
Total - Category - A		23,046	9.2												
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	178,405	70.9												
	Urban	33,952	13.5												
	Total	212,357	84.4		M	L				H					H/M
Total - Category - B		212,357	84.4												
C1 - Concrete Wall	Rural	9,176	3.6												
	Urban	2,621	1.0												
	Total	11,797	4.6		L	VL				L					L/VL
C2 - Wood wall	Rural	294	0.1												
	Urban	50	-												
	Total	344	0.1		L	VL				VH					H
Total - Category - C		12,141	4.8												
X - Other Materials	Rural	3,728	1.5												
	Urban	365	0.1												
	Total	4,093	1.6		VL	VL				VH					VH
Total - Category - X		4,093	1.6												
TOTAL HOUSES*		251,637													

ROOF														
R1 - Light Weight Sloping Roof	Rural	24,502	9.7											
	Urban	4,948	2.0											
	Total	29,450	11.7		M	L				VH				VH
R2 - Heavy Weight Sloping Roof	Rural	97,017	38.6											
	Urban	7,181	2.9											
	Total	104,198	41.5		M	L				H				H
R3 - Flat Roof	Rural	91,203	36.2											
	Urban	26,786	10.6											
	Total	117,989	46.8											
TOTAL HOUSES*		251,637												

Probable Maximum Precipitation at a Station of the district in 24 hrs is 480 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
 - Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
 - Category - C** : Reinforced building, well built wooden structures
 - Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
 - Category - R2** - Heavy Weight (Tiles, Stone/Slate)
 - Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
 Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
 * Total No. of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : PN 17 State : PUNJAB RUPNAGAR

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %			
		No. of Houses	%	EQ Zone				Wind Velocity m/s							
				V	IV	III	II	55 & 50	47	44 & 39	33				
				Area in %				Area in %							
					100									60.9	
WALL															
A1 - Mud & Unburnt Brick Wall	Rural	6,699	3.6												
	Urban	1,070	0.6												
	Total	7,769	4.2		H					VH		M			VH
A2 - Stone Wall not packed with mortar	Rural	1,538	0.8												
	Urban	189	0.1												
	Total	1,727	0.9		H					H		L			VH
Total - Category - A		9,496	5.1												
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	119,386	64.3												
	Urban	46,184	24.9												
	Total	165,570	89.2		M					H		L			H/M
Total - Category - B		165,570	89.2												
C1 - Concrete Wall	Rural	4,961	2.7												
	Urban	2,087	1.1												
	Total	7,048	3.8		L					L		VL			L/VL
C2 - Wood wall	Rural	113	0.1												
	Urban	31	-												
	Total	144	0.1		L					VH		M			H
Total - Category - C		7,192	3.9												
X - Other Materials	Rural	2,402	1.3												
	Urban	895	0.5												
	Total	3,297	1.8		VL					VH		M			VH
Total - Category - X		3,297	1.8												
TOTAL HOUSES*		185,555													

ROOF														
R1 - Light Weight Sloping Roof	Rural	20,451	11.0											
	Urban	3,386	1.8											
	Total	23,837	12.8		M					VH		H		
R2 - Heavy Weight Sloping Roof	Rural	8,481	4.6											
	Urban	2,255	1.2											
	Total	10,736	5.8		M					H		L		
R3 - Flat Roof	Rural	106,167	57.2											
	Urban	44,815	24.2											
	Total	150,982	81.4											
TOTAL HOUSES*		185,555												

Probable Maximum Precipitation at a Station of the district in 24 hrs is 400 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
 - Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
 - Category - C** : Reinforced building, well built wooden structures
 - Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
 - Category - R2** - Heavy Weight (Tiles, Stone/Slate)
 - Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
 Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
 * Total No. of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : PN 18 State : PUNJAB SAHIBZADA AJIT SINGH NAGAR

Wall / Roof	Census Houses		Level of Risk under								Flood Prone Area in %										
	No. of Houses	%	EQ Zone				Wind Velocity m/s														
			V	IV	III	II	55 & 50	47	44 & 39	33											
			Area in %				Area in %														
											100									72.3	
WALL																					
A1 - Mud & Unburnt Brick Wall	Rural	6,685	2.6																		
	Urban	3,388	1.3																		
	Total	10,073	3.9																		
A2 - Stone Wall not packed with mortar	Rural	1,047	0.4																		
	Urban	788	0.3																		
	Total	1,835	0.7																		
Total - Category - A		11,908	4.7																		
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	90,139	35.3																		
	Urban	130,406	51.1																		
	Total	220,545	86.4																		
Total - Category - B		220,545	86.3																		
C1 - Concrete Wall	Rural	7,830	3.1																		
	Urban	11,133	4.4																		
	Total	18,963	7.5																		
C2 - Wood wall	Rural	99	-																		
	Urban	95	-																		
	Total	194	-																		
Total - Category - C		19,157	7.5																		
X - Other Materials	Rural	2,152	0.8																		
	Urban	1,670	0.7																		
	Total	3,822	1.5																		
Total - Category - X		3,822	1.5																		
TOTAL HOUSES*		255,432																			

Roof	Census Houses		Level of Risk under								Flood Prone Area in %										
	No. of Houses	%	EQ Zone				Wind Velocity m/s														
			V	IV	III	II	55 & 50	47	44 & 39	33											
			Area in %				Area in %														
ROOF																					
R1 - Light Weight Sloping Roof	Rural	29,958	11.7																		
	Urban	11,799	4.6																		
	Total	41,757	16.3																		
R2 - Heavy Weight Sloping Roof	Rural	12,494	4.9																		
	Urban	4,981	2.0																		
	Total	17,475	6.9																		
R3 - Flat Roof	Rural	65,500	25.6																		
	Urban	130,700	51.2																		
	Total	196,200	76.8																		
TOTAL HOUSES*		255,432																			

Probable Maximum Precipitation at a Station of the district in 24 hrs is 400 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
 - Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
 - Category - C** : Reinforced building, well built wooden structures
 - Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
 - Category - R2** - Heavy Weight (Tiles, Stone/Slate)
 - Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
 Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
 * Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : PN 19 State : PUNJAB SANGRUR

Wall / Roof	Census Houses		Level of Risk under								Flood Prone Area in %											
	No. of Houses	%	EQ Zone				Wind Velocity m/s															
			V	IV	III	II	55 & 50	47	44 & 39	33												
			Area in %				Area in %															
WALL																						
A1 - Mud & Unburnt Brick Wall	Rural	8,618	2.1																			
	Urban	3,216	0.8																			
	Total	11,834	2.9																			
A2 - Stone Wall not packed with mortar	Rural	2,560	0.6																			
	Urban	828	0.2																			
	Total	3,388	0.8																			
Total - Category - A		15,222	3.6																			
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	254,663	60.9																			
	Urban	129,016	30.8																			
	Total	383,679	91.7																			
Total - Category - B		383,679	91.7																			
C1 - Concrete Wall	Rural	9,597	2.3																			
	Urban	6,362	1.5																			
	Total	15,959	3.8																			
C2 - Wood wall	Rural	207	-																			
	Urban	195	-																			
	Total	402	-																			
Total - Category - C		16,361	3.9																			
X - Other Materials	Rural	1,890	0.5																			
	Urban	1,175	0.3																			
	Total	3,065	0.8																			
Total - Category - X		3,065	0.7																			
TOTAL HOUSES*		418,327																				

Roof	Census Houses		Level of Risk under								Flood Prone Area in %											
	No. of Houses	%	EQ Zone				Wind Velocity m/s															
			V	IV	III	II	55 & 50	47	44 & 39	33												
			Area in %				Area in %															
ROOF																						
R1 - Light Weight Sloping Roof	Rural	27,472	6.6																			
	Urban	10,637	2.5																			
	Total	38,109	9.1																			
R2 - Heavy Weight Sloping Roof	Rural	61,327	14.7																			
	Urban	10,424	2.5																			
	Total	71,751	17.2																			
R3 - Flat Roof	Rural	188,736	45.1																			
	Urban	119,731	28.6																			
	Total	308,467	73.7																			
TOTAL HOUSES*		418,327																				

Probable Maximum Precipitation at a Station of the district in 24 hrs is 440 mm

Housing

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : PN 20 State : PUNJAB BARNALA

Wall / Roof	Census Houses		Level of Risk under					Flood Prone Area in %				
	No. of Houses	%	EQ Zone			Wind Velocity m/s						
			V	IV	III	II	55 & 50		47	44 & 39	33	
			Area in %			Area in %						
WALL					100			98.7	1.3			76.6
A1 - Mud & Unburnt Brick Wall	Rural	3,039	2.1									
	Urban	1,252	0.9									
	Total	4,291	3.0			M		VH	H			VH
A2 - Stone Wall not packed with mortar	Rural	719	0.5									
	Urban	422	0.3									
	Total	1,141	0.8			M		H	M			VH
Total - Category - A		5,432	3.7									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	89,895	61.9									
	Urban	45,327	31.2									
	Total	135,222	93.1			L		H	M			H/M
Total - Category - B		135,222	93.2									
C1 - Concrete Wall	Rural	1,829	1.3									
	Urban	1,677	1.2									
	Total	3,506	2.5			VL		L	VL			L/VL
C2 - Wood wall	Rural	29	-									
	Urban	25	-									
	Total	54	-			VL		VH	H			H
Total - Category - C		3,560	2.5									
X - Other Materials	Rural	587	0.4									
	Urban	327	0.2									
	Total	914	0.6			VL		VH	H			VH
Total - Category - X		914	0.6									
TOTAL HOUSES*		145,128										

ROOF	Census Houses		Level of Risk under					Flood Prone Area in %				
	No. of Houses	%	EQ Zone			Wind Velocity m/s						
			V	IV	III	II	55 & 50		47	44 & 39	33	
			Area in %			Area in %						
R1 - Light Weight Sloping Roof					L			VH	VH			VH
R2 - Heavy Weight Sloping Roof	Rural	22,276	15.3									
	Urban	4,443	3.1									
	Total	26,719	18.4			L		H	M			H
R3 - Flat Roof	Rural	65,931	45.4									
	Urban	41,789	28.8									
	Total	107,720	74.2									
TOTAL HOUSES*		145,128										

Probable Maximum Precipitation at a Station of the district in 24 hrs is 440 mm

Housing Category : Wall Types

- Category - A :** Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B :** Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C :** Reinforced building, well built wooden structures
- Category - X :** Other materials not covered in A,B,C. These are generally light.

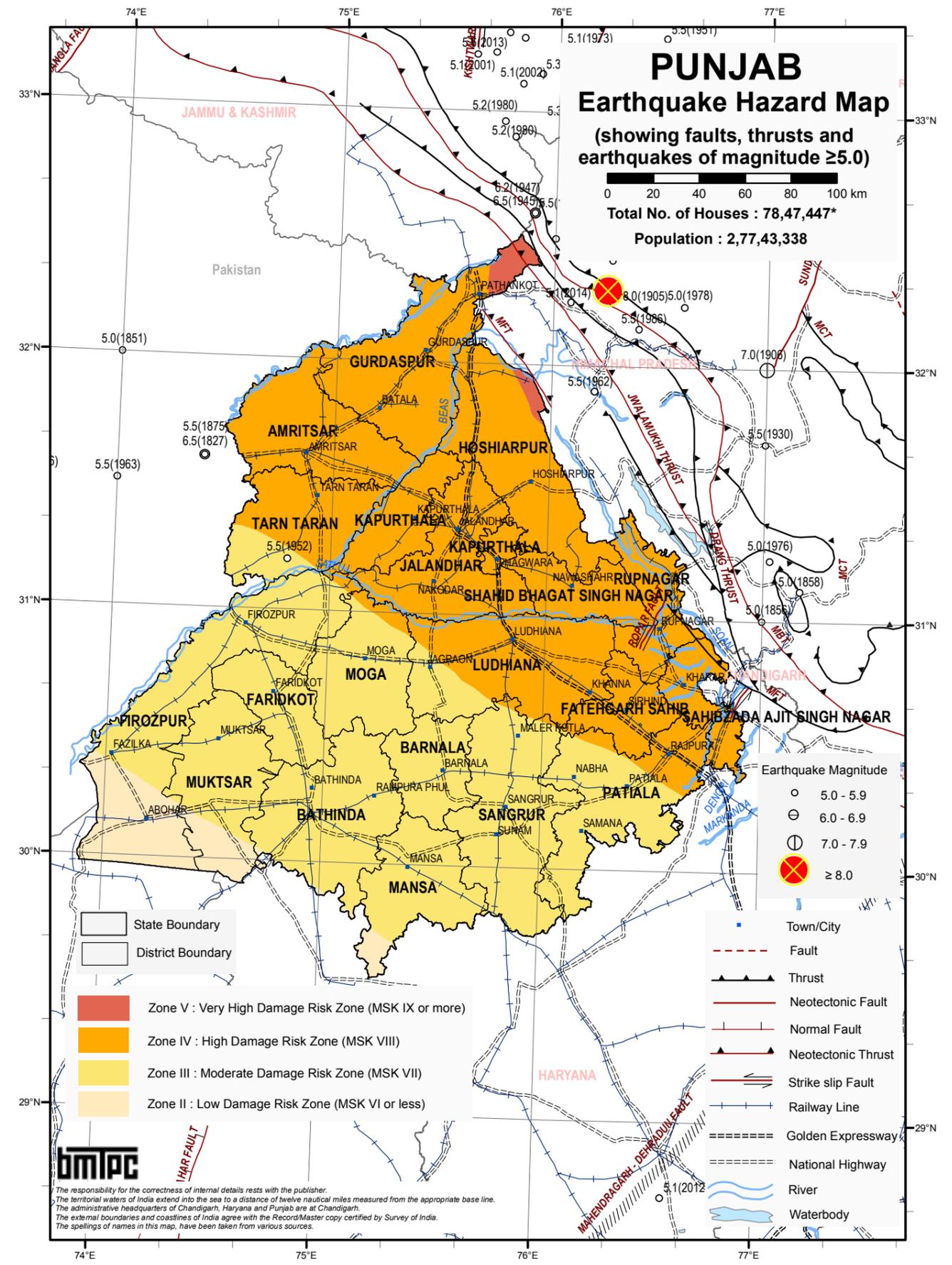
- Notes :**
- Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 - Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 - Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

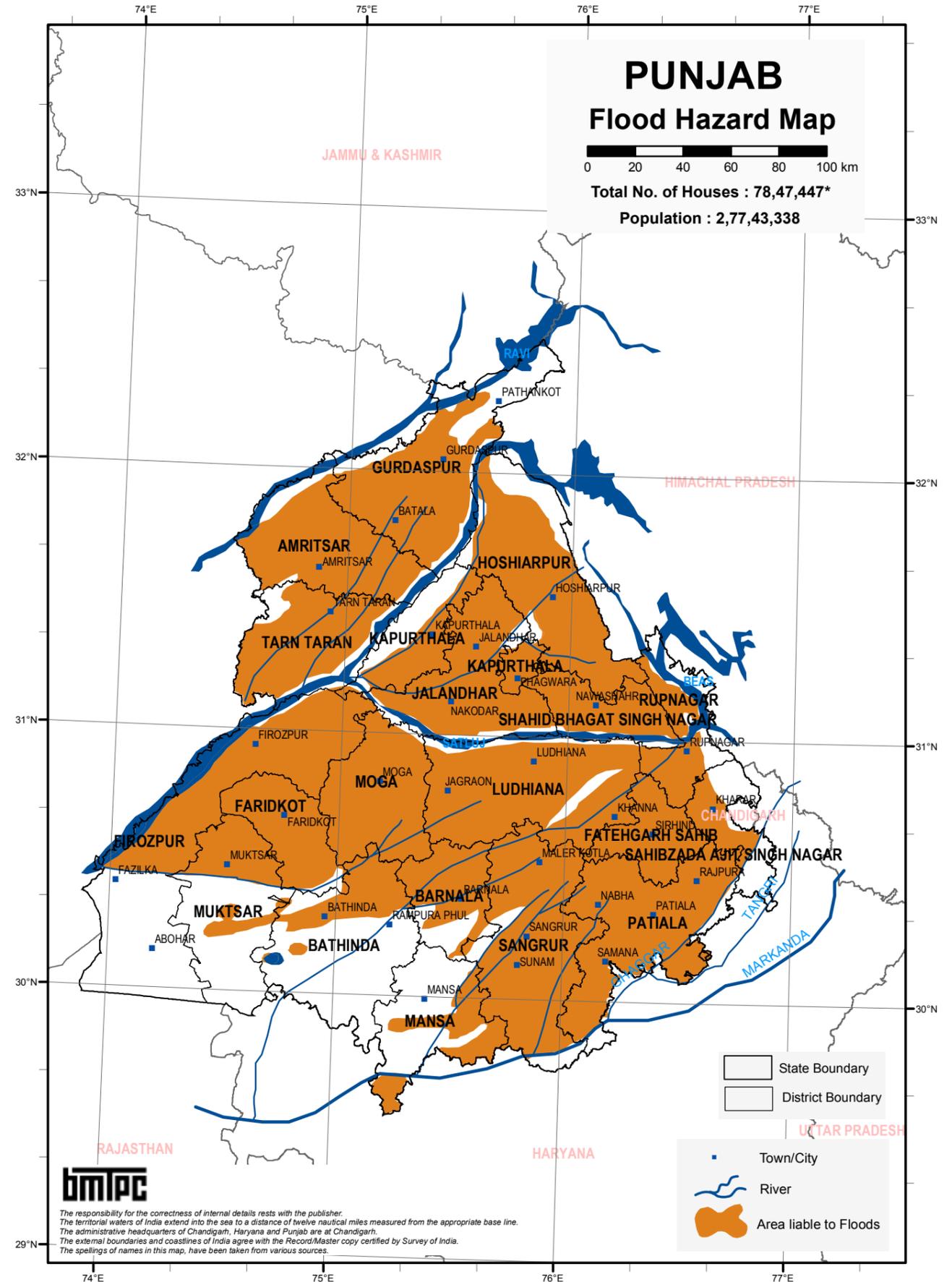
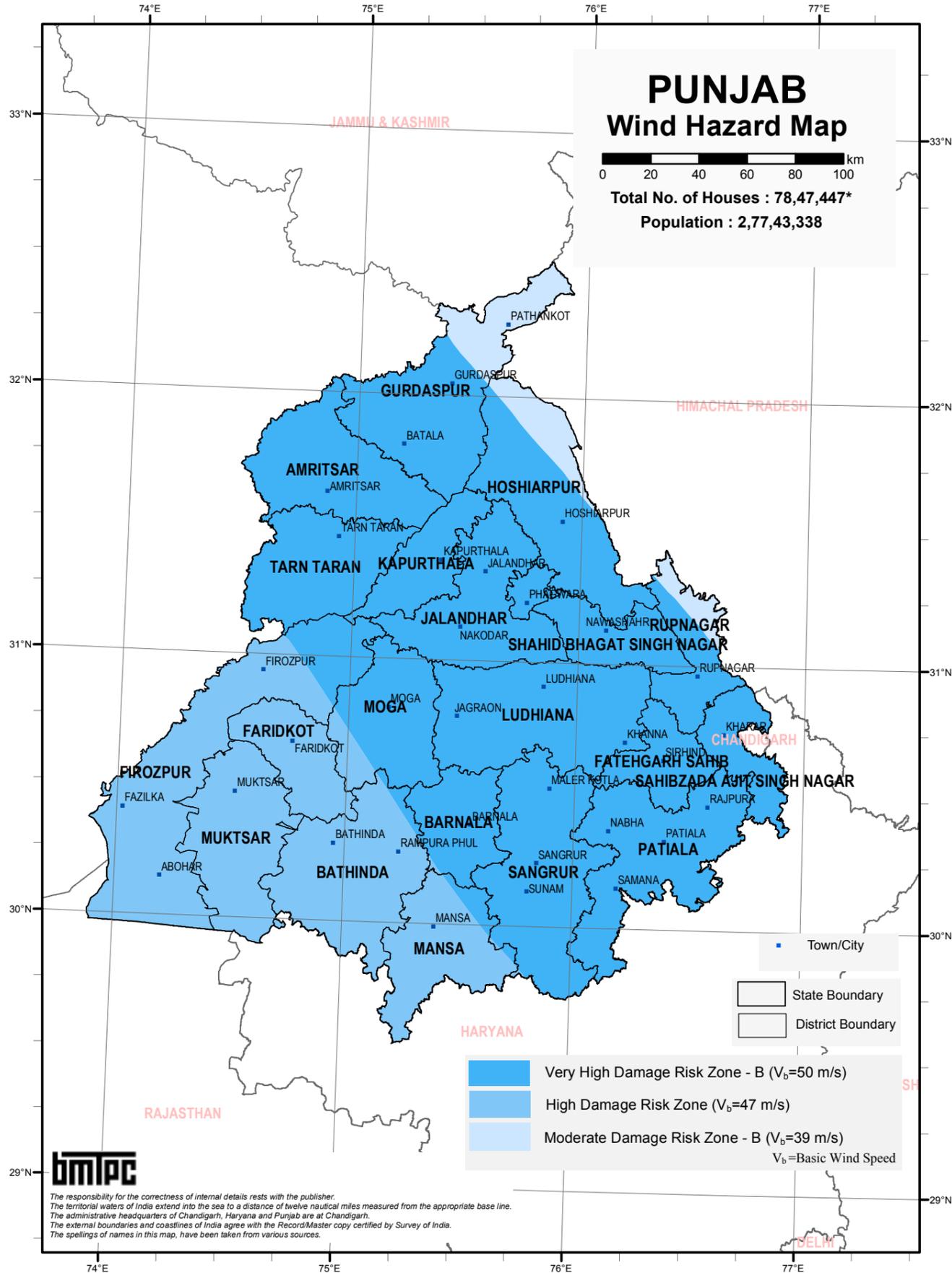
- Category - R1 - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)**
- Category - R2 - Heavy Weight (Tiles, Stone/Slate)**
- Category - R3 - Flat Roof (Brick, Concrete)**

- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 - EQ Zone IV : High Damage Risk Zone (MSK VIII)
 - EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 - EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
M = Moderate; L = Low; VL = Very Low

* Total No. of Houses excluding Vacant/Locked Houses



BMPCC : Vulnerability Atlas - 3rd Edition : Peer Group, MoHUA, GOI; Map is Based on digitised data of SOI; Seismic Zones of India Map IS:1893 (Part I); 2002, BIS; Earthquake Epicentre from IMD; Seismotectonic Atlas of India and its Environs, GSI; Houses/Population as per Census 2011; * Houses including vacant & locked houses. Disclaimer: The maps are solely for thematic presentation.



BMTPC : Vulnerability Atlas - 3rd Edition; Peer Group, MoHUA; Map is Based on digitised data of SOI, GOI; Basic Wind Speed Map National Building Code 2016. Houses/Population as per Census 2011; *Houses including vacant & locked houses. Disclaimer: The maps are solely for thematic presentation.

BMTPC : Vulnerability Atlas - 3rd Edition; Peer Group, MoHUA; Map is Based on digitised data of SOI, GOI; Census of India 2011; Flood Atlas (1987), Task Force Report (2004), C.W.C., G.O.I. Houses/Population as per Census 2011; * Houses including vacant & locked houses. Disclaimer: The maps are solely for thematic presentation.

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

RAJASTHAN

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
				Area in %				Area in %					
STATE - RAJASTHAN													
WALL													
A1 - Mud & Unburnt Brick Wall	Rural	3,089,906	19.1										
	Urban	179,109	1.1										
	Total	3,269,015	20.2		H	M	L		H	M			
A2 - Stone Wall not packed with mortar	Rural	875,259	5.4										
	Urban	250,669	1.6										
	Total	1,125,928	7.0		H	M	L		M	L			
Total - Category - A		4,394,943	27.2										
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	7,522,173	46.6										
	Urban	3,546,277	22.0										
	Total	11,068,450	68.6		M	L	VL		M	L			
Total - Category - B		11,068,450	68.5										
C1 - Concrete Wall	Rural	26,657	0.2										
	Urban	37,713	0.2										
	Total	64,370	0.4		L	VL	VL		VL	VL			
C2 - Wood wall	Rural	70,605	0.4										
	Urban	12,678	0.1										
	Total	83,283	0.5		L	VL	VL		H	M			
Total - Category - C		147,653	0.9										
X - Other Materials	Rural	479,232	3.0										
	Urban	62,556	0.4										
	Total	541,788	3.4		VL	VL	VL		H	M			
Total - Category - X		541,788	3.4										
TOTAL HOUSES*		16,152,834											

ROOF										
R1 - Light Weight Sloping Roof	Rural	2,948,586	18.3							
	Urban	373,556	2.3							
	Total	3,322,142	20.6		M	L	VL		VH	H
R2 - Heavy Weight Sloping Roof	Rural	7,897,550	48.9							
	Urban	2,340,600	14.5							
	Total	10,238,150	63.4		M	L	VL		M	L
R3 - Flat Roof	Rural	1,217,696	7.5							
	Urban	1,374,846	8.5							
	Total	2,592,542	16.0		<i>Damage Risk as per that for the Wall supporting it</i>					
TOTAL HOUSES*		16,152,834								

Housing Category : Wall Types

Category - A : Buildings in field-stone, rural structures, unburnt brick houses, clay houses

Category - B : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone

Category - C : Reinforced building, well built wooden structures

Category - X : Other materials not covered in A,B,C. These are generally light.

Notes : 1. Flood prone area includes that protected area which may have more severe

damage under failure of protection works. In some other areas the local

damage may be severe under heavy rains and choked drainage.

2. Damage Risk for wall types is indicated assuming heavy flat roof

in categories A, B and C (Reinforced Concrete) building

3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

Category - R1 - Light Weight (Grass, Thatch,

Bamboo, Wood, Mud, Plastic, Polythene,

GI Metal, Asbestos Sheets, Other Materials)

Category - R2 - Heavy Weight (Tiles, Stone/Slate)

Category - R3 - Flat Roof (Brick, Concrete)

EQ Zone V : Very High Damage Risk Zone (MSK > IX)

EQ Zone IV : High Damage Risk Zone (MSK VIII)

EQ Zone III : Moderate Damage Risk Zone (MSK VII)

EQ Zone II : Low Damage Risk Zone (MSK < VI)

Level of Risk : VH = Very High; H = High;

M = Moderate; L = Low; VL = Very Low

* Total No. of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : RJ 01

State : RAJASTHAN

GANGANAGAR

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
				Area in %				Area in %					
STATE - RAJASTHAN													
WALL													
A1 - Mud & Unburnt Brick Wall	Rural	180,218	36.0										
	Urban	13,936	2.8										
	Total	194,154	38.8			M	L		H				
A2 - Stone Wall not packed with mortar	Rural	1,160	0.2										
	Urban	1,088	0.2										
	Total	2,248	0.4			M	L		M				
Total - Category - A		196,402	39.2										
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	171,390	34.2										
	Urban	126,349	25.2										
	Total	297,739	59.4			L	VL		M				
Total - Category - B		297,739	59.5										
C1 - Concrete Wall	Rural	242	-										
	Urban	394	0.1										
	Total	636	0.1			VL	VL		VL				
C2 - Wood wall	Rural	108	-										
	Urban	135	-										
	Total	243	-			VL	VL		H				
Total - Category - C		879	0.2										
X - Other Materials	Rural	4,297	0.9										
	Urban	1,360	0.3										
	Total	5,657	1.2			VL	VL		H				
Total - Category - X		5,657	1.1										
TOTAL HOUSES*		500,677											

ROOF										
R1 - Light Weight Sloping Roof	Rural	195,054	39.0							
	Urban	20,093	4.0							
	Total	215,147	43.0			L	VL		VH	
R2 - Heavy Weight Sloping Roof	Rural	4,453	0.9							
	Urban	4,975	1.0							
	Total	9,428	1.9			L	VL		M	
R3 - Flat Roof	Rural	157,908	31.5							
	Urban	118,194	23.6							
	Total	276,102	55.1		<i>Damage Risk as per that for the Wall supporting it</i>					
TOTAL HOUSES*		500,677								

Probable Maximum Precipitation at a Station of the district in 24 hrs is 280 mm

Housing Category : Wall Types

Category - A : Buildings in field-stone, rural structures, unburnt brick houses, clay houses

Category - B : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone

Category - C : Reinforced building, well built wooden structures

Category - X : Other materials not covered in A,B,C. These are generally light.

Notes : 1. Flood prone area includes that protected area which may have more severe

damage under failure of protection works. In some other areas the local

damage may be severe under heavy rains and choked drainage.

2. Damage Risk for wall types is indicated assuming heavy flat roof

in categories A, B and C (Reinforced Concrete) building

3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

Category - R1 - Light Weight (Grass, Thatch,

Bamboo, Wood, Mud, Plastic, Polythene,

GI Metal, Asbestos Sheets, Other Materials)

Category - R2 - Heavy Weight (Tiles, Stone/Slate)

Category - R3 - Flat Roof (Brick, Concrete)

EQ Zone V : Very High Damage Risk Zone (MSK > IX)

EQ Zone IV : High Damage Risk Zone (MSK VIII)

EQ Zone III : Moderate Damage Risk Zone (MSK VII)

EQ Zone II : Low Damage Risk Zone (MSK < VI)

Level of Risk : VH = Very High; H = High;

M = Moderate; L = Low; VL = Very Low

* Total No. of Houses excluding Vacant/Locked Houses

**Distribution of Houses by Predominant Materials of Roof and Wall
and Level of Damage Risk**

Table No. : RJ 02 State : RAJASTHAN HANUMANGARH

Wall / Roof	Census Houses		Level of Risk under								Flood Prone Area in %	
	No. of Houses	%	EQ Zone				Wind Velocity m/s					
			V	IV	III	II	55 & 50	47	44 & 39	33		
			Area in %				Area in %					
WALL							100			100		
A1 - Mud & Unburnt Brick Wall	Rural	133,045	29.3									
	Urban	7,774	1.7									
	Total	140,819	31.0				L			H		
A2 - Stone Wall not packed with mortar	Rural	1,866	0.4									
	Urban	573	0.1									
	Total	2,439	0.5				L			M		
Total - Category - A		143,258	31.5									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	217,127	47.8									
	Urban	85,044	18.7									
	Total	302,171	66.5				VL			M		
Total - Category - B		302,171	66.5									
C1 - Concrete Wall	Rural	415	0.1									
	Urban	223	-									
	Total	638	0.1				VL			VL		
C2 - Wood wall	Rural	106	-									
	Urban	166	-									
	Total	272	-				VL			H		
Total - Category - C		910	0.2									
X - Other Materials	Rural	6,593	1.5									
	Urban	1,155	0.3									
	Total	7,748	1.8				VL			H		
Total - Category - X		7,748	1.7									
TOTAL HOUSES*		454,087										
ROOF												
R1 - Light Weight Sloping Roof	Rural	174,687	38.5									
	Urban	18,932	4.2									
	Total	193,619	42.7				VL			VH		
R2 - Heavy Weight Sloping Roof	Rural	37,882	8.3									
	Urban	14,649	3.2									
	Total	52,531	11.5				VL			M		
R3 - Flat Roof	Rural	146,583	32.3									
	Urban	61,354	13.5									
	Total	207,937	45.8									
TOTAL HOUSES*		454,087										

Probable Maximum Precipitation at a Station of the district in 24 hrs is 320 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
- M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

**Distribution of Houses by Predominant Materials of Roof and Wall
and Level of Damage Risk**

Table No. : RJ 03 State : RAJASTHAN BIKANER

Wall / Roof	Census Houses		Level of Risk under								Flood Prone Area in %	
	No. of Houses	%	EQ Zone				Wind Velocity m/s					
			V	IV	III	II	55 & 50	47	44 & 39	33		
			Area in %				Area in %					
WALL								53.4	46.6			
A1 - Mud & Unburnt Brick Wall	Rural	94,815	20.9									
	Urban	7,183	1.6									
	Total	101,998	22.5					M	L	H		
A2 - Stone Wall not packed with mortar	Rural	3,171	0.7									
	Urban	1,785	0.4									
	Total	4,956	1.1					M	L	M		
Total - Category - A		106,954	23.6									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	158,139	34.9									
	Urban	153,458	33.9									
	Total	311,597	68.8					L	VL	M		
Total - Category - B		311,597	68.8									
C1 - Concrete Wall	Rural	442	0.1									
	Urban	497	0.1									
	Total	939	0.2					VL	VL	VL		
C2 - Wood wall	Rural	2,425	0.5									
	Urban	145	-									
	Total	2,570	0.5					VL	VL	H		
Total - Category - C		3,509	0.8									
X - Other Materials	Rural	28,387	6.3									
	Urban	2,598	0.6									
	Total	30,985	6.9					VL	VL	H		
Total - Category - X		30,985	6.8									
TOTAL HOUSES*		453,045										
ROOF												
R1 - Light Weight Sloping Roof	Rural	126,384	27.9									
	Urban	10,223	2.3									
	Total	136,607	30.2					L	VL	VH		
R2 - Heavy Weight Sloping Roof	Rural	136,905	30.2									
	Urban	142,347	31.4									
	Total	279,252	61.6					L	VL	M		
R3 - Flat Roof	Rural	24,090	5.3									
	Urban	13,096	2.9									
	Total	37,186	8.2									
TOTAL HOUSES*		453,045										

Probable Maximum Precipitation at a Station of the district in 24 hrs is 320 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
- M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : RJ 06 State : RAJASTHAN ALWAR

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
					49.1	46.3	4.6			100		
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	67,979	7.5									
	Urban	4,757	0.5									
	Total	72,736	8.0		H	M	L		H			
A2 - Stone Wall not packed with mortar	Rural	55,741	6.1									
	Urban	7,366	0.8									
	Total	63,107	6.9		H	M	L		M			
Total - Category - A		135,843	15.0									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	592,751	65.3									
	Urban	160,172	17.6									
	Total	752,923	82.9		M	L	VL		M			
Total - Category - B		752,923	83.0									
C1 - Concrete Wall	Rural	1,406	0.2									
	Urban	1,287	0.1									
	Total	2,693	0.3		L	VL	VL		VL			
C2 - Wood wall	Rural	1,775	0.2									
	Urban	461	0.1									
	Total	2,236	0.3		L	VL	VL		H			
Total - Category - C		4,929	0.5									
X - Other Materials	Rural	11,623	1.3									
	Urban	2,280	0.3									
	Total	13,903	1.6		VL	VL	VL		H			
Total - Category - X		13,903	1.5									
TOTAL HOUSES*		907,598										
ROOF												
R1 - Light Weight Sloping Roof	Rural	141,017	15.5									
	Urban	11,484	1.3									
	Total	152,501	16.8		M	L	VL		VH			
R2 - Heavy Weight Sloping Roof	Rural	482,962	53.2									
	Urban	87,816	9.7									
	Total	570,778	62.9		M	L	VL		M			
R3 - Flat Roof	Rural	107,296	11.8									
	Urban	77,023	8.5									
	Total	184,319	20.3									
TOTAL HOUSES*		907,598										

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 708 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
 - Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
 - Category - C** : Reinforced building, well built wooden structures
 - Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
 - Category - R2** - Heavy Weight (Tiles, Stone/Slate)
 - Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : RJ 07 State : RAJASTHAN BHARATPUR

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
					29.6	53.7	16.7			100		
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	53,773	9.3									
	Urban	3,742	0.6									
	Total	57,515	9.9		H	M	L		H			
A2 - Stone Wall not packed with mortar	Rural	21,256	3.7									
	Urban	2,182	0.4									
	Total	23,438	4.1		H	M	L		M			
Total - Category - A		80,953	14.0									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	366,824	63.5									
	Urban	107,673	18.6									
	Total	474,497	82.1		M	L	VL		M			
Total - Category - B		474,497	82.2									
C1 - Concrete Wall	Rural	744	0.1									
	Urban	377	0.1									
	Total	1,121	0.2		L	VL	VL		VL			
C2 - Wood wall	Rural	1,235	0.2									
	Urban	185	-									
	Total	1,420	0.2		L	VL	VL		H			
Total - Category - C		2,541	0.4									
X - Other Materials	Rural	17,042	3.0									
	Urban	2,555	0.4									
	Total	19,597	3.4		VL	VL	VL		H			
Total - Category - X		19,597	3.4									
TOTAL HOUSES*		577,588										
ROOF												
R1 - Light Weight Sloping Roof	Rural	74,264	12.9									
	Urban	5,449	0.9									
	Total	79,713	13.8		M	L	VL		VH			
R2 - Heavy Weight Sloping Roof	Rural	334,575	57.9									
	Urban	101,118	17.5									
	Total	435,693	75.4		M	L	VL		M			
R3 - Flat Roof	Rural	52,035	9.0									
	Urban	10,147	1.8									
	Total	62,182	10.8									
TOTAL HOUSES*		577,588										

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 714 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
 - Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
 - Category - C** : Reinforced building, well built wooden structures
 - Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
 - Category - R2** - Heavy Weight (Tiles, Stone/Slate)
 - Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : RJ 12 State : RAJASTHAN JAIPUR

Table No. : RJ 13 State : RAJASTHAN SIKAR

Wall / Roof		Census Houses		Level of Risk under										Flood Prone Area
		No. of Houses	%	EQ Zone				Wind Velocity m/s				Flood Prone Area		
				V	IV	III	II	55 & 50	47	44 & 39	33			
				Area in %				Area in %						
WALL						10.2	89.8			100				
A1 - Mud & Unburnt Brick Wall	Rural	86,455	5.7											
	Urban	18,966	1.3											
	Total	105,421	7.0			M	L			H				
A2 - Stone Wall not packed with mortar	Rural	50,643	3.3											
	Urban	29,038	1.9											
	Total	79,681	5.2			M	L			M				
Total - Category - A		185,102	12.2											
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	519,834	34.3											
	Urban	754,500	49.8											
	Total	1,274,334	84.1			L	VL			M				
Total - Category - B		1,274,334	84.0											
C1 - Concrete Wall	Rural	2,750	0.2											
	Urban	15,325	1.0											
	Total	18,075	1.2			VL	VL			VL				
C2 - Wood wall	Rural	2,127	0.1											
	Urban	1,616	0.1											
	Total	3,743	0.2			VL	VL			H				
Total - Category - C		21,818	1.4											
X - Other Materials	Rural	21,668	1.4											
	Urban	13,380	0.9											
	Total	35,048	2.3			VL	VL			H				
Total - Category - X		35,048	2.3											
TOTAL HOUSES*		1,516,302												

Wall / Roof		Census Houses		Level of Risk under										Flood Prone Area
		No. of Houses	%	EQ Zone				Wind Velocity m/s				Flood Prone Area		
				V	IV	III	II	55 & 50	47	44 & 39	33			
				Area in %				Area in %						
WALL						7.4	92.6			100				
A1 - Mud & Unburnt Brick Wall	Rural	24,954	4.0											
	Urban	5,353	0.9											
	Total	30,307	4.9			M	L			H				
A2 - Stone Wall not packed with mortar	Rural	19,769	3.2											
	Urban	3,619	0.6											
	Total	23,388	3.8			M	L			M				
Total - Category - A		53,695	8.6											
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	417,338	67.0											
	Urban	133,042	21.3											
	Total	550,380	88.3			L	VL			M				
Total - Category - B		550,380	88.3											
C1 - Concrete Wall	Rural	722	0.1											
	Urban	568	0.1											
	Total	1,290	0.2			VL	VL			VL				
C2 - Wood wall	Rural	2,015	0.3											
	Urban	559	0.1											
	Total	2,574	0.4			VL	VL			H				
Total - Category - C		3,864	0.6											
X - Other Materials	Rural	12,942	2.1											
	Urban	2,428	0.4											
	Total	15,370	2.5			VL	VL			H				
Total - Category - X		15,370	2.5											
TOTAL HOUSES*		623,309												

ROOF													
R1 - Light Weight Sloping Roof	Rural	158,488	10.5										
	Urban	91,565	6.0										
	Total	250,053	16.5			L	VL			VH			
R2 - Heavy Weight Sloping Roof	Rural	407,568	26.9										
	Urban	262,232	17.3										
	Total	669,800	44.2			L	VL			M			
R3 - Flat Roof	Rural	117,421	7.7										
	Urban	479,028	31.6										
	Total	596,449	39.3										
TOTAL HOUSES*		1,516,302											

ROOF													
R1 - Light Weight Sloping Roof	Rural	69,684	11.2										
	Urban	8,837	1.4										
	Total	78,521	12.6			L	VL			VH			
R2 - Heavy Weight Sloping Roof	Rural	386,086	61.9										
	Urban	111,097	17.8										
	Total	497,183	79.7			L	VL			M			
R3 - Flat Roof	Rural	21,970	3.5										
	Urban	25,635	4.1										
	Total	47,605	7.6										
TOTAL HOUSES*		623,309											

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 683 mm

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 683 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
- 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
- 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V** : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV** : High Damage Risk Zone (MSK VIII)
- EQ Zone III** : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II** : Low Damage Risk Zone (MSK < VI)

- Level of Risk** : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
- 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
- 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V** : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV** : High Damage Risk Zone (MSK VIII)
- EQ Zone III** : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II** : Low Damage Risk Zone (MSK < VI)

- Level of Risk** : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : RJ 16 State : RAJASTHAN JAISALMER

Wall / Roof		Census Houses		Level of Risk under										Flood Prone Area
		No. of Houses	%	EQ Zone				Wind Velocity m/s				Flood Prone Area		
				V	IV	III	II	55 & 50	47	44 & 39	33			
				Area in %				Area in %						
WALL						81.9	18.1			100				
A1 - Mud & Unburnt Brick Wall	Rural	42,058	28.1											
	Urban	1,054	0.7											
	Total	43,112	28.8			M	L			H				
A2 - Stone Wall not packed with mortar	Rural	9,693	6.5											
	Urban	2,755	1.8											
	Total	12,448	8.3			M	L			M				
Total - Category - A		55,560	37.2											
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	62,632	41.9											
	Urban	17,595	11.8											
	Total	80,227	53.7			L	VL			M				
Total - Category - B		80,227	53.7											
C1 - Concrete Wall	Rural	209	0.1											
	Urban	16	-											
	Total	225	0.1			VL	VL			VL				
C2 - Wood wall	Rural	1,141	0.8											
	Urban	100	0.1											
	Total	1,241	0.9			VL	VL			H				
Total - Category - C		1,466	1.0											
X - Other Materials	Rural	11,615	7.8											
	Urban	589	0.4											
	Total	12,204	8.2			VL	VL			H				
Total - Category - X		12,204	8.2											
TOTAL HOUSES*		149,457												

ROOF													
R1 - Light Weight Sloping Roof	Rural	64,212	43.0										
	Urban	4,772	3.2										
	Total	68,984	46.2			L	VL			VH			
R2 - Heavy Weight Sloping Roof	Rural	46,292	31.0										
	Urban	15,052	10.1										
	Total	61,344	41.1			L	VL			M			
R3 - Flat Roof	Rural	16,844	11.3										
	Urban	2,285	1.5										
	Total	19,129	12.8										
TOTAL HOUSES*		149,457											

Probable Maximum Precipitation at a Station of the district in 24 hrs is 280 mm

Housing Category : Wall Types

- Category - A :** Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B :** Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C :** Reinforced building, well built wooden structures
- Category - X :** Other materials not covered in A,B,C. These are generally light.

- Notes :** 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
- 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
- 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1 -** Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2 -** Heavy Weight (Tiles, Stone/Slate)
- Category - R3 -** Flat Roof (Brick, Concrete)
- EQ Zone V :** Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV :** High Damage Risk Zone (MSK VIII)
- EQ Zone III :** Moderate Damage Risk Zone (MSK VII)
- EQ Zone II :** Low Damage Risk Zone (MSK < VI)

- Level of Risk :** VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

Table No. : RJ 17 State : RAJASTHAN BARMER

Wall / Roof		Census Houses		Level of Risk under										Flood Prone Area
		No. of Houses	%	EQ Zone				Wind Velocity m/s				Flood Prone Area		
				V	IV	III	II	55 & 50	47	44 & 39	33			
				Area in %				Area in %						
WALL						17.3	59.6	23.1			100			
A1 - Mud & Unburnt Brick Wall	Rural	141,756	26.6											
	Urban	1,524	0.3											
	Total	143,280	26.9			H	M	L		H				
A2 - Stone Wall not packed with mortar	Rural	20,598	3.9											
	Urban	2,545	0.5											
	Total	23,143	4.4			H	M	L		M				
Total - Category - A		166,423	31.3											
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	202,612	38.1											
	Urban	38,196	7.2											
	Total	240,808	45.3			M	L	VL		M				
Total - Category - B		240,808	45.3											
C1 - Concrete Wall	Rural	2,392	0.4											
	Urban	382	0.1											
	Total	2,774	0.5			L	VL	VL		VL				
C2 - Wood wall	Rural	25,853	4.9											
	Urban	131	-											
	Total	25,984	4.9			L	VL	VL		H				
Total - Category - C		28,758	5.4											
X - Other Materials	Rural	94,116	17.7											
	Urban	1,976	0.4											
	Total	96,092	18.1			VL	VL	VL		H				
Total - Category - X		96,092	18.1											
TOTAL HOUSES*		532,081												

ROOF													
R1 - Light Weight Sloping Roof	Rural	348,040	65.4										
	Urban	5,195	1.0										
	Total	353,235	66.4			M	L	VL		VH			
R2 - Heavy Weight Sloping Roof	Rural	125,551	23.6										
	Urban	33,702	6.3										
	Total	159,253	29.9			M	L	VL		M			
R3 - Flat Roof	Rural	13,736	2.6										
	Urban	5,857	1.1										
	Total	19,593	3.7										
TOTAL HOUSES*		532,081											

Probable Maximum Precipitation at a Station of the district in 24 hrs is 470 mm

Housing Category : Wall Types

- Category - A :** Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B :** Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C :** Reinforced building, well built wooden structures
- Category - X :** Other materials not covered in A,B,C. These are generally light.

- Notes :** 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
- 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
- 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1 -** Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2 -** Heavy Weight (Tiles, Stone/Slate)
- Category - R3 -** Flat Roof (Brick, Concrete)
- EQ Zone V :** Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV :** High Damage Risk Zone (MSK VIII)
- EQ Zone III :** Moderate Damage Risk Zone (MSK VII)
- EQ Zone II :** Low Damage Risk Zone (MSK < VI)

- Level of Risk :** VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

**Distribution of Houses by Predominant Materials of Roof and Wall
and Level of Damage Risk**

Table No. : RJ 18 State : RAJASTHAN JALOR

Wall / Roof		Census Houses		Level of Risk under								Flood Pron e Area
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
					20.8	61.8	17.4			100		
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	122,302	31.0									
	Urban	3,771	1.0									
	Total	126,073	32.0		H	M	L		H			
A2 - Stone Wall not packed with mortar	Rural	11,542	2.9									
	Urban	1,526	0.4									
	Total	13,068	3.3		H	M	L		M			
Total - Category - A		139,141	35.2									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	194,754	49.3									
	Urban	30,198	7.6									
	Total	224,952	56.9		M	L	VL		M			
Total - Category - B		224,952	56.9									
C1 - Concrete Wall	Rural	2,959	0.7									
	Urban	527	0.1									
	Total	3,486	0.8		L	VL	VL		VL			
C2 - Wood wall	Rural	1,626	0.4									
	Urban	132	-									
	Total	1,758	0.4		L	VL	VL		H			
Total - Category - C		5,244	1.3									
X - Other Materials	Rural	24,139	6.1									
	Urban	1,531	0.4									
	Total	25,670	6.5		VL	VL	VL		H			
Total - Category - X		25,670	6.5									
TOTAL HOUSES*		395,007										
ROOF												
R1 - Light Weight Sloping Roof	Rural	135,186	34.2									
	Urban	8,083	2.0									
	Total	143,269	36.2		M	L	VL		VH			
R2 - Heavy Weight Sloping Roof	Rural	197,511	50.0									
	Urban	19,959	5.1									
	Total	217,470	55.1		M	L	VL		M			
R3 - Flat Roof	Rural	24,625	6.2									
	Urban	9,643	2.4									
	Total	34,268	8.6									
TOTAL HOUSES*		395,007										

Probable Maximum Precipitation at a Station of the district in 24 hrs is 485 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
- M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

**Distribution of Houses by Predominant Materials of Roof and Wall
and Level of Damage Risk**

Table No. : RJ 19 State : RAJASTHAN SIROHI

Wall / Roof		Census Houses		Level of Risk under								Flood Pron e Area
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	55,189	22.1									
	Urban	5,900	2.4									
	Total	61,089	24.5			M	L		H			
A2 - Stone Wall not packed with mortar	Rural	8,361	3.3									
	Urban	2,075	0.8									
	Total	10,436	4.1			M	L		M			
Total - Category - A		71,525	28.6									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	118,378	47.3									
	Urban	45,085	18.0									
	Total	163,463	65.3			L	VL		M			
Total - Category - B		163,463	65.3									
C1 - Concrete Wall	Rural	487	0.2									
	Urban	393	0.2									
	Total	880	0.4			VL	VL		VL			
C2 - Wood wall	Rural	706	0.3									
	Urban	190	0.1									
	Total	896	0.4			VL	VL		H			
Total - Category - C		1,776	0.7									
X - Other Materials	Rural	11,795	4.7									
	Urban	1,696	0.7									
	Total	13,491	5.4			VL	VL		H			
Total - Category - X		13,491	5.4									
TOTAL HOUSES*		250,255										
ROOF												
R1 - Light Weight Sloping Roof	Rural	41,667	16.6									
	Urban	8,769	3.5									
	Total	50,436	20.1			L	VL		VH			
R2 - Heavy Weight Sloping Roof	Rural	136,923	54.7									
	Urban	28,380	11.3									
	Total	165,303	66.0			L	VL		M			
R3 - Flat Roof	Rural	16,326	6.5									
	Urban	18,190	7.3									
	Total	34,516	13.8									
TOTAL HOUSES*		250,255										

Probable Maximum Precipitation at a Station of the district in 24 hrs is 485 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
- M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

**Distribution of Houses by Predominant Materials of Roof and Wall
and Level of Damage Risk**

Table No. : RJ 26 State : RAJASTHAN DUNGARPUR

Wall / Roof		Census Houses		Level of Risk under								Flood Pron e Area
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
WALL						14.4	85.6			.1	99.9	
A1 - Mud & Unburnt Brick Wall	Rural	211,073	64.4									
	Urban	3,667	1.1									
	Total	214,740	65.5			M	L			H	M	
A2 - Stone Wall not packed with mortar	Rural	9,687	3.0									
	Urban	1,027	0.3									
	Total	10,714	3.3			M	L			M	L	
Total - Category - A		225,454	68.8									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	77,191	23.5									
	Urban	20,191	6.2									
	Total	97,382	29.7			L	VL			M	L	
Total - Category - B		97,382	29.7									
C1 - Concrete Wall	Rural	364	0.1									
	Urban	173	0.1									
	Total	537	0.2			VL	VL			VL	VL	
C2 - Wood wall	Rural	744	0.2									
	Urban	71	-									
	Total	815	0.2			VL	VL			H	M	
Total - Category - C		1,352	0.4									
X - Other Materials	Rural	3,454	1.1									
	Urban	275	0.1									
	Total	3,729	1.2			VL	VL			H	M	
Total - Category - X		3,729	1.1									
TOTAL HOUSES*		327,917										
ROOF												
R1 - Light Weight Sloping Roof	Rural	36,171	11.0									
	Urban	2,314	0.7									
	Total	38,485	11.7			L	VL			VH	H	
R2 - Heavy Weight Sloping Roof	Rural	249,642	76.1									
	Urban	12,976	4.0									
	Total	262,618	80.1			L	VL			M	L	
R3 - Flat Roof	Rural	16,700	5.1									
	Urban	10,114	3.1									
	Total	26,814	8.2									
TOTAL HOUSES*		327,917										

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. **492 mm**

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
- M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

**Distribution of Houses by Predominant Materials of Roof and Wall
and Level of Damage Risk**

Table No. : RJ 27 State : RAJASTHAN BANSWARA

Wall / Roof		Census Houses		Level of Risk under								Flood Pron e Area
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	236,483	57.7									
	Urban	3,726	0.9									
	Total	240,209	58.6							L	H	M
A2 - Stone Wall not packed with mortar	Rural	16,754	4.1									
	Urban	806	0.2									
	Total	17,560	4.3							L	M	L
Total - Category - A		257,769	62.9									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	88,702	21.6									
	Urban	28,256	6.9									
	Total	116,958	28.5							VL	M	L
Total - Category - B		116,958	28.5									
C1 - Concrete Wall	Rural	1,586	0.4									
	Urban	727	0.2									
	Total	2,313	0.6							VL	VL	VL
C2 - Wood wall	Rural	2,747	0.7									
	Urban	81	-									
	Total	2,828	0.7							VL	H	M
Total - Category - C		5,141	1.3									
X - Other Materials	Rural	29,330	7.2									
	Urban	704	0.2									
	Total	30,034	7.4							VL	H	M
Total - Category - X		30,034	7.3									
TOTAL HOUSES*		409,902										
ROOF												
R1 - Light Weight Sloping Roof	Rural	67,198	16.4									
	Urban	4,724	1.2									
	Total	71,922	17.6							VL	VH	H
R2 - Heavy Weight Sloping Roof	Rural	283,626	69.2									
	Urban	13,461	3.3									
	Total	297,087	72.5							VL	M	L
R3 - Flat Roof	Rural	24,778	6.0									
	Urban	16,115	3.9									
	Total	40,893	9.9									
TOTAL HOUSES*		409,902										

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. **530 mm**

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
- M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : RJ 32 State : RAJASTHAN UDAIPUR

Table No. : RJ 33 State : RAJASTHAN PRATAPGARH

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
WALL						13.8	86.2			89.2	10.8	
A1 - Mud & Unburnt Brick Wall	Rural	260,318	34.0									
	Urban	7,653	1.0									
	Total	267,971	35.0			M	L			H	M	
A2 - Stone Wall not packed with mortar	Rural	47,444	6.2									
	Urban	11,901	1.6									
	Total	59,345	7.8			M	L			M	L	
Total - Category - A		327,316	42.7									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	284,003	37.1									
	Urban	136,318	17.8									
	Total	420,321	54.9			L	VL			M	L	
Total - Category - B		420,321	54.9									
C1 - Concrete Wall	Rural	1,644	0.2									
	Urban	2,036	0.3									
	Total	3,680	0.5			VL	VL			VL	VL	
C2 - Wood wall	Rural	1,821	0.2									
	Urban	295	-									
	Total	2,116	0.2			VL	VL			H	M	
Total - Category - C		5,796	0.8									
X - Other Materials	Rural	11,184	1.5									
	Urban	1,570	0.2									
	Total	12,754	1.7			VL	VL			H	M	
Total - Category - X		12,754	1.7									
TOTAL HOUSES*		766,187										

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	133,871	61.0									
	Urban	2,236	1.0									
	Total	136,107	62.0							L	H	M
A2 - Stone Wall not packed with mortar	Rural	5,523	2.5									
	Urban	1,268	0.6									
	Total	6,791	3.1							L	M	L
Total - Category - A		142,898	65.2									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	55,041	25.1									
	Urban	16,227	7.4									
	Total	71,268	32.5							VL	M	L
Total - Category - B		71,268	32.5									
C1 - Concrete Wall	Rural	283	0.1									
	Urban	337	0.2									
	Total	620	0.3							VL	VL	VL
C2 - Wood wall	Rural	542	0.2									
	Urban	64	-									
	Total	606	0.2							VL	H	M
Total - Category - C		1,226	0.6									
X - Other Materials	Rural	3,610	1.6									
	Urban	305	0.1									
	Total	3,915	1.7							VL	H	M
Total - Category - X		3,915	1.8									
TOTAL HOUSES*		219,307										

ROOF												
R1 - Light Weight Sloping Roof		Census Houses		Level of Risk under								Flood Prone Area
		No. of Houses	%	V	IV	III	II	55 & 50	47	44 & 39	33	
R1 - Light Weight Sloping Roof	Rural	99,352	13.0									
	Urban	9,841	1.3									
	Total	109,193	14.3			L	VL			VH	H	
R2 - Heavy Weight Sloping Roof	Rural	458,127	59.8									
	Urban	57,749	7.5									
	Total	515,876	67.3			L	VL			M	L	
R3 - Flat Roof	Rural	48,935	6.4									
	Urban	92,183	12.0									
	Total	141,118	18.4									
TOTAL HOUSES*		766,187										

ROOF												
R1 - Light Weight Sloping Roof		Census Houses		Level of Risk under								Flood Prone Area
		No. of Houses	%	V	IV	III	II	55 & 50	47	44 & 39	33	
R1 - Light Weight Sloping Roof	Rural	35,061	16.0									
	Urban	3,602	1.6									
	Total	38,663	17.6							VL	VH	H
R2 - Heavy Weight Sloping Roof	Rural	154,735	70.6									
	Urban	11,137	5.1									
	Total	165,872	75.7							VL	M	L
R3 - Flat Roof	Rural	9,074	4.1									
	Urban	5,698	2.6									
	Total	14,772	6.7									
TOTAL HOUSES*		219,307										

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. **462 mm**

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
- 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
- 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V** : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV** : High Damage Risk Zone (MSK VIII)
- EQ Zone III** : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II** : Low Damage Risk Zone (MSK < VI)

- Level of Risk** : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. **421 mm**

Housing Category : Wall Types

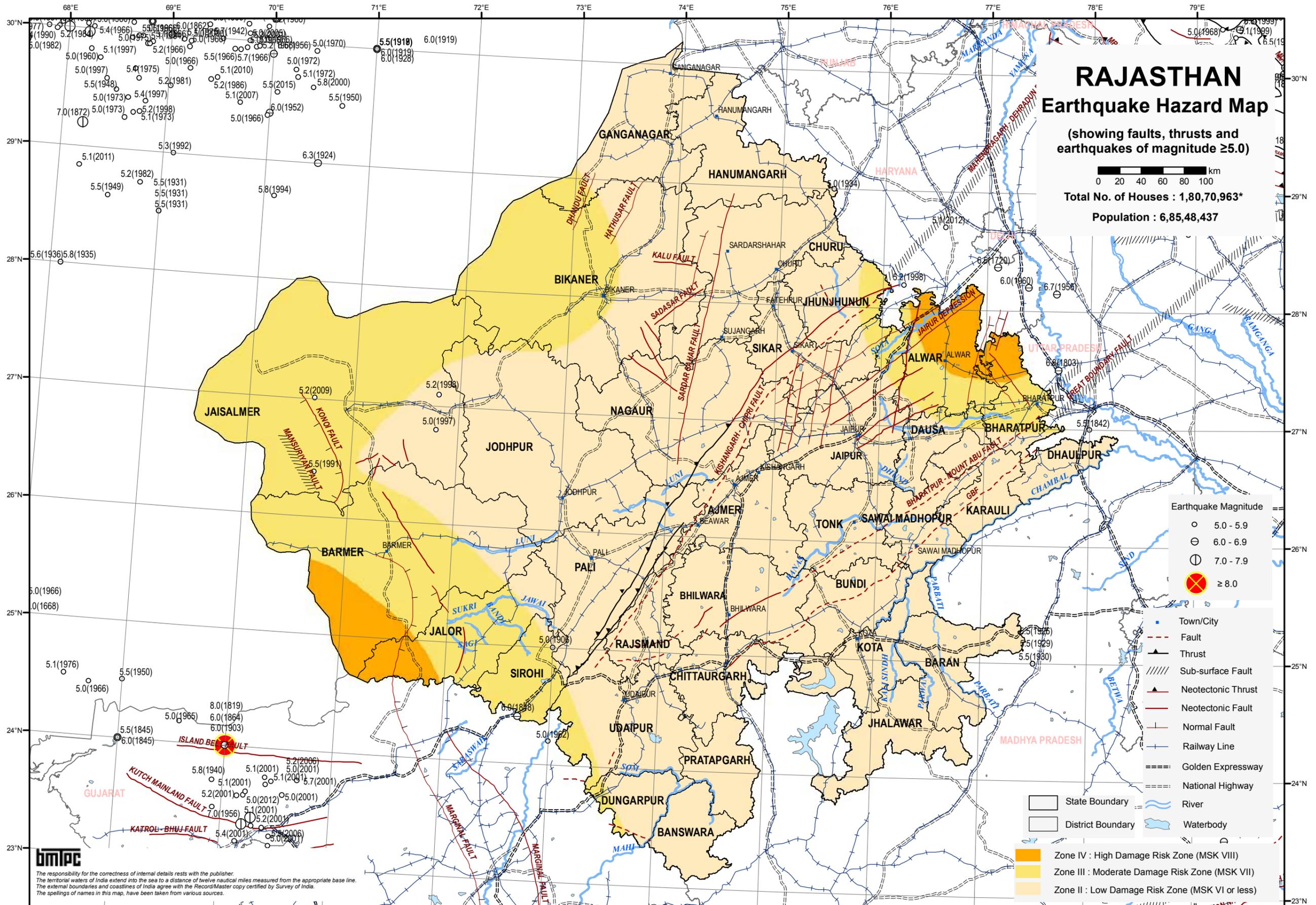
- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
- 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
- 3. Source of Housing Data : Census of Housing, GOI, 2011

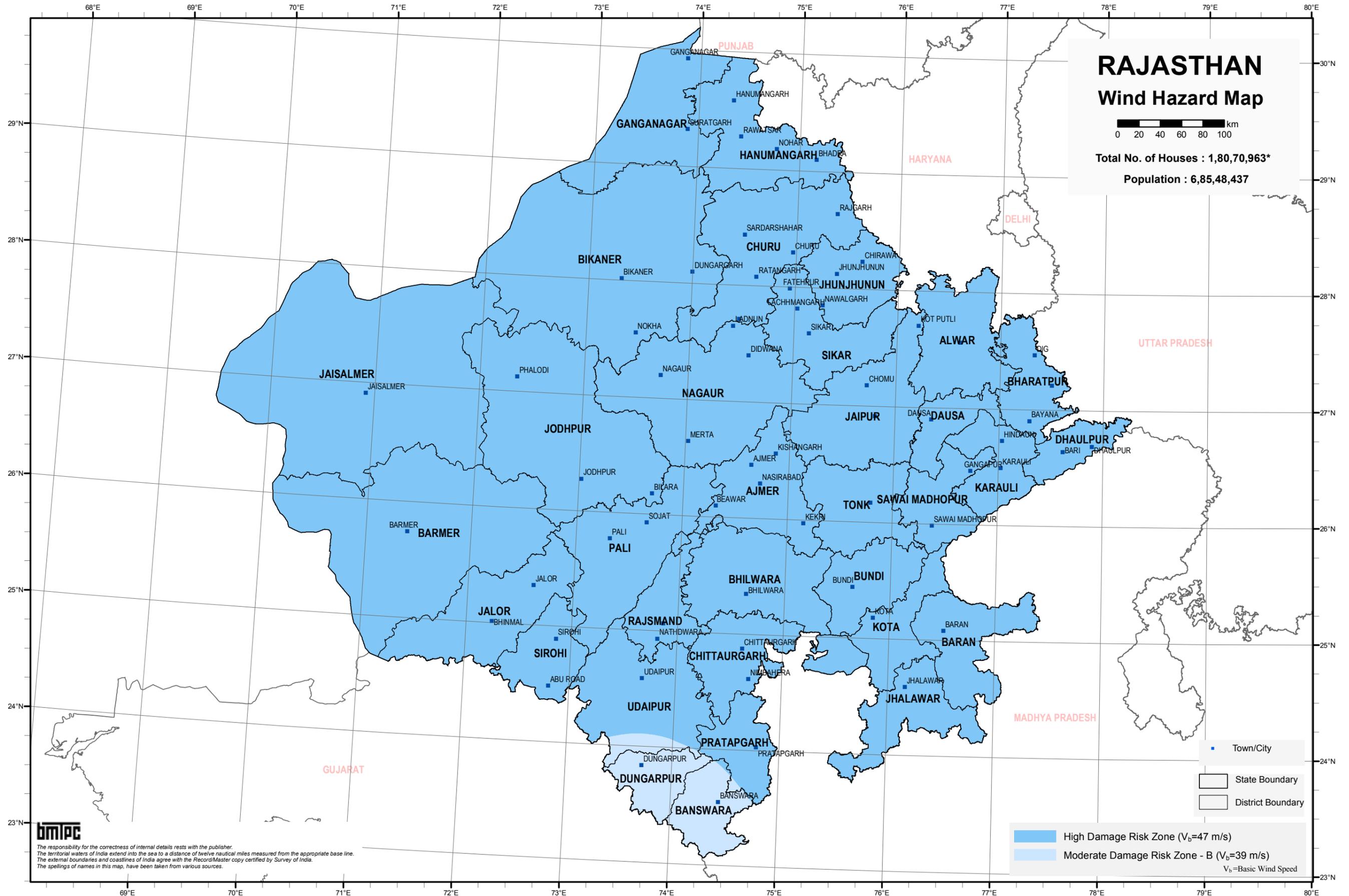
Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V** : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV** : High Damage Risk Zone (MSK VIII)
- EQ Zone III** : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II** : Low Damage Risk Zone (MSK < VI)

- Level of Risk** : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses



BMTPC : Vulnerability Atlas - 3rd Edition : Peer Group, MoHUA, GOI; Map is Based on digitised data of SOI; Seismic Zones of India Map IS: 1893 (Part I): 2002, BIS; Earthquake Epicentre from IMD; Seismotectonic Atlas of India and its Environs, GSI; Houses/Population as per Census 2011; *Houses including vacant & locked houses. Disclaimer: The maps are solely for thematic presentation.



Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

SIKKIM

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
STATE - SIKKIM				Area in %				Area in %				
				100				100				
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	13,159	8.7									
	Urban	1,467	1.0									
	Total	14,626	9.7		H				H			
A2 - Stone Wall not packed with mortar	Rural	6,463	4.3									
	Urban	548	0.4									
	Total	7,011	4.7		H				M			
Total - Category - A		21,637	14.3									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	16,400	10.8									
	Urban	29,013	19.1									
	Total	45,413	29.9		M				M			
Total - Category - B		45,413	29.9									
C1 - Concrete Wall	Rural	13,573	8.9									
	Urban	9,600	6.3									
	Total	23,173	15.2		L				VL			
C2 - Wood wall	Rural	31,852	21.0									
	Urban	3,044	2.0									
	Total	34,896	23.0		L				H			
Total - Category - C		58,069	38.3									
X - Other Materials	Rural	23,554	15.5									
	Urban	3,099	2.0									
	Total	26,653	17.5		VL				H			
Total - Category - X		26,653	17.6									
TOTAL HOUSES*		151,772										

ROOF												
R1 - Light Weight Sloping Roof	Rural	90,727	59.8									
	Urban	18,803	12.4									
	Total	109,530	72.2		M				VH			
R2 - Heavy Weight Sloping Roof	Rural	1,434	0.9									
	Urban	824	0.5									
	Total	2,258	1.4		M				M			
R3 - Flat Roof	Rural	12,840	8.5									
	Urban	27,144	17.9									
	Total	39,984	26.4									
<i>Damage Risk as per that for the Wall supporting it</i>												
TOTAL HOUSES*		151,772										

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
EQ Zone IV : High Damage Risk Zone (MSK VIII)
EQ Zone III : Moderate Damage Risk Zone (MSK VII)
EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : SK 01

State : SIKKIM

NORTH DISTRICT

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
STATE - SIKKIM				Area in %				Area in %				
				100				100				
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	357	3.2									
	Urban	25	0.2									
	Total	382	3.4		H				H			
A2 - Stone Wall not packed with mortar	Rural	513	4.7									
	Urban	11	0.1									
	Total	524	4.8		H				M			
Total - Category - A		906	8.2									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	826	7.5									
	Urban	757	6.9									
	Total	1,583	14.4		M				M			
Total - Category - B		1,583	14.4									
C1 - Concrete Wall	Rural	1,315	11.9									
	Urban	548	5.0									
	Total	1,863	16.9		L				VL			
C2 - Wood wall	Rural	3,627	32.9									
	Urban	213	1.9									
	Total	3,840	34.8		L				H			
Total - Category - C		5,703	51.8									
X - Other Materials	Rural	2,665	24.2									
	Urban	160	1.5									
	Total	2,825	25.7		VL				H			
Total - Category - X		2,825	25.6									
TOTAL HOUSES*		11,017										

ROOF												
R1 - Light Weight Sloping Roof	Rural	8,114	73.6									
	Urban	760	6.9									
	Total	8,874	80.5		M				VH			
R2 - Heavy Weight Sloping Roof	Rural	317	2.9									
	Urban	7	0.1									
	Total	324	3.0		M				M			
R3 - Flat Roof	Rural	872	7.9									
	Urban	947	8.6									
	Total	1,819	16.5									
<i>Damage Risk as per that for the Wall supporting it</i>												
TOTAL HOUSES*		11,017										

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 342 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
EQ Zone IV : High Damage Risk Zone (MSK VIII)
EQ Zone III : Moderate Damage Risk Zone (MSK VII)
EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : SK 02 State : SIKKIM WEST DISTRICT

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
				Area in %				Area in %					
			100							100			
WALL													
A1 - Mud & Unburnt Brick Wall	Rural	4,015	12.7										
	Urban	63	0.2										
	Total	4,078	12.9		H					H			
A2 - Stone Wall not packed with mortar	Rural	2,962	9.4										
	Urban	9	-										
	Total	2,971	9.4		H					M			
Total - Category - A		7,049	22.3										
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	4,715	14.9										
	Urban	1,013	3.2										
	Total	5,728	18.1		M					M			
Total - Category - B		5,728	18.1										
C1 - Concrete Wall	Rural	3,063	9.7										
	Urban	78	0.2										
	Total	3,141	9.9		L					VL			
C2 - Wood wall	Rural	8,242	26.1										
	Urban	403	1.3										
	Total	8,645	27.4		L					H			
Total - Category - C		11,786	37.3										
X - Other Materials	Rural	6,977	22.1										
	Urban	78	0.2										
	Total	7,055	22.3		VL					H			
Total - Category - X		7,055	22.3										
TOTAL HOUSES*		31,618											

ROOF													
R1 - Light Weight Sloping Roof	Rural	27,094	85.7										
	Urban	778	2.5										
	Total	27,872	88.2		M					VH			
R2 - Heavy Weight Sloping Roof	Rural	391	1.2										
	Urban	15	-										
	Total	406	1.2		M					M			
R3 - Flat Roof	Rural	2,489	7.9										
	Urban	851	2.7										
	Total	3,340	10.6										
TOTAL HOUSES*		31,618											

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 673 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
- 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
- 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)

- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

Table No. : SK 03 State : SIKKIM SOUTH DISTRICT

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
				Area in %				Area in %					
			100										
WALL													
A1 - Mud & Unburnt Brick Wall	Rural	4,026	11.5										
	Urban	261	0.7										
	Total	4,287	12.2		H					H			
A2 - Stone Wall not packed with mortar	Rural	1,360	3.9										
	Urban	17	-										
	Total	1,377	3.9		H					M			
Total - Category - A		5,664	16.2										
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	4,493	12.9										
	Urban	4,394	12.6										
	Total	8,887	25.5		M					M			
Total - Category - B		8,887	25.4										
C1 - Concrete Wall	Rural	3,248	9.3										
	Urban	935	2.7										
	Total	4,183	12.0		L					VL			
C2 - Wood wall	Rural	9,468	27.1										
	Urban	490	1.4										
	Total	9,958	28.5		L					H			
Total - Category - C		14,141	40.4										
X - Other Materials	Rural	6,066	17.3										
	Urban	206	0.6										
	Total	6,272	17.9		VL					H			
Total - Category - X		6,272	17.9										
TOTAL HOUSES*		34,964											

ROOF													
R1 - Light Weight Sloping Roof	Rural	25,068	71.7										
	Urban	2,273	6.5										
	Total	27,341	78.2		M					VH			
R2 - Heavy Weight Sloping Roof	Rural	318	0.9										
	Urban	94	0.3										
	Total	412	1.2		M					M			
R3 - Flat Roof	Rural	3,275	9.4										
	Urban	3,936	11.3										
	Total	7,211	20.7										
TOTAL HOUSES*		34,964											

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 673 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
- 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
- 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)

- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : SK 04 State : SIKKIM EAST DISTRICT

Wall / Roof		Census Houses		Level of Risk under							Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39		33
				Area in %				Area in %				
		100					100					
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	4,761	6.4									
	Urban	1,118	1.5									
	Total	5,879	7.9									
A2 - Stone Wall not packed with mortar	Rural	1,628	2.2									
	Urban	511	0.7									
	Total	2,139	2.9									
Total - Category - A		8,018	10.8									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	6,366	8.6									
	Urban	22,849	30.8									
	Total	29,215	39.4									
Total - Category - B		29,215	39.4									
C1 - Concrete Wall	Rural	5,947	8.0									
	Urban	8,039	10.8									
	Total	13,986	18.8									
C2 - Wood wall	Rural	10,515	14.2									
	Urban	1,938	2.6									
	Total	12,453	16.8									
Total - Category - C		26,439	35.6									
X - Other Materials	Rural	7,846	10.6									
	Urban	2,655	3.6									
	Total	10,501	14.2									
Total - Category - X		10,501	14.2									
TOTAL HOUSES*		74,173										
ROOF												
R1 - Light Weight Sloping Roof	Rural	30,451	41.1									
	Urban	14,992	20.2									
	Total	45,443	61.3									
R2 - Heavy Weight Sloping Roof	Rural	408	0.6									
	Urban	708	1.0									
	Total	1,116	1.6									
R3 - Flat Roof	Rural	6,204	8.4									
	Urban	21,410	28.9									
	Total	27,614	37.3									
TOTAL HOUSES*		74,173										

Probable Maximum Precipitation at a Station of the district in 24 hrs is 720 mm

Housing Category : Wall Types

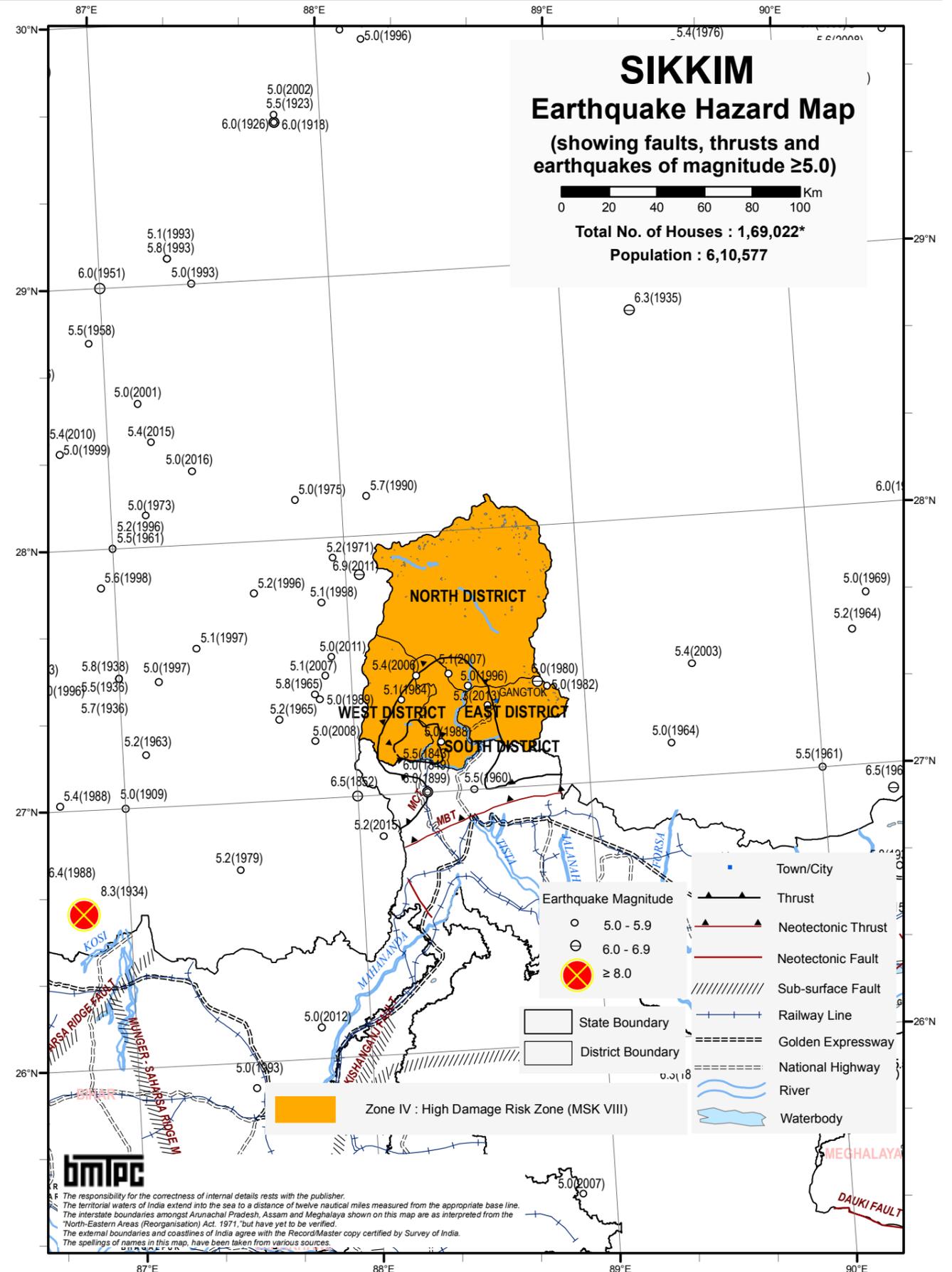
- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes :**
1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

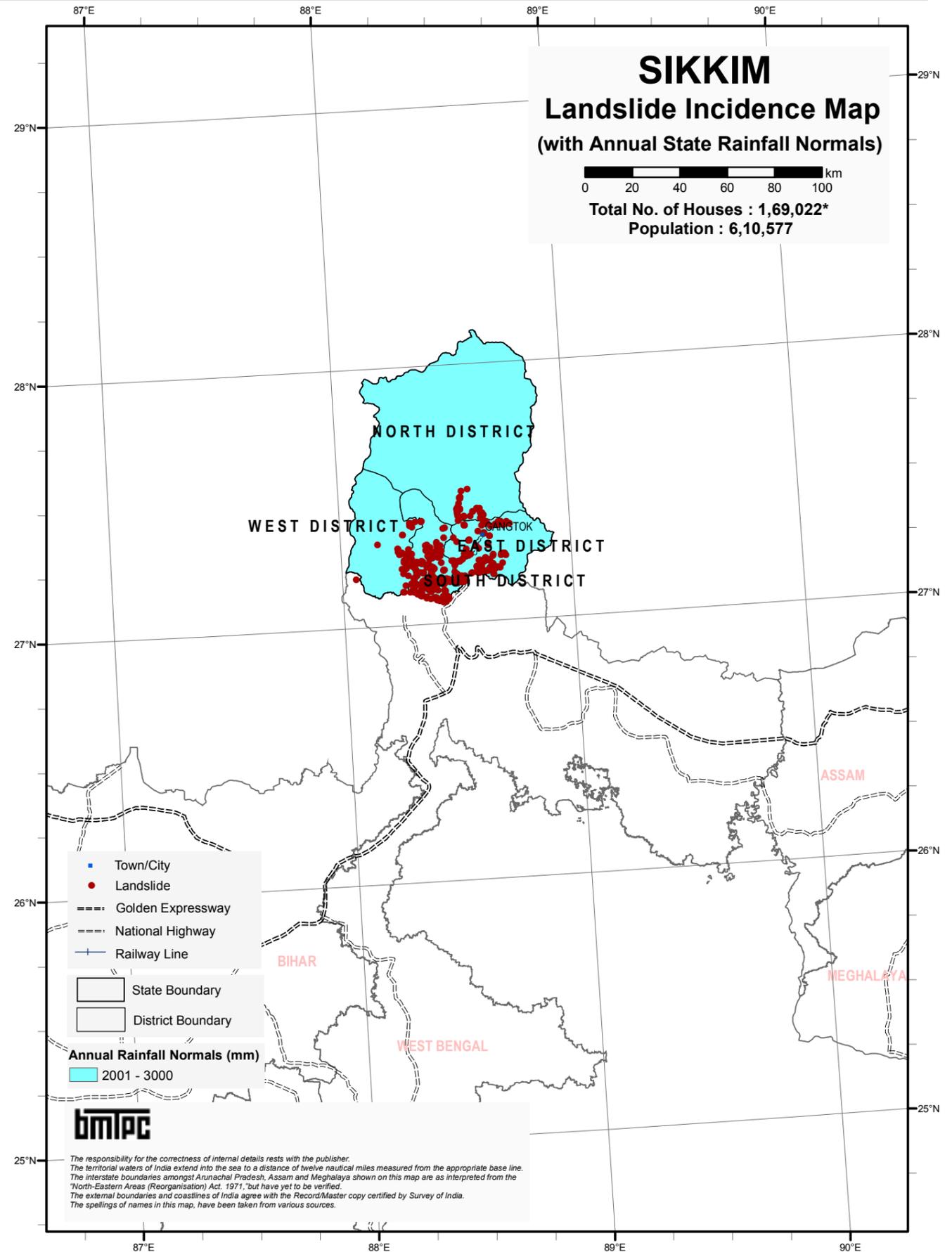
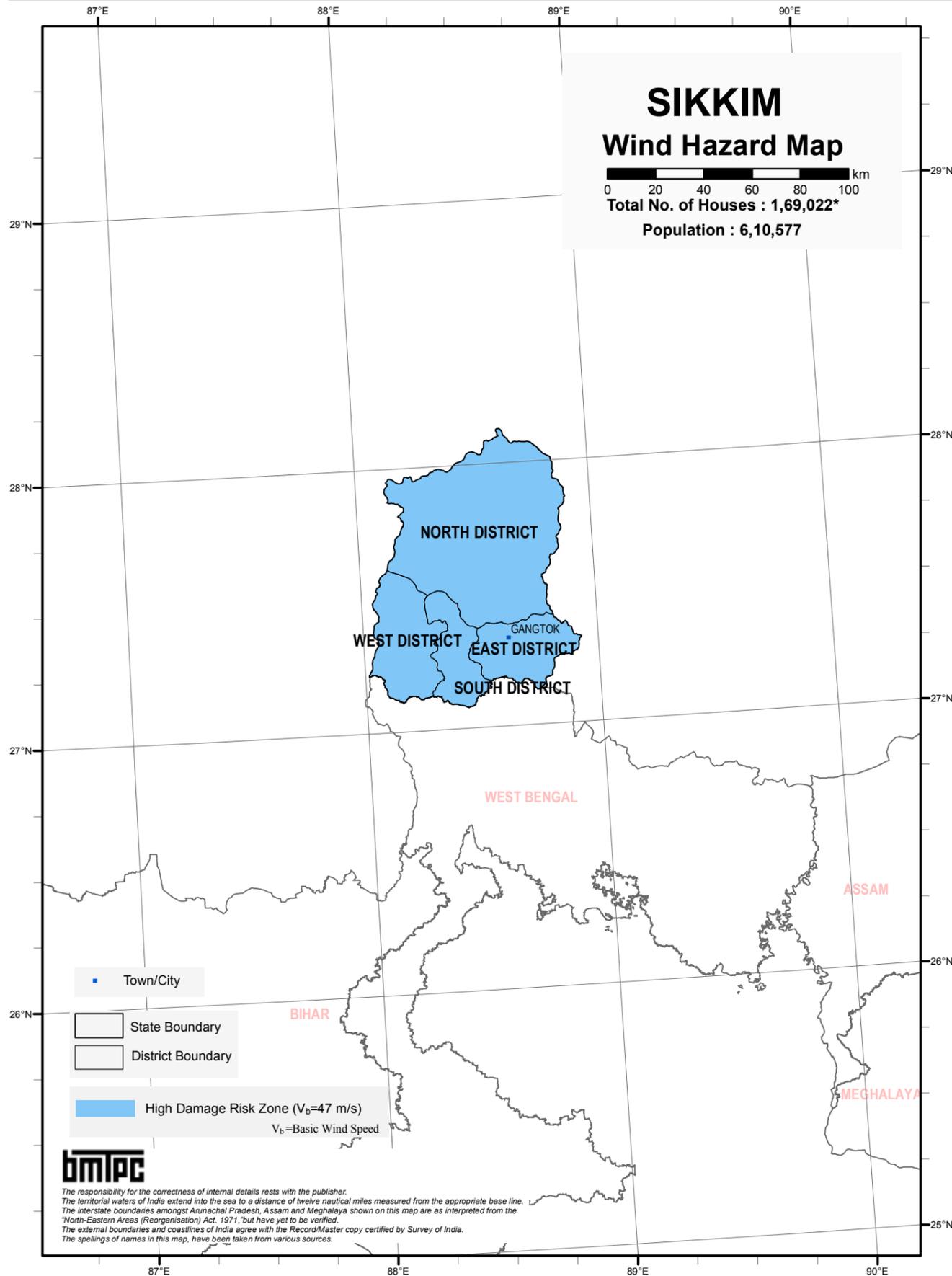
Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
 - Category - R2** - Heavy Weight (Tiles, Stone/Slate)
 - Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)

Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
 * Total No. of Houses excluding Vacant/Locked Houses



BMTPC : Vulnerability Atlas - 3rd Edition : Peer Group, MoHUA, GOI; Map is Based on digitised data of SOI; Seismic Zones of India Map IS:1893 (Part I): 2002, BIS; Earthquake Epicentre from IMD; Seismotectonic Atlas of India and its Environs, GSI; Houses/Population as per Census 2011; * Houses including vacant & locked houses. Disclaimer: The maps are solely for thematic presentation.



BMTPC: Vulnerability Atlas - 3rd Edition; Peer Group, MoHUA; Map is Based on digitised data of SOI, GOI; Basic Wind Speed Map National Building Code 2016. Houses/Population as per Census 2011; *Houses including vacant & locked houses. Disclaimer: The maps are solely for thematic presentation.

BMTPC: Vulnerability Atlas - 3rd Edition; Peer Group, MoHUA, GOI; Map is Based on digitised data of SOI; Landslide Incidence data GSI; Annual Rainfall data IMD. Houses/Population as per Census 2011; * Houses including vacant & locked houses. Disclaimer: The maps are solely for thematic presentation.

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

TAMIL NADU

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
STATE - TAMIL NADU												
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	3,020,940	14.1									
	Urban	1,161,328	5.4									
	Total	4,182,268	19.5		M	L	VH	H	M	L		
A2 - Stone Wall not packed with mortar	Rural	387,952	1.8									
	Urban	257,224	1.2									
	Total	645,176	3.0		M	L	H	M	L	VL		
Total - Category - A		4,827,444	22.6									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	6,071,138	28.4									
	Urban	7,366,311	34.4									
	Total	13,437,449	62.8		L	VL	H	M	L	VL		
Total - Category - B		13,437,449	62.8									
C1 - Concrete Wall	Rural	564,592	2.6									
	Urban	1,301,542	6.1									
	Total	1,866,134	8.7		VL	VL	L	VL	VL	VL		
C2 - Wood wall	Rural	35,777	0.2									
	Urban	22,459	0.1									
	Total	58,236	0.3		VL	VL	VH	H	M	L		
Total - Category - C		1,924,370	9.0									
X - Other Materials	Rural	849,632	4.0									
	Urban	359,227	1.7									
	Total	1,208,859	5.7		VL	VL	VH	H	M	L		
Total - Category - X		1,208,859	5.6									
TOTAL HOUSES*		21,398,122										
ROOF												
R1 - Light Weight Sloping Roof	Rural	3,523,116	16.5									
	Urban	1,687,597	7.9									
	Total	5,210,713	24.4		L	VL	VH	VH	H	M		
R2 - Heavy Weight Sloping Roof	Rural	3,734,847	17.5									
	Urban	2,524,340	11.8									
	Total	6,259,187	29.3		L	VL	H	M	L	VL		
R3 - Flat Roof	Rural	3,672,068	17.2									
	Urban	6,256,154	29.2									
	Total	9,928,222	46.4									
TOTAL HOUSES*		21,398,122										

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : TN 01

State : TAMIL NADU

THIRUVALLUR

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
STATE - TAMIL NADU												
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	71,913	6.8									
	Urban	26,736	2.5									
	Total	98,649	9.3			M		VH		M		
A2 - Stone Wall not packed with mortar	Rural	14,477	1.4									
	Urban	19,682	1.9									
	Total	34,159	3.3			M		H		L		
Total - Category - A		132,808	12.6									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	220,581	20.9									
	Urban	471,056	44.6									
	Total	691,637	65.5			L		H		L		
Total - Category - B		691,637	65.5									
C1 - Concrete Wall	Rural	29,637	2.8									
	Urban	151,524	14.3									
	Total	181,161	17.1			VL		L		VL		
C2 - Wood wall	Rural	1,046	0.1									
	Urban	1,313	0.1									
	Total	2,359	0.2			VL		VH		M		
Total - Category - C		183,520	17.4									
X - Other Materials	Rural	26,564	2.5									
	Urban	21,803	2.1									
	Total	48,367	4.6			VL		VH		M		
Total - Category - X		48,367	4.6									
TOTAL HOUSES*		1,056,332										
ROOF												
R1 - Light Weight Sloping Roof	Rural	133,397	12.6									
	Urban	116,573	11.0									
	Total	249,970	23.6			L		VH		H		
R2 - Heavy Weight Sloping Roof	Rural	63,245	6.0									
	Urban	73,582	7.0									
	Total	136,827	13.0			L		H		L		
R3 - Flat Roof	Rural	167,576	15.9									
	Urban	501,959	47.5									
	Total	669,535	63.4									
TOTAL HOUSES*		1,056,332										

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 667 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : TN 02 State : TAMIL NADU CHENNAI

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
				Area in %				Area in %					
						100				100			
WALL													
A1 - Mud & Unburnt Brick Wall	Rural		-										
	Urban	18,848	1.5										
	Total	18,848	1.5			M				VH			
A2 - Stone Wall not packed with mortar	Rural		-										
	Urban	26,290	2.1										
	Total	26,290	2.1			M				H			
Total - Category - A		45,138	3.6										
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural		-										
	Urban	882,697	70.0										
	Total	882,697	70.0			L				H			
Total - Category - B		882,697	70.0										
C1 - Concrete Wall	Rural		-										
	Urban	308,345	24.5										
	Total	308,345	24.5			VL				L			
C2 - Wood wall	Rural		-										
	Urban	959	0.1										
	Total	959	0.1			VL				VH			
Total - Category - C		309,304	24.5										
X - Other Materials	Rural		-										
	Urban	23,159	1.8										
	Total	23,159	1.8			VL				VH			
Total - Category - X		23,159	1.8										
TOTAL HOUSES*		1,260,298											

ROOF													
R1 - Light Weight Sloping Roof	Rural		-										
	Urban	159,502	12.7										
	Total	159,502	12.7			L				VH			
R2 - Heavy Weight Sloping Roof	Rural		-										
	Urban	88,158	7.0										
	Total	88,158	7.0			L				H			
R3 - Flat Roof	Rural		-										
	Urban	1,012,638	80.3										
	Total	1,012,638	80.3										
TOTAL HOUSES*		1,260,298											

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 667 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes :**
1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)

- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low

* Total No. of Houses excluding Vacant/Locked Houses

Table No. : TN 03 State : TAMIL NADU KANCHEEPURAM

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %		
		No. of Houses	%	EQ Zone				Wind Velocity m/s						
				V	IV	III	II	55 & 50	47	44 & 39	33			
				Area in %				Area in %						
						61.3			38.7	87.0			13.0	
WALL														
A1 - Mud & Unburnt Brick Wall	Rural	93,412	8.2											
	Urban	36,617	3.2											
	Total	130,029	11.4			M			L	VH			M	
A2 - Stone Wall not packed with mortar	Rural	15,500	1.4											
	Urban	19,697	1.7											
	Total	35,197	3.1			M			L	H			L	
Total - Category - A		165,226	14.6											
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	223,011	19.7											
	Urban	504,493	44.5											
	Total	727,504	64.2			L			VL	H			L	
Total - Category - B		727,504	64.1											
C1 - Concrete Wall	Rural	42,187	3.7											
	Urban	145,312	12.8											
	Total	187,499	16.5			VL			VL	L			VL	
C2 - Wood wall	Rural	1,086	0.1											
	Urban	913	0.1											
	Total	1,999	0.2			VL			VL	VH			M	
Total - Category - C		189,498	16.7											
X - Other Materials	Rural	30,065	2.7											
	Urban	21,834	1.9											
	Total	51,899	4.6			VL			VL	VH			M	
Total - Category - X		51,899	4.6											
TOTAL HOUSES*		1,134,127												

ROOF													
R1 - Light Weight Sloping Roof	Rural	167,233	14.7										
	Urban	140,233	12.4										
	Total	307,466	27.1			L			VL	VH			H
R2 - Heavy Weight Sloping Roof	Rural	63,516	5.6										
	Urban	75,471	6.7										
	Total	138,987	12.3			L			VL	H			L
R3 - Flat Roof	Rural	174,512	15.4										
	Urban	513,162	45.2										
	Total	687,674	60.6										
TOTAL HOUSES*		1,134,127											

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 667 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes :**
1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)

- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low

* Total No. of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : TN 04 State : TAMIL NADU VELLORE

Wall / Roof	Census Houses		Level of Risk under								Flood Prone Area in %	
	No. of Houses	%	EQ Zone				Wind Velocity m/s					
			V	IV	III	II	55 & 50	47	44 & 39	33		
			Area in %				Area in %					
					100			.0		54.8	45.1	
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	159,443	14.9									
	Urban	56,770	5.3									
	Total	216,213	20.2			M		VH		M	L	
A2 - Stone Wall not packed with mortar	Rural	18,710	1.7									
	Urban	15,666	1.5									
	Total	34,376	3.2			M		H		L	VL	
Total - Category - A		250,589	23.4									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	365,737	34.2									
	Urban	325,885	30.4									
	Total	691,622	64.6			L		H		L	VL	
Total - Category - B		691,622	64.6									
C1 - Concrete Wall	Rural	33,424	3.1									
	Urban	48,519	4.5									
	Total	81,943	7.6			VL		L		VL	VL	
C2 - Wood wall	Rural	1,143	0.1									
	Urban	482	-									
	Total	1,625	0.1			VL		VH		M	L	
Total - Category - C		83,568	7.8									
X - Other Materials	Rural	31,086	2.9									
	Urban	13,851	1.3									
	Total	44,937	4.2			VL		VH		M	L	
Total - Category - X		44,937	4.2									
TOTAL HOUSES*		1,070,716										
ROOF												
R1 - Light Weight Sloping Roof	Rural	207,329	19.4									
	Urban	83,374	7.8									
	Total	290,703	27.2			L		VH		H	M	
R2 - Heavy Weight Sloping Roof	Rural	115,422	10.8									
	Urban	78,939	7.4									
	Total	194,361	18.2			L		H		L	VL	
R3 - Flat Roof	Rural	286,792	26.8									
	Urban	298,860	27.9									
	Total	585,652	54.7									
TOTAL HOUSES*		1,070,716										

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 554 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
 - Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
 - Category - C** : Reinforced building, well built wooden structures
 - Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
 - Category - R2** - Heavy Weight (Tiles, Stone/Slate)
 - Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
 Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
 * Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : TN 05 State : TAMIL NADU TIRUVANNAMALAI

Wall / Roof	Census Houses		Level of Risk under								Flood Prone Area in %
	No. of Houses	%	EQ Zone				Wind Velocity m/s				
			V	IV	III	II	55 & 50	47	44 & 39	33	
			Area in %				Area in %				
					66.4	33.6	1.6	.4	97.9	.1	
WALL											
A1 - Mud & Unburnt Brick Wall	Rural	156,245	23.5								
	Urban	19,551	2.9								
	Total	175,796	26.4			M	L	VH	H	M	L
A2 - Stone Wall not packed with mortar	Rural	16,071	2.4								
	Urban	3,791	0.6								
	Total	19,862	3.0			M	L	H	M	L	VL
Total - Category - A		195,658	29.4								
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	300,859	45.2								
	Urban	93,941	14.1								
	Total	394,800	59.3			L	VL	H	M	L	VL
Total - Category - B		394,800	59.4								
C1 - Concrete Wall	Rural	27,934	4.2								
	Urban	16,738	2.5								
	Total	44,672	6.7			VL	VL	L	VL	VL	VL
C2 - Wood wall	Rural	1,373	0.2								
	Urban	273	-								
	Total	1,646	0.2			VL	VL	VH	H	M	L
Total - Category - C		46,318	7.0								
X - Other Materials	Rural	24,265	3.6								
	Urban	3,863	0.6								
	Total	28,128	4.2			VL	VL	VH	H	M	L
Total - Category - X		28,128	4.2								
TOTAL HOUSES*		664,904									
ROOF											
R1 - Light Weight Sloping Roof	Rural	180,285	27.1								
	Urban	20,627	3.1								
	Total	200,912	30.2			L	VL	VH	VH	H	M
R2 - Heavy Weight Sloping Roof	Rural	129,596	19.5								
	Urban	28,123	4.2								
	Total	157,719	23.7			L	VL	H	M	L	VL
R3 - Flat Roof	Rural	216,866	32.6								
	Urban	89,407	13.4								
	Total	306,273	46.0								
TOTAL HOUSES*		664,904									

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 566 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
 - Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
 - Category - C** : Reinforced building, well built wooden structures
 - Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
 - Category - R2** - Heavy Weight (Tiles, Stone/Slate)
 - Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
 Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
 * Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : TN 06 State : TAMIL NADU VILUPPURAM

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
						1.0	99.0	26.3	42.8	30.9		
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	260,476	28.8									
	Urban	17,670	2.0									
	Total	278,146	30.8		M	L	VH	H	M			
A2 - Stone Wall not packed with mortar	Rural	21,264	2.3									
	Urban	3,896	0.4									
	Total	25,160	2.7		M	L	H	M	L			
Total - Category - A		303,306	33.5									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	369,189	40.8									
	Urban	100,099	11.1									
	Total	469,288	51.9		L	VL	H	M	L			
Total - Category - B		469,288	51.9									
C1 - Concrete Wall	Rural	42,015	4.6									
	Urban	19,147	2.1									
	Total	61,162	6.7		VL	VL	L	VL	VL			
C2 - Wood wall	Rural	1,879	0.2									
	Urban	270	-									
	Total	2,149	0.2		VL	VL	VH	H	M			
Total - Category - C		63,311	7.0									
X - Other Materials	Rural	61,856	6.8									
	Urban	7,121	0.8									
	Total	68,977	7.6		VL	VL	VH	H	M			
Total - Category - X		68,977	7.6									
TOTAL HOUSES*		904,882										

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
ROOF												
R1 - Light Weight Sloping Roof	Rural	361,539	40.0									
	Urban	31,508	3.5									
	Total	393,047	43.5		L	VL	VH	VH	H			
R2 - Heavy Weight Sloping Roof	Rural	134,551	14.9									
	Urban	22,832	2.5									
	Total	157,383	17.4		L	VL	H	M	L			
R3 - Flat Roof	Rural	260,589	28.8									
	Urban	93,863	10.4									
	Total	354,452	39.2									
TOTAL HOUSES*		904,882										

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 578 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes :**
1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)

- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
 Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low

* Total No.of Houses excluding Vacant/Locked Houses

Table No. : TN 07 State : TAMIL NADU SALEM

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
						40.7	59.3					
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	134,281	12.5									
	Urban	80,336	7.5									
	Total	214,617	20.0		M	L		H	M			
A2 - Stone Wall not packed with mortar	Rural	28,414	2.6									
	Urban	15,051	1.4									
	Total	43,465	4.0		M	L		M	L			
Total - Category - A		258,082	24.0									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	303,596	28.2									
	Urban	390,742	36.3									
	Total	694,338	64.5		L	VL		M	L			
Total - Category - B		694,338	64.5									
C1 - Concrete Wall	Rural	26,244	2.4									
	Urban	47,205	4.4									
	Total	73,449	6.8		VL	VL		VL	VL			
C2 - Wood wall	Rural	1,894	0.2									
	Urban	1,265	0.1									
	Total	3,159	0.3		VL	VL		H	M			
Total - Category - C		76,608	7.1									
X - Other Materials	Rural	30,833	2.9									
	Urban	16,634	1.5									
	Total	47,467	4.4		VL	VL		H	M			
Total - Category - X		47,467	4.4									
TOTAL HOUSES*		1,076,495										

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
ROOF												
R1 - Light Weight Sloping Roof	Rural	190,739	17.7									
	Urban	81,663	7.6									
	Total	272,402	25.3		L	VL		VH	H			
R2 - Heavy Weight Sloping Roof	Rural	198,116	18.4									
	Urban	214,303	19.9									
	Total	412,419	38.3		L	VL		M	L			
R3 - Flat Roof	Rural	136,407	12.7									
	Urban	255,267	23.7									
	Total	391,674	36.4									
TOTAL HOUSES*		1,076,495										

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 471 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes :**
1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)

- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
 Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low

* Total No.of Houses excluding Vacant/Locked Houses

**Distribution of Houses by Predominant Materials of Roof and Wall
and Level of Damage Risk**

Table No. : TN 08 State : TAMIL NADU NAMAKKAL

Wall / Roof	Census Houses		Level of Risk under								Flood Prone Area in %	
	No. of Houses	%	EQ Zone				Wind Velocity m/s					
			V	IV	III	II	55 & 50	47	44 & 39	33		
			Area in %				Area in %					
					21.8	78.2				100		
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	79,522	13.9									
	Urban	32,144	5.6									
	Total	111,666	19.5		M	L			H			
A2 - Stone Wall not packed with mortar	Rural	10,935	1.9									
	Urban	4,967	0.9									
	Total	15,902	2.8		M	L			M			
Total - Category - A		127,568	22.3									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	209,333	36.5									
	Urban	176,385	30.8									
	Total	385,718	67.3		L	VL			M			
Total - Category - B		385,718	67.3									
C1 - Concrete Wall	Rural	12,207	2.1									
	Urban	14,588	2.5									
	Total	26,795	4.6			VL	VL		VL			
C2 - Wood wall	Rural	935	0.2									
	Urban	448	0.1									
	Total	1,383	0.3			VL	VL		H			
Total - Category - C		28,178	4.9									
X - Other Materials	Rural	22,674	4.0									
	Urban	8,781	1.5									
	Total	31,455	5.5			VL	VL		H			
Total - Category - X		31,455	5.5									
TOTAL HOUSES*		572,919										
ROOF												
R1 - Light Weight Sloping Roof	Rural	107,419	18.7									
	Urban	39,456	6.9									
	Total	146,875	25.6			L	VL		VH			
R2 - Heavy Weight Sloping Roof	Rural	133,390	23.3									
	Urban	96,715	16.9									
	Total	230,105	40.2			L	VL		M			
R3 - Flat Roof	Rural	94,797	16.5									
	Urban	101,142	17.7									
	Total	195,939	34.2									
TOTAL HOUSES*		572,919										

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 481 mm

Housing Category : Wall Types

- Category - A :** Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B :** Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C :** Reinforced building, well built wooden structures
- Category - X :** Other materials not covered in A,B,C. These are generally light.
- Notes :** 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1 -** Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2 -** Heavy Weight (Tiles, Stone/Slate)
- Category - R3 -** Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
EQ Zone IV : High Damage Risk Zone (MSK VIII)
EQ Zone III : Moderate Damage Risk Zone (MSK VII)
EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

**Distribution of Houses by Predominant Materials of Roof and Wall
and Level of Damage Risk**

Table No. : TN 09 State : TAMIL NADU ERODE

Wall / Roof	Census Houses		Level of Risk under								Flood Prone Area in %	
	No. of Houses	%	EQ Zone				Wind Velocity m/s					
			V	IV	III	II	55 & 50	47	44 & 39	33		
			Area in %				Area in %					
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	62,675	8.1									
	Urban	44,575	5.8									
	Total	107,250	13.9			M	L		H	M	L	
A2 - Stone Wall not packed with mortar	Rural	28,497	3.7									
	Urban	13,241	1.7									
	Total	41,738	5.4			M	L		M	L	VL	
Total - Category - A		148,988	19.3									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	218,495	28.2									
	Urban	285,720	36.9									
	Total	504,215	65.1			L	VL		M	L	VL	
Total - Category - B		504,215	65.2									
C1 - Concrete Wall	Rural	16,202	2.1									
	Urban	28,531	3.7									
	Total	44,733	5.8			VL	VL		VL	VL	VL	
C2 - Wood wall	Rural	2,211	0.3									
	Urban	1,311	0.2									
	Total	3,522	0.5			VL	VL		H	M	L	
Total - Category - C		48,255	6.2									
X - Other Materials	Rural	45,513	5.9									
	Urban	26,797	3.5									
	Total	72,310	9.4			VL	VL		H	M	L	
Total - Category - X		72,310	9.3									
TOTAL HOUSES*		773,768										
ROOF												
R1 - Light Weight Sloping Roof	Rural	105,778	13.7									
	Urban	72,437	9.4									
	Total	178,215	23.1			L	VL		VH	H	M	
R2 - Heavy Weight Sloping Roof	Rural	181,096	23.4									
	Urban	161,967	20.9									
	Total	343,063	44.3			L	VL		M	L	VL	
R3 - Flat Roof	Rural	86,719	11.2									
	Urban	165,771	21.4									
	Total	252,490	32.6									
TOTAL HOUSES*		773,768										

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 481 mm

Housing Category : Wall Types

- Category - A :** Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B :** Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C :** Reinforced building, well built wooden structures
- Category - X :** Other materials not covered in A,B,C. These are generally light.
- Notes :** 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1 -** Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2 -** Heavy Weight (Tiles, Stone/Slate)
- Category - R3 -** Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
EQ Zone IV : High Damage Risk Zone (MSK VIII)
EQ Zone III : Moderate Damage Risk Zone (MSK VII)
EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : TN 10 State : TAMIL NADU THE NILGIRIS

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
				Area in %				Area in %					
						97.6	2.4					45.7	54.3
WALL													
A1 - Mud & Unburnt Brick Wall	Rural	22,512	9.8										
	Urban	35,847	15.6										
	Total	58,359	25.4			M	L					M	L
A2 - Stone Wall not packed with mortar	Rural	5,171	2.2										
	Urban	5,494	2.4										
	Total	10,665	4.6			M	L					L	VL
Total - Category - A		69,024	30.0										
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	56,669	24.6										
	Urban	77,133	33.5										
	Total	133,802	58.1			L	VL					L	VL
Total - Category - B		133,802	58.2										
C1 - Concrete Wall	Rural	8,008	3.5										
	Urban	10,658	4.6										
	Total	18,666	8.1			VL	VL					VL	VL
C2 - Wood wall	Rural	517	0.2										
	Urban	1,160	0.5										
	Total	1,677	0.7			VL	VL					M	L
Total - Category - C		20,343	8.8										
X - Other Materials	Rural	2,958	1.3										
	Urban	3,791	1.6										
	Total	6,749	2.9			VL	VL					M	L
Total - Category - X		6,749	2.9										
TOTAL HOUSES*		229,918											

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
				Area in %				Area in %					
ROOF													
R1 - Light Weight Sloping Roof	Rural	17,696	7.7										
	Urban	30,425	13.2										
	Total	48,121	20.9			L	VL					H	M
R2 - Heavy Weight Sloping Roof	Rural	56,484	24.6										
	Urban	67,441	29.3										
	Total	123,925	53.9			L	VL					L	VL
R3 - Flat Roof	Rural	21,655	9.4										
	Urban	36,217	15.8										
	Total	57,872	25.2										
TOTAL HOUSES*		229,918											

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 819 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes :**
1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)

- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low

* Total No. of Houses excluding Vacant/Locked Houses

Table No. : TN 11 State : TAMIL NADU DINDIGUL

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
				Area in %				Area in %					
						4.5	95.5					13.7	86.3
WALL													
A1 - Mud & Unburnt Brick Wall	Rural	95,683	14.6										
	Urban	44,284	6.8										
	Total	139,967	21.4			M	L					H	M
A2 - Stone Wall not packed with mortar	Rural	13,473	2.1										
	Urban	5,734	0.9										
	Total	19,207	3.0			M	L					M	L
Total - Category - A		159,174	24.3										
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	240,636	36.7										
	Urban	163,163	24.9										
	Total	403,799	61.6			L	VL					M	L
Total - Category - B		403,799	61.6										
C1 - Concrete Wall	Rural	16,350	2.5										
	Urban	23,916	3.6										
	Total	40,266	6.1			VL	VL					VL	VL
C2 - Wood wall	Rural	1,709	0.3										
	Urban	824	0.1										
	Total	2,533	0.4			VL	VL					H	M
Total - Category - C		42,799	6.5										
X - Other Materials	Rural	36,459	5.6										
	Urban	13,256	2.0										
	Total	49,715	7.6			VL	VL					H	M
Total - Category - X		49,715	7.6										
TOTAL HOUSES*		655,487											

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
				Area in %				Area in %					
ROOF													
R1 - Light Weight Sloping Roof	Rural	104,478	15.9										
	Urban	46,625	7.1										
	Total	151,103	23.0			L	VL					VH	H
R2 - Heavy Weight Sloping Roof	Rural	190,481	29.1										
	Urban	83,121	12.7										
	Total	273,602	41.8			L	VL					M	L
R3 - Flat Roof	Rural	109,351	16.7										
	Urban	121,431	18.5										
	Total	230,782	35.2										
TOTAL HOUSES*		655,487											

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 475 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes :**
1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)

- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low

* Total No. of Houses excluding Vacant/Locked Houses

**Distribution of Houses by Predominant Materials of Roof and Wall
and Level of Damage Risk**

Table No. : TN 12 State : TAMIL NADU KARUR

Wall / Roof	Census Houses		Level of Risk under								Flood Prone Area in %		
	No. of Houses	%	EQ Zone				Wind Velocity m/s						
			V	IV	III	II	55 & 50	47	44 & 39	33			
			Area in %				Area in %						
WALL													
A1 - Mud & Unburnt Brick Wall	Rural	39,919	12.0										
	Urban	11,082	3.3										
	Total	51,001	15.3				L		H	M			
A2 - Stone Wall not packed with mortar	Rural	4,249	1.3										
	Urban	3,320	1.0										
	Total	7,569	2.3				L		M	L			
Total - Category - A		58,570	17.5										
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	124,767	37.4										
	Urban	109,192	32.7										
	Total	233,959	70.1				VL		M	L			
Total - Category - B		233,959	70.1										
C1 - Concrete Wall	Rural	6,872	2.1										
	Urban	9,650	2.9										
	Total	16,522	5.0				VL		VL	VL			
C2 - Wood wall	Rural	714	0.2										
	Urban	342	0.1										
	Total	1,056	0.3				VL		H	M			
Total - Category - C		17,578	5.3										
X - Other Materials	Rural	16,871	5.1										
	Urban	6,893	2.1										
	Total	23,764	7.2				VL		H	M			
Total - Category - X		23,764	7.1										
TOTAL HOUSES*		333,871											

ROOF												
R1 - Light Weight Sloping Roof	Rural	53,190	15.9									
	Urban	29,282	8.8									
	Total	82,472	24.7				VL		VH	H		
R2 - Heavy Weight Sloping Roof	Rural	82,025	24.6									
	Urban	37,650	11.3									
	Total	119,675	35.9				VL		M	L		
R3 - Flat Roof	Rural	58,177	17.4									
	Urban	73,547	22.0									
	Total	131,724	39.4									
TOTAL HOUSES*		333,871										

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. **481 mm**

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
EQ Zone IV : High Damage Risk Zone (MSK VIII)
EQ Zone III : Moderate Damage Risk Zone (MSK VII)
EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

**Distribution of Houses by Predominant Materials of Roof and Wall
and Level of Damage Risk**

Table No. : TN 13 State : TAMIL NADU TIRUCHIRAPPALLI

Wall / Roof	Census Houses		Level of Risk under								Flood Prone Area in %		
	No. of Houses	%	EQ Zone				Wind Velocity m/s						
			V	IV	III	II	55 & 50	47	44 & 39	33			
			Area in %				Area in %						
WALL													
A1 - Mud & Unburnt Brick Wall	Rural	117,797	14.6										
	Urban	42,531	5.3										
	Total	160,328	19.9				L		H				
A2 - Stone Wall not packed with mortar	Rural	10,271	1.3										
	Urban	6,855	0.8										
	Total	17,126	2.1				L		M				
Total - Category - A		177,454	22.0										
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	229,715	28.5										
	Urban	288,077	35.7										
	Total	517,792	64.2				VL		M				
Total - Category - B		517,792	64.2										
C1 - Concrete Wall	Rural	21,441	2.7										
	Urban	47,018	5.8										
	Total	68,459	8.5				VL		VL				
C2 - Wood wall	Rural	1,167	0.1										
	Urban	672	0.1										
	Total	1,839	0.2				VL		H				
Total - Category - C		70,298	8.7										
X - Other Materials	Rural	29,662	3.7										
	Urban	11,804	1.5										
	Total	41,466	5.2				VL		H				
Total - Category - X		41,466	5.1										
TOTAL HOUSES*		807,010											

ROOF												
R1 - Light Weight Sloping Roof	Rural	112,933	14.0									
	Urban	59,269	7.3									
	Total	172,202	21.3				VL		VH			
R2 - Heavy Weight Sloping Roof	Rural	149,346	18.5									
	Urban	79,012	9.8									
	Total	228,358	28.3				VL		M			
R3 - Flat Roof	Rural	147,774	18.3									
	Urban	258,676	32.1									
	Total	406,450	50.4									
TOTAL HOUSES*		807,010										

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. **578 mm**

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
EQ Zone IV : High Damage Risk Zone (MSK VIII)
EQ Zone III : Moderate Damage Risk Zone (MSK VII)
EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : TN 16 State : TAMIL NADU CUDDALORE

Wall / Roof	Census Houses		Level of Risk under								Flood Prone Area in %
	No. of Houses	%	EQ Zone				Wind Velocity m/s				
			V	IV	III	II	55 & 50	47	44 & 39	33	
			Area in %				Area in %				
							100	9.4	90.6		
WALL											
A1 - Mud & Unburnt Brick Wall	Rural	149,539	20.9								
	Urban	33,587	4.7								
	Total	183,126	25.6			L	VH	H			
A2 - Stone Wall not packed with mortar	Rural	20,789	2.9								
	Urban	9,278	1.3								
	Total	30,067	4.2			L	H	M			
Total - Category - A		213,193	29.8								
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	214,411	30.0								
	Urban	157,297	22.0								
	Total	371,708	52.0			VL	H	M			
Total - Category - B		371,708	52.0								
C1 - Concrete Wall	Rural	24,718	3.5								
	Urban	30,967	4.3								
	Total	55,685	7.8			VL	L	VL			
C2 - Wood wall	Rural	1,018	0.1								
	Urban	519	0.1								
	Total	1,537	0.2			VL	VH	H			
Total - Category - C		57,222	8.0								
X - Other Materials	Rural	59,364	8.3								
	Urban	12,728	1.8								
	Total	72,092	10.1			VL	VH	H			
Total - Category - X		72,092	10.1								
TOTAL HOUSES*		714,215									
ROOF											
R1 - Light Weight Sloping Roof	Rural	242,559	34.0								
	Urban	66,926	9.4								
	Total	309,485	43.4			VL	VH	VH			
R2 - Heavy Weight Sloping Roof	Rural	96,421	13.5								
	Urban	41,417	5.8								
	Total	137,838	19.3			VL	H	M			
R3 - Flat Roof	Rural	130,859	18.3								
	Urban	136,033	19.0								
	Total	266,892	37.3								
TOTAL HOUSES*		714,215									

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 642 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
 - Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
 - Category - C** : Reinforced building, well built wooden structures
 - Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
 - Category - R2** - Heavy Weight (Tiles, Stone/Slate)
 - Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
 Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
 * Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : TN 17 State : TAMIL NADU NAGAPATTINAM

Wall / Roof	Census Houses		Level of Risk under								Flood Prone Area in %
	No. of Houses	%	EQ Zone				Wind Velocity m/s				
			V	IV	III	II	55 & 50	47	44 & 39	33	
			Area in %				Area in %				
WALL											
A1 - Mud & Unburnt Brick Wall	Rural	102,131	21.1								
	Urban	13,146	2.7								
	Total	115,277	23.8			L		H			
A2 - Stone Wall not packed with mortar	Rural	22,086	4.6								
	Urban	6,007	1.2								
	Total	28,093	5.8			L		M			
Total - Category - A		143,370	29.6								
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	176,692	36.5								
	Urban	70,719	14.6								
	Total	247,411	51.1			VL		M			
Total - Category - B		247,411	51.1								
C1 - Concrete Wall	Rural	18,399	3.8								
	Urban	12,301	2.5								
	Total	30,700	6.3			VL		VL			
C2 - Wood wall	Rural	2,217	0.5								
	Urban	395	0.1								
	Total	2,612	0.6			VL		H			
Total - Category - C		33,312	6.9								
X - Other Materials	Rural	54,105	11.2								
	Urban	6,107	1.3								
	Total	60,212	12.5			VL		H			
Total - Category - X		60,212	12.4								
TOTAL HOUSES*		484,305									
ROOF											
R1 - Light Weight Sloping Roof	Rural	200,781	41.5								
	Urban	32,624	6.7								
	Total	233,405	48.2			VL		VH			
R2 - Heavy Weight Sloping Roof	Rural	65,763	13.6								
	Urban	23,365	4.8								
	Total	89,128	18.4			VL		M			
R3 - Flat Roof	Rural	109,086	22.5								
	Urban	52,686	10.9								
	Total	161,772	33.4								
TOTAL HOUSES*		484,305									

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 616 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
 - Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
 - Category - C** : Reinforced building, well built wooden structures
 - Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
 - Category - R2** - Heavy Weight (Tiles, Stone/Slate)
 - Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
 Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
 * Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : TN 18 State : TAMIL NADU THIRUVARUR

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
Area in %				Area in %								
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	105,992	27.5									
	Urban	14,353	3.7									
	Total	120,345	31.2				L			H		
A2 - Stone Wall not packed with mortar	Rural	14,420	3.7									
	Urban	3,059	0.8									
	Total	17,479	4.5				L			M		
Total - Category - A		137,824	35.8									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	127,309	33.0									
	Urban	49,603	12.9									
	Total	176,912	45.9				VL			M		
Total - Category - B		176,912	45.9									
C1 - Concrete Wall	Rural	17,922	4.6									
	Urban	9,998	2.6									
	Total	27,920	7.2				VL			VL		
C2 - Wood wall	Rural	1,020	0.3									
	Urban	260	0.1									
	Total	1,280	0.4				VL			H		
Total - Category - C		29,200	7.6									
X - Other Materials	Rural	37,358	9.7									
	Urban	4,145	1.1									
	Total	41,503	10.8				VL			H		
Total - Category - X		41,503	10.8									
TOTAL HOUSES*		385,439										

ROOF												
R1 - Light Weight Sloping Roof	Rural	154,177	40.0									
	Urban	24,393	6.3									
	Total	178,570	46.3				VL			VH		
R2 - Heavy Weight Sloping Roof	Rural	68,875	17.9									
	Urban	16,572	4.3									
	Total	85,447	22.2				VL			M		
R3 - Flat Roof	Rural	80,969	21.0									
	Urban	40,453	10.5									
	Total	121,422	31.5									
TOTAL HOUSES*											385,439	

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 578 mm

Housing Category : Wall Types

- Category - A :** Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B :** Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C :** Reinforced building, well built wooden structures
- Category - X :** Other materials not covered in A,B,C. These are generally light.

- Notes :**
1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1 -** Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2 -** Heavy Weight (Tiles, Stone/Slate)
- Category - R3 -** Flat Roof (Brick, Concrete)

- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low

* Total No.of Houses excluding Vacant/Locked Houses

Table No. : TN 19 State : TAMIL NADU THANJAVUR

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
Area in %				Area in %								
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	153,571	21.7									
	Urban	48,862	6.9									
	Total	202,433	28.6				L			H		
A2 - Stone Wall not packed with mortar	Rural	15,837	2.2									
	Urban	8,233	1.2									
	Total	24,070	3.4				L			M		
Total - Category - A		226,503	32.0									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	199,530	28.2									
	Urban	155,683	22.0									
	Total	355,213	50.2				VL			M		
Total - Category - B		355,213	50.1									
C1 - Concrete Wall	Rural	23,381	3.3									
	Urban	31,951	4.5									
	Total	55,332	7.8				VL			VL		
C2 - Wood wall	Rural	1,455	0.2									
	Urban	604	0.1									
	Total	2,059	0.3				VL			H		
Total - Category - C		57,391	8.1									
X - Other Materials	Rural	58,525	8.3									
	Urban	10,835	1.5									
	Total	69,360	9.8				VL			H		
Total - Category - X		69,360	9.8									
TOTAL HOUSES*		708,467										

ROOF												
R1 - Light Weight Sloping Roof	Rural	202,321	28.6									
	Urban	58,109	8.2									
	Total	260,430	36.8				VL			VH		
R2 - Heavy Weight Sloping Roof	Rural	129,868	18.3									
	Urban	67,875	9.6									
	Total	197,743	27.9				VL			M		
R3 - Flat Roof	Rural	120,110	17.0									
	Urban	130,184	18.4									
	Total	250,294	35.4									
TOTAL HOUSES*											708,467	

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 578 mm

Housing Category : Wall Types

- Category - A :** Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B :** Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C :** Reinforced building, well built wooden structures
- Category - X :** Other materials not covered in A,B,C. These are generally light.

- Notes :**
1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1 -** Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2 -** Heavy Weight (Tiles, Stone/Slate)
- Category - R3 -** Flat Roof (Brick, Concrete)

- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low

* Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : TN 20 State : TAMIL NADU PUDUKKOTTAI

Wall / Roof	Census Houses		Level of Risk under								Flood Prone Area in %
	No. of Houses	%	EQ Zone				Wind Velocity m/s				
			V	IV	III	II	55 & 50	47	44 & 39	33	
			Area in %				Area in %				
						100				100	
WALL											
A1 - Mud & Unburnt Brick Wall	Rural	94,361	20.4								
	Urban	14,599	3.2								
	Total	108,960	23.6				L			H	
A2 - Stone Wall not packed with mortar	Rural	7,559	1.6								
	Urban	1,729	0.4								
	Total	9,288	2.0				L			M	
Total - Category - A		118,248	25.6								
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	203,163	43.9								
	Urban	64,786	14.0								
	Total	267,949	57.9				VL			M	
Total - Category - B		267,949	57.9								
C1 - Concrete Wall	Rural	13,716	3.0								
	Urban	9,134	2.0								
	Total	22,850	5.0				VL			VL	
C2 - Wood wall	Rural	1,045	0.2								
	Urban	298	0.1								
	Total	1,343	0.3				VL			H	
Total - Category - C		24,193	5.2								
X - Other Materials	Rural	47,551	10.3								
	Urban	4,477	1.0								
	Total	52,028	11.3				VL			H	
Total - Category - X		52,028	11.3								
TOTAL HOUSES*		462,418									
ROOF											
R1 - Light Weight Sloping Roof	Rural	104,015	22.5								
	Urban	13,716	3.0								
	Total	117,731	25.5				VL			VH	
R2 - Heavy Weight Sloping Roof	Rural	160,697	34.8								
	Urban	31,395	6.8								
	Total	192,092	41.6				VL			M	
R3 - Flat Roof	Rural	102,683	22.2								
	Urban	49,912	10.8								
	Total	152,595	33.0								<i>Damage Risk as per that for the Wall supporting it</i>
TOTAL HOUSES*		462,418									

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 591 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
 - Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
 - Category - C** : Reinforced building, well built wooden structures
 - Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
 - Category - R2** - Heavy Weight (Tiles, Stone/Slate)
 - Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
 Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
 * Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : TN 21 State : TAMIL NADU SIVAGANGA

Wall / Roof	Census Houses		Level of Risk under								Flood Prone Area in %	
	No. of Houses	%	EQ Zone				Wind Velocity m/s					
			V	IV	III	II	55 & 50	47	44 & 39	33		
			Area in %				Area in %					
						100				36.0	64.0	
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	76,915	19.0									
	Urban	15,363	3.8									
	Total	92,278	22.8				L			H	M	
A2 - Stone Wall not packed with mortar	Rural	6,445	1.6									
	Urban	2,491	0.6									
	Total	8,936	2.2				L			M	L	
Total - Category - A		101,214	25.0									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	159,440	39.3									
	Urban	93,645	23.1									
	Total	253,085	62.4				VL			M	L	
Total - Category - B		253,085	62.5									
C1 - Concrete Wall	Rural	15,633	3.9									
	Urban	15,360	3.8									
	Total	30,993	7.7				VL			VL	VL	
C2 - Wood wall	Rural	1,028	0.3									
	Urban	386	0.1									
	Total	1,414	0.4				VL			H	M	
Total - Category - C		32,407	8.0									
X - Other Materials	Rural	16,273	4.0									
	Urban	2,279	0.6									
	Total	18,552	4.6				VL			H	M	
Total - Category - X		18,552	4.6									
TOTAL HOUSES*		405,258										
ROOF												
R1 - Light Weight Sloping Roof	Rural	34,211	8.4									
	Urban	8,684	2.1									
	Total	42,895	10.5				VL			VH	H	
R2 - Heavy Weight Sloping Roof	Rural	157,072	38.8									
	Urban	44,440	11.0									
	Total	201,512	49.8				VL			M	L	
R3 - Flat Roof	Rural	84,451	20.8									
	Urban	76,400	18.9									
	Total	160,851	39.7								<i>Damage Risk as per that for the Wall supporting it</i>	
TOTAL HOUSES*		405,258										

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 530 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
 - Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
 - Category - C** : Reinforced building, well built wooden structures
 - Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
 - Category - R2** - Heavy Weight (Tiles, Stone/Slate)
 - Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
 Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
 * Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : TN 22 State : TAMIL NADU MADURAI

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
							100			1.5	98.5	
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	107,314	11.7									
	Urban	40,863	4.4									
	Total	148,177	16.1				L			H	M	
A2 - Stone Wall not packed with mortar	Rural	8,200	0.9									
	Urban	7,360	0.8									
	Total	15,560	1.7				L			M	L	
Total - Category - A		163,737	17.8									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	192,714	20.9									
	Urban	390,363	42.4									
	Total	583,077	63.3				VL			M	L	
Total - Category - B		583,077	63.3									
C1 - Concrete Wall	Rural	36,033	3.9									
	Urban	104,941	11.4									
	Total	140,974	15.3				VL			VL	VL	
C2 - Wood wall	Rural	1,197	0.1									
	Urban	912	0.1									
	Total	2,109	0.2				VL			H	M	
Total - Category - C		143,083	15.5									
X - Other Materials	Rural	21,496	2.3									
	Urban	9,272	1.0									
	Total	30,768	3.3				VL			H	M	
Total - Category - X		30,768	3.3									
TOTAL HOUSES*		920,665										

ROOF												
R1 - Light Weight Sloping Roof	Rural	79,602	8.6									
	Urban	49,827	5.4									
	Total	129,429	14.0				VL			VH	H	
R2 - Heavy Weight Sloping Roof	Rural	145,813	15.8									
	Urban	101,743	11.1									
	Total	247,556	26.9				VL			M	L	
R3 - Flat Roof	Rural	141,539	15.4									
	Urban	402,141	43.7									
	Total	543,680	59.1									
<i>Damage Risk as per that for the Wall supporting it</i>												
TOTAL HOUSES*		920,665										

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 469 mm

Housing Category : Wall Types

- Category - A :** Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B :** Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C :** Reinforced building, well built wooden structures
- Category - X :** Other materials not covered in A,B,C. These are generally light.

- Notes :**
1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1 -** Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2 -** Heavy Weight (Tiles, Stone/Slate)
- Category - R3 -** Flat Roof (Brick, Concrete)

- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low

* Total No. of Houses excluding Vacant/Locked Houses

Table No. : TN 23 State : TAMIL NADU THENI

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
				Area in %				Area in %					
								4.3	95.7			100	
WALL													
A1 - Mud & Unburnt Brick Wall	Rural	37,506	9.8										
	Urban	34,392	9.0										
	Total	71,898	18.8							M	L		M
A2 - Stone Wall not packed with mortar	Rural	3,346	0.9										
	Urban	2,982	0.8										
	Total	6,328	1.7							M	L		L
Total - Category - A		78,226	20.4										
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	112,936	29.5										
	Urban	140,595	36.7										
	Total	253,531	66.2				L	VL					L
Total - Category - B		253,531	66.2										
C1 - Concrete Wall	Rural	11,829	3.1										
	Urban	21,842	5.7										
	Total	33,671	8.8							VL	VL		VL
C2 - Wood wall	Rural	345	0.1										
	Urban	431	0.1										
	Total	776	0.2							VL	VL		M
Total - Category - C		34,447	9.0										
X - Other Materials	Rural	7,762	2.0										
	Urban	8,922	2.3										
	Total	16,684	4.3							VL	VL		M
Total - Category - X		16,684	4.4										
TOTAL HOUSES*		382,888											

ROOF													
R1 - Light Weight Sloping Roof	Rural	93,367	24.4										
	Urban	89,346	23.3										
	Total	182,713	47.7							L	VL		H
R2 - Heavy Weight Sloping Roof	Rural	16,715	4.4										
	Urban	17,594	4.6										
	Total	34,309	9.0							L	VL		L
R3 - Flat Roof	Rural	63,642	16.6										
	Urban	102,224	26.7										
	Total	165,866	43.3										
<i>Damage Risk as per that for the Wall supporting it</i>													
TOTAL HOUSES*		382,888											

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 440 mm

Housing Category : Wall Types

- Category - A :** Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B :** Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C :** Reinforced building, well built wooden structures
- Category - X :** Other materials not covered in A,B,C. These are generally light.

- Notes :**
1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1 -** Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2 -** Heavy Weight (Tiles, Stone/Slate)
- Category - R3 -** Flat Roof (Brick, Concrete)

- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low

* Total No. of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : TN 24 State : TAMIL NADU VIRUDHUNAGAR

Wall / Roof	Census Houses		Level of Risk under								Flood Prone Area in %	
	No. of Houses	%	EQ Zone				Wind Velocity m/s					
			V	IV	III	II	55 & 50	47	44 & 39	33		
			Area in %				Area in %					
							100				100	
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	75,008	11.6									
	Urban	35,017	5.4									
	Total	110,025	17.0				L				M	
A2 - Stone Wall not packed with mortar	Rural	5,771	0.9									
	Urban	4,137	0.6									
	Total	9,908	1.5				L				L	
Total - Category - A		119,933	18.5									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	205,902	31.8									
	Urban	263,988	40.7									
	Total	469,890	72.5				VL				L	
Total - Category - B		469,890	72.5									
C1 - Concrete Wall	Rural	17,707	2.7									
	Urban	27,842	4.3									
	Total	45,549	7.0				VL				VL	
C2 - Wood wall	Rural	741	0.1									
	Urban	655	0.1									
	Total	1,396	0.2				VL				M	
Total - Category - C		46,945	7.2									
X - Other Materials	Rural	7,025	1.1									
	Urban	4,218	0.7									
	Total	11,243	1.8				VL				M	
Total - Category - X		11,243	1.7									
TOTAL HOUSES*		648,011										
ROOF												
R1 - Light Weight Sloping Roof	Rural	54,398	8.4									
	Urban	50,860	7.8									
	Total	105,258	16.2				VL				H	
R2 - Heavy Weight Sloping Roof	Rural	105,974	16.4									
	Urban	64,245	9.9									
	Total	170,219	26.3				VL				L	
R3 - Flat Roof	Rural	151,782	23.4									
	Urban	220,752	34.1									
	Total	372,534	57.5									
TOTAL HOUSES*		648,011										

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 444 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
 - Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
 - Category - C** : Reinforced building, well built wooden structures
 - Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
 - Category - R2** - Heavy Weight (Tiles, Stone/Slate)
 - Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
 Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
 * Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : TN 25 State : TAMIL NADU RAMANATHAPURAM

Wall / Roof	Census Houses		Level of Risk under								Flood Prone Area in %							
	No. of Houses	%	EQ Zone				Wind Velocity m/s											
			V	IV	III	II	55 & 50	47	44 & 39	33								
			Area in %				Area in %											
												100						
WALL																		
A1 - Mud & Unburnt Brick Wall	Rural	68,515	18.0															
	Urban	11,576	3.0															
	Total	80,091	21.0				L				H	M						
A2 - Stone Wall not packed with mortar	Rural	7,402	1.9															
	Urban	2,826	0.7															
	Total	10,228	2.6				L				M	L						
Total - Category - A		90,319	23.7															
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	142,145	37.3															
	Urban	81,474	21.4															
	Total	223,619	58.7				VL				M	L						
Total - Category - B		223,619	58.7															
C1 - Concrete Wall	Rural	14,195	3.7															
	Urban	12,642	3.3															
	Total	26,837	7.0				VL				VL	VL						
C2 - Wood wall	Rural	788	0.2															
	Urban	229	0.1															
	Total	1,017	0.3				VL				H	M						
Total - Category - C		27,854	7.3															
X - Other Materials	Rural	30,358	8.0															
	Urban	8,565	2.2															
	Total	38,923	10.2				VL				H	M						
Total - Category - X		38,923	10.2															
TOTAL HOUSES*		380,715																
ROOF																		
R1 - Light Weight Sloping Roof	Rural	40,200	10.6															
	Urban	14,439	3.8															
	Total	54,639	14.4				VL				VH	H						
R2 - Heavy Weight Sloping Roof	Rural	137,760	36.2															
	Urban	33,164	8.7															
	Total	170,924	44.9				VL				M	L						
R3 - Flat Roof	Rural	85,443	22.4															
	Urban	69,709	18.3															
	Total	155,152	40.7															
TOTAL HOUSES*		380,715																

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 419 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
 - Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
 - Category - C** : Reinforced building, well built wooden structures
 - Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
 - Category - R2** - Heavy Weight (Tiles, Stone/Slate)
 - Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
 Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
 * Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : TN 26 State : TAMIL NADU THOOTHUKKUDI

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
							100				100	
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	82,567	14.9									
	Urban	28,070	5.1									
	Total	110,637	20.0				L				M	
A2 - Stone Wall not packed with mortar	Rural	6,183	1.1									
	Urban	5,146	0.9									
	Total	11,329	2.0				L				L	
Total - Category - A		121,966	22.1									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	167,628	30.3									
	Urban	208,866	37.8									
	Total	376,494	68.1				VL				L	
Total - Category - B		376,494	68.1									
C1 - Concrete Wall	Rural	10,162	1.8									
	Urban	14,657	2.7									
	Total	24,819	4.5				VL				VL	
C2 - Wood wall	Rural	783	0.1									
	Urban	550	0.1									
	Total	1,333	0.2				VL				M	
Total - Category - C		26,152	4.7									
X - Other Materials	Rural	14,549	2.6									
	Urban	13,710	2.5									
	Total	28,259	5.1				VL				M	
Total - Category - X		28,259	5.1									
TOTAL HOUSES*		552,871										

ROOF												
R1 - Light Weight Sloping Roof	Rural	39,358	7.1									
	Urban	39,277	7.1									
	Total	78,635	14.2				VL				H	
R2 - Heavy Weight Sloping Roof	Rural	124,773	22.6									
	Urban	62,601	11.3									
	Total	187,374	33.9				VL				L	
R3 - Flat Roof	Rural	117,741	21.3									
	Urban	169,121	30.6									
	Total	286,862	51.9									
<i>Damage Risk as per that for the Wall supporting it</i>												
TOTAL HOUSES*		552,871										

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 440 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes :**
1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)

- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low

* Total No. of Houses excluding Vacant/Locked Houses

Table No. : TN 27 State : TAMIL NADU TIRUNELVELI

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
				Area in %				Area in %					
WALL													
A1 - Mud & Unburnt Brick Wall	Rural	121,044	12.7										
	Urban	93,919	9.8										
	Total	214,963	22.5				M	L			M		
A2 - Stone Wall not packed with mortar	Rural	9,784	1.0										
	Urban	6,702	0.7										
	Total	16,486	1.7				M	L			L		
Total - Category - A		231,449	24.2										
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	326,339	34.1										
	Urban	340,436	35.6										
	Total	666,775	69.7				L	VL			L		
Total - Category - B		666,775	69.7										
C1 - Concrete Wall	Rural	14,583	1.5										
	Urban	22,968	2.4										
	Total	37,551	3.9				VL	VL			VL		
C2 - Wood wall	Rural	1,316	0.1										
	Urban	887	0.1										
	Total	2,203	0.2				VL	VL			M		
Total - Category - C		39,754	4.2										
X - Other Materials	Rural	11,205	1.2										
	Urban	7,251	0.8										
	Total	18,456	2.0				VL	VL			M		
Total - Category - X		18,456	1.9										
TOTAL HOUSES*		956,434											

ROOF												
R1 - Light Weight Sloping Roof	Rural	75,042	7.8									
	Urban	65,434	6.8									
	Total	140,476	14.6				L	VL			H	
R2 - Heavy Weight Sloping Roof	Rural	178,545	18.7									
	Urban	130,008	13.6									
	Total	308,553	32.3				L	VL			L	
R3 - Flat Roof	Rural	230,684	24.1									
	Urban	276,721	28.9									
	Total	507,405	53.0									
<i>Damage Risk as per that for the Wall supporting it</i>												
TOTAL HOUSES*		956,434										

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 419 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes :**
1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)

- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low

* Total No. of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : TN 28 State : TAMIL NADU KANNIYAKUMARI

Wall / Roof	Census Houses		Level of Risk under								Flood Prone Area in %
	No. of Houses	%	EQ Zone				Wind Velocity m/s				
			V	IV	III	II	55 & 50	47	44 & 39	33	
			Area in %				Area in %				
					100					100	
WALL											
A1 - Mud & Unburnt Brick Wall	Rural	22,978	4.1								
	Urban	124,278	22.2								
	Total	147,256	26.3			M				M	
A2 - Stone Wall not packed with mortar	Rural	1,850	0.3								
	Urban	10,546	1.9								
	Total	12,396	2.2			M				L	
Total - Category - A		159,652	28.5								
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	62,779	11.2								
	Urban	294,314	52.6								
	Total	357,093	63.8			L				L	
Total - Category - B		357,093	63.8								
C1 - Concrete Wall	Rural	3,472	0.6								
	Urban	18,343	3.3								
	Total	21,815	3.9			VL				VL	
C2 - Wood wall	Rural	200	-								
	Urban	1,450	0.3								
	Total	1,650	0.3			VL				M	
Total - Category - C		23,465	4.2								
X - Other Materials	Rural	4,615	0.8								
	Urban	14,891	2.7								
	Total	19,506	3.5			VL				M	
Total - Category - X		19,506	3.5								
TOTAL HOUSES*		559,716									
ROOF											
R1 - Light Weight Sloping Roof	Rural	16,515	3.0								
	Urban	76,595	13.7								
	Total	93,110	16.7			L				H	
R2 - Heavy Weight Sloping Roof	Rural	28,382	5.1								
	Urban	136,864	24.5								
	Total	165,246	29.6			L				L	
R3 - Flat Roof	Rural	50,997	9.1								
	Urban	250,363	44.7								
	Total	301,360	53.8								
TOTAL HOUSES*		559,716									

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. **419 mm**

Housing Category : Wall Types

- Category - A :** Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B :** Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C :** Reinforced building, well built wooden structures
- Category - X :** Other materials not covered in A,B,C. These are generally light.

- Notes :**
1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1 -** Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2 -** Heavy Weight (Tiles, Stone/Slate)
- Category - R3 -** Flat Roof (Brick, Concrete)

- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
 Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
 * Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : TN 29 State : TAMIL NADU DHARMAPURI

Wall / Roof	Census Houses		Level of Risk under								Flood Prone Area in %		
	No. of Houses	%	EQ Zone				Wind Velocity m/s						
			V	IV	III	II	55 & 50	47	44 & 39	33			
			Area in %				Area in %						
						50.3	49.7				33.3	61.3	5.4
WALL													
A1 - Mud & Unburnt Brick Wall	Rural	137,130	30.5										
	Urban	15,523	3.5										
	Total	152,653	34.0			M	L			H	M	L	
A2 - Stone Wall not packed with mortar	Rural	9,336	2.1										
	Urban	1,593	0.4										
	Total	10,929	2.5			M	L			M	L	VL	
Total - Category - A		163,582	36.4										
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	187,747	41.8										
	Urban	59,494	13.2										
	Total	247,241	55.0			L	VL			M	L	VL	
Total - Category - B		247,241	55.0										
C1 - Concrete Wall	Rural	11,301	2.5										
	Urban	3,862	0.9										
	Total	15,163	3.4			VL	VL			VL	VL	VL	
C2 - Wood wall	Rural	1,077	0.2										
	Urban	182	-										
	Total	1,259	0.2			VL	VL			H	M	L	
Total - Category - C		16,422	3.7										
X - Other Materials	Rural	19,980	4.4										
	Urban	2,287	0.5										
	Total	22,267	4.9			VL	VL			H	M	L	
Total - Category - X		22,267	5.0										
TOTAL HOUSES*		449,512											
ROOF													
R1 - Light Weight Sloping Roof	Rural	117,998	26.3										
	Urban	9,116	2.0										
	Total	127,114	28.3			L	VL			VH	H	M	
R2 - Heavy Weight Sloping Roof	Rural	146,887	32.7										
	Urban	27,368	6.1										
	Total	174,255	38.8			L	VL			M	L	VL	
R3 - Flat Roof	Rural	101,686	22.6										
	Urban	46,457	10.3										
	Total	148,143	32.9										
TOTAL HOUSES*		449,512											

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. **471 mm**

Housing Category : Wall Types

- Category - A :** Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B :** Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C :** Reinforced building, well built wooden structures
- Category - X :** Other materials not covered in A,B,C. These are generally light.

- Notes :**
1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1 -** Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2 -** Heavy Weight (Tiles, Stone/Slate)
- Category - R3 -** Flat Roof (Brick, Concrete)

- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
 Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
 * Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : TN 30 State : TAMIL NADU KRISHNAGIRI

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %		
		No. of Houses	%	EQ Zone				Wind Velocity m/s						
				V	IV	III	II	55 & 50	47	44 & 39	33			
				Area in %				Area in %						
						21.9	78.1					20.7	79.3	
WALL														
A1 - Mud & Unburnt Brick Wall	Rural	145,889	27.5											
	Urban	17,072	3.2											
	Total	162,961	30.7		M	L			M	L				
A2 - Stone Wall not packed with mortar	Rural	9,686	1.8											
	Urban	2,499	0.5											
	Total	12,185	2.3		M	L			L	VL				
Total - Category - A		175,146	33.0											
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	204,851	38.6											
	Urban	98,338	18.5											
	Total	303,189	57.1		L	VL			L	VL				
Total - Category - B		303,189	57.2											
C1 - Concrete Wall	Rural	20,079	3.8											
	Urban	8,655	1.6											
	Total	28,734	5.4			VL	VL			VL	VL			
C2 - Wood wall	Rural	1,488	0.3											
	Urban	162	-											
	Total	1,650	0.3			VL	VL			M	L			
Total - Category - C		30,384	5.7											
X - Other Materials	Rural	19,850	3.7											
	Urban	1,827	0.3											
	Total	21,677	4.0			VL	VL			M	L			
Total - Category - X		21,677	4.1											
TOTAL HOUSES*		530,396												

ROOF														
R1 - Light Weight Sloping Roof	Rural	102,508	19.3											
	Urban	16,465	3.1											
	Total	118,973	22.4			L	VL			H	M			
R2 - Heavy Weight Sloping Roof	Rural	179,196	33.8											
	Urban	25,531	4.8											
	Total	204,727	38.6			L	VL			L	VL			
R3 - Flat Roof	Rural	120,139	22.7											
	Urban	86,557	16.3											
	Total	206,696	39.0											
TOTAL HOUSES*		530,396												

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. **452 mm**

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
- 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
- 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)

- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low

* Total No.of Houses excluding Vacant/Locked Houses

Table No. : TN 31 State : TAMIL NADU COIMBATORE

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %		
		No. of Houses	%	EQ Zone				Wind Velocity m/s						
				V	IV	III	II	55 & 50	47	44 & 39	33			
				Area in %				Area in %						
WALL														
A1 - Mud & Unburnt Brick Wall	Rural	45,976	4.2											
	Urban	89,371	8.2											
	Total	135,347	12.4							M			M	
A2 - Stone Wall not packed with mortar	Rural	19,788	1.8											
	Urban	17,466	1.6											
	Total	37,254	3.4							M			L	
Total - Category - A		172,601	15.9											
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	168,026	15.4											
	Urban	635,267	58.4											
	Total	803,293	73.8							L			L	
Total - Category - B		803,293	73.8											
C1 - Concrete Wall	Rural	6,877	0.6											
	Urban	50,329	4.6											
	Total	57,206	5.2								VL			VL
C2 - Wood wall	Rural	1,702	0.2											
	Urban	2,511	0.2											
	Total	4,213	0.4								VL			M
Total - Category - C		61,419	5.6											
X - Other Materials	Rural	22,653	2.1											
	Urban	28,538	2.6											
	Total	51,191	4.7								VL			M
Total - Category - X		51,191	4.7											
TOTAL HOUSES*		1,088,504												

ROOF														
R1 - Light Weight Sloping Roof	Rural	38,334	3.5											
	Urban	94,626	8.7											
	Total	132,960	12.2								L			H
R2 - Heavy Weight Sloping Roof	Rural	169,612	15.6											
	Urban	317,155	29.1											
	Total	486,767	44.7								L			L
R3 - Flat Roof	Rural	57,076	5.2											
	Urban	411,701	37.8											
	Total	468,777	43.0											
TOTAL HOUSES*		1,088,504												

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. **471 mm**

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
- 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
- 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)

- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low

* Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : TN 32 State : TAMIL NADU TIRUPPUR

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
						58.2	41.8			42.1	57.9	
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	73,621	9.0									
	Urban	51,890	6.3									
	Total	125,511	15.3			M	L			H	M	
A2 - Stone Wall not packed with mortar	Rural	23,757	2.9									
	Urban	20,334	2.5									
	Total	44,091	5.4			M	L			M	L	
Total - Category - A		169,602	20.6									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	183,209	22.3									
	Urban	354,422	43.1									
	Total	537,631	65.4			L	VL			M	L	
Total - Category - B		537,631	65.4									
C1 - Concrete Wall	Rural	10,535	1.3									
	Urban	31,524	3.8									
	Total	42,059	5.1			VL	VL			VL	VL	
C2 - Wood wall	Rural	1,764	0.2									
	Urban	1,688	0.2									
	Total	3,452	0.4			VL	VL			H	M	
Total - Category - C		45,511	5.5									
X - Other Materials	Rural	31,890	3.9									
	Urban	36,996	4.5									
	Total	68,886	8.4			VL	VL			H	M	
Total - Category - X		68,886	8.4									
TOTAL HOUSES*		821,630										
ROOF												
R1 - Light Weight Sloping Roof	Rural	54,026	6.6									
	Urban	54,230	6.6									
	Total	108,256	13.2			L	VL			VH	H	
R2 - Heavy Weight Sloping Roof	Rural	209,315	25.5									
	Urban	260,063	31.7									
	Total	469,378	57.2			L	VL			M	L	
R3 - Flat Roof	Rural	61,435	7.5									
	Urban	182,561	22.2									
	Total	243,996	29.7									
TOTAL HOUSES*		821,630										

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. **471 mm**

Housing Category : Wall Types

Category - A : Buildings in field-stone, rural structures, unburnt brick houses, clay houses

Category - B : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone

Category - C : Reinforced building, well built wooden structures

Category - X : Other materials not covered in A,B,C. These are generally light.

Notes: 1. Flood prone area includes that protected area which may have more severe

damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.

2. Damage Risk for wall types is indicated assuming heavy flat roof

in categories A, B and C (Reinforced Concrete) building

3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

Category - R1 - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)

Category - R2 - Heavy Weight (Tiles, Stone/Slate)

Category - R3 - Flat Roof (Brick, Concrete)

EQ Zone V : Very High Damage Risk Zone (MSK > IX)

EQ Zone IV : High Damage Risk Zone (MSK VIII)

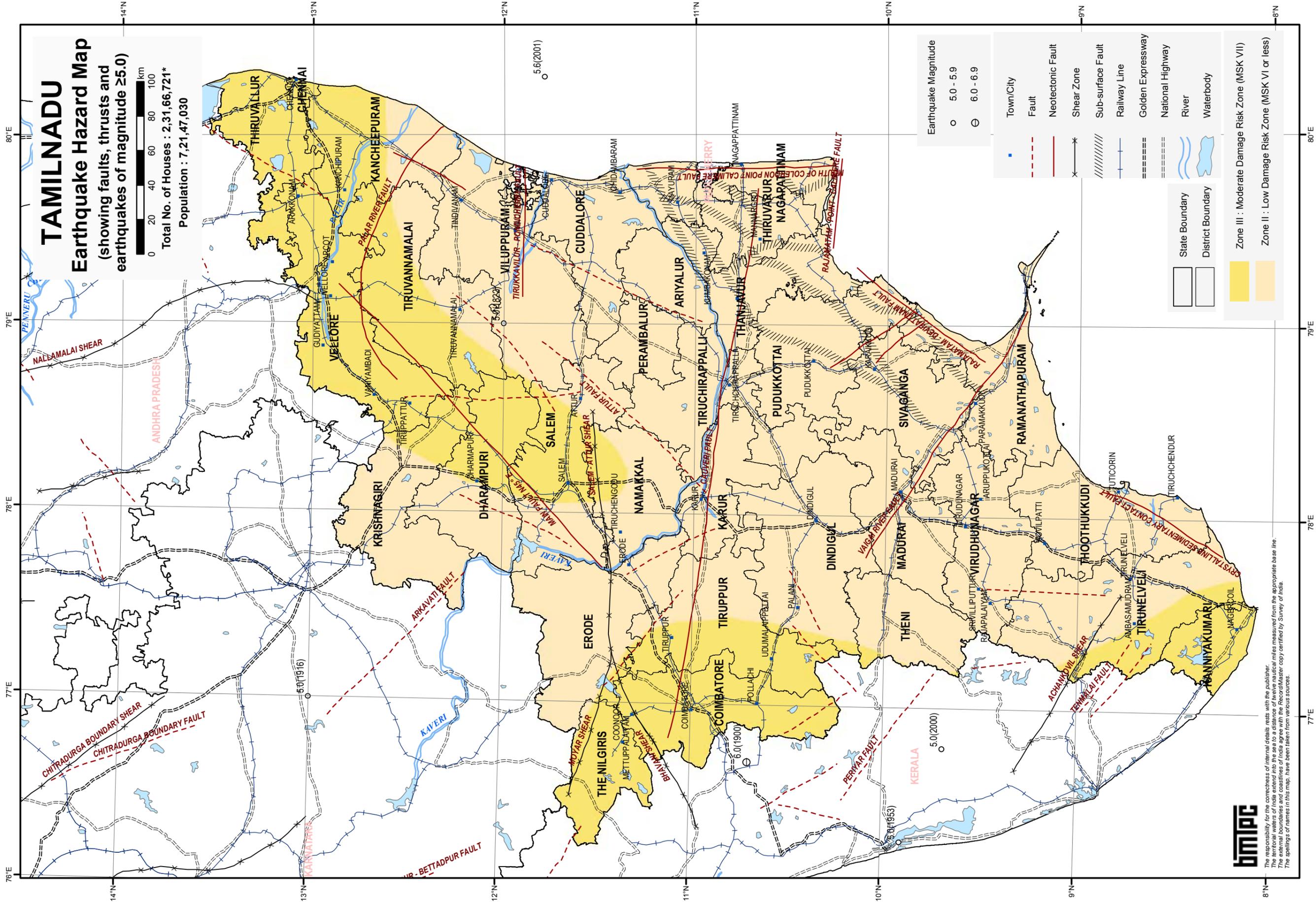
EQ Zone III : Moderate Damage Risk Zone (MSK VII)

EQ Zone II : Low Damage Risk Zone (MSK < VI)

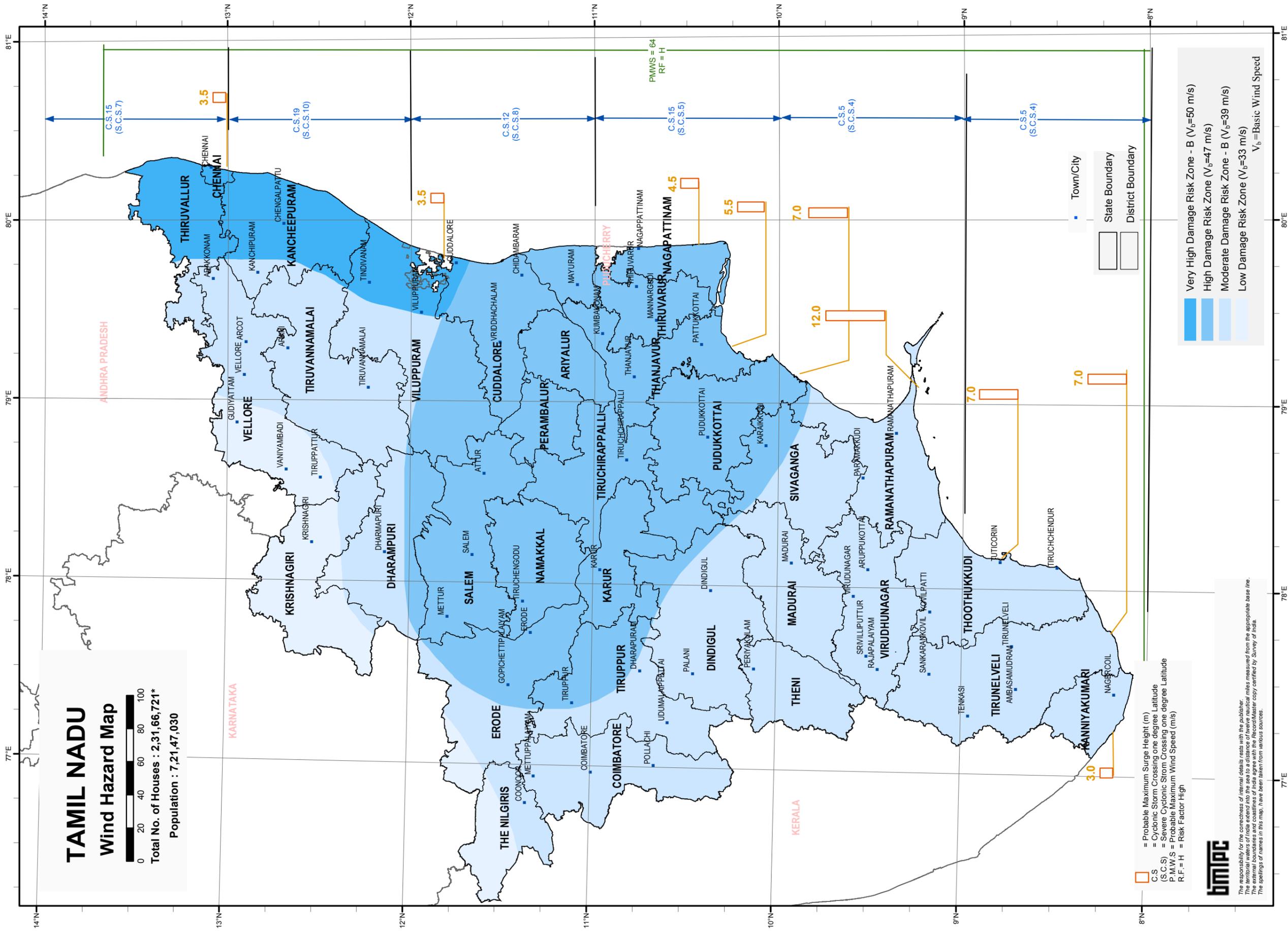
Level of Risk : VH = Very High; H = High;

M = Moderate; L = Low; VL = Very Low

* Total No.of Houses excluding Vacant/Locked Houses

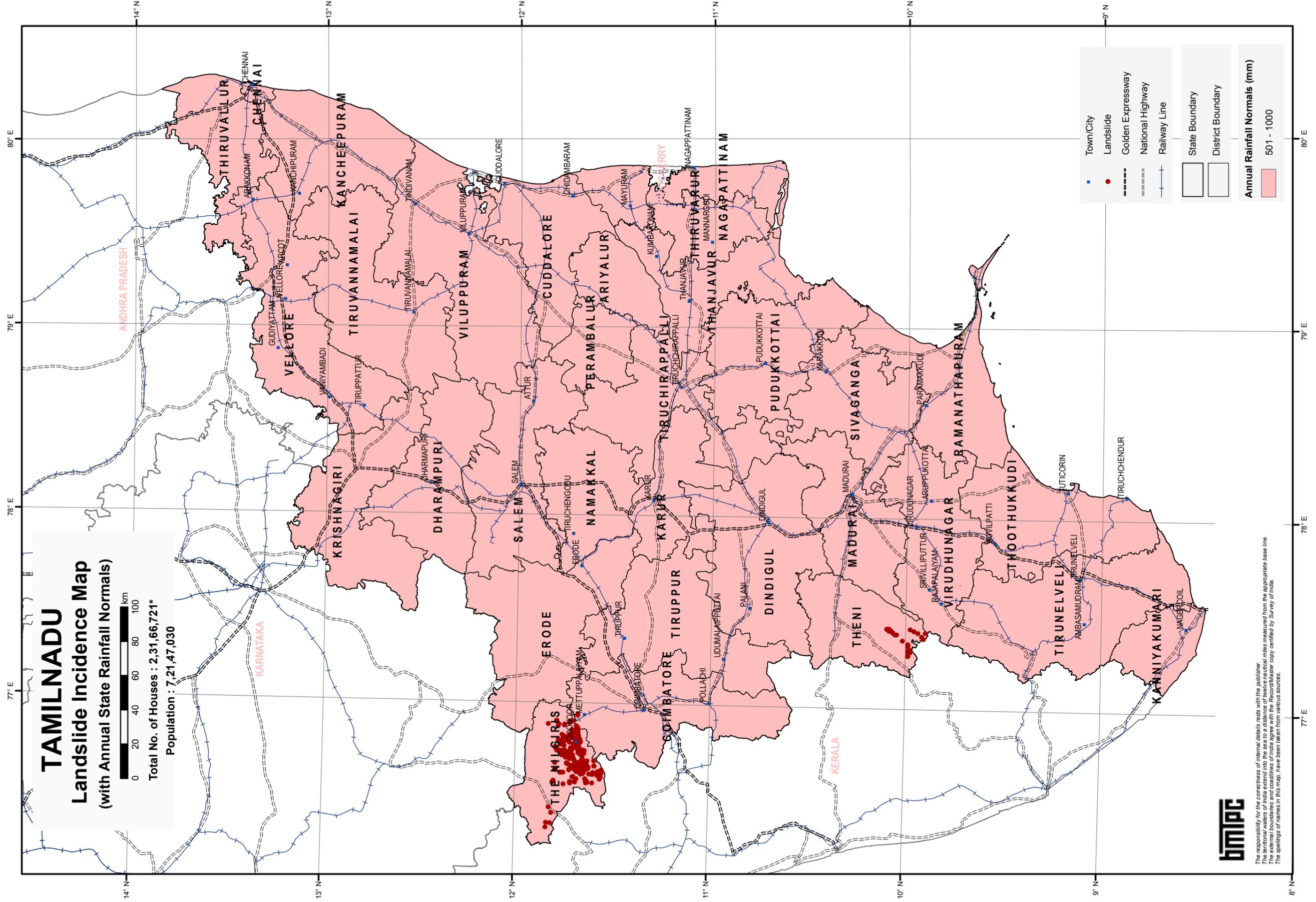


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BMTPC: Vulnerability Atlas - 3rd Edition; Peer Group, MoHUA; Map is Based on digitised data of SOI, GOI; Basic Wind Speed Map National Building Code 2016; Cyclone Data, 1891-2015, IMD, GOI. Houses/Population as per Census 2011; *Houses including vacant & locked houses Disclaimer: The maps are solely for thematic presentation.



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BMTPC: Vulnerability Atlas - 3rd Edition; Peer Group, MoHUA, GOI; Map is Based on digitised data of SOI; Landslide Incidence data GSI; Annual Rainfall data IMD. Houses/Population as per Census 2011; * Houses including vacant & locked houses. Disclaimer: The maps are solely for thematic presentation.

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

TELANGANA

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %				
		No. of Houses	%	EQ Zone				Wind Velocity m/s								
				V	IV	III	II	55 & 50	47	44 & 39	33					
				Area in %				Area in %								
						28.0	72.0					100.0			2.2	
WALL																
A1 - Mud & Unburnt Brick Wall	Rural	1,464,232	15.6													
	Urban	267,121	2.8													
	Total	1,731,353	18.4			M	L					M				VH
A2 - Stone Wall not packed with mortar	Rural	355,039	3.8													
	Urban	103,121	1.1													
	Total	458,160	4.9			M	L					L				VH
Total - Category - A		2,189,513	23.3													
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	3,283,066	34.9													
	Urban	2,980,091	31.7													
	Total	6,263,157	66.6			L	VL					L				H/M
Total - Category - B		6,263,157	66.5													
C1 - Concrete Wall	Rural	64,086	0.7													
	Urban	180,831	1.9													
	Total	244,917	2.6			VL	VL					VL				L/VL
C2 - Wood Wall	Rural	98,766	1.0													
	Urban	12,160	0.1													
	Total	110,926	1.1			VL	VL					M				H
Total - Category - C		355,843	3.8													
X - Other Materials	Rural	518,303	5.5													
	Urban	87,864	0.9													
	Total	606,167	6.4			VL	VL					M				VH
Total - Category - X		606,167	6.4													
TOTAL HOUSES*		9,414,680														
ROOF																
R1 - Light Weight Sloping Roof	Rural	1,537,122	16.3													
	Urban	886,997	9.4													
	Total	2,424,119	25.7			L	VL					H				VH
R2 - Heavy Weight Sloping Roof	Rural	2,332,684	24.8													
	Urban	371,355	3.9													
	Total	2,704,039	28.7			L	VL					L				H
R3 - Flat Roof	Rural	1,913,686	20.3													
	Urban	2,372,836	25.2													
	Total	4,286,522	45.5													
TOTAL HOUSES*		9,414,680														

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : TL 01

TELANGANA

ADILABAD

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %				
		No. of Houses	%	EQ Zone				Wind Velocity m/s								
				V	IV	III	II	55 & 50	47	44 & 39	33					
				Area in %				Area in %								
						51.0	49.0									7.8
WALL																
A1 - Mud & Unburnt Brick Wall	Rural	83,905	11.0													
	Urban	21,462	2.8													
	Total	105,367	13.8			M	L					M				VH
A2 - Stone Wall not packed with mortar	Rural	14,611	1.9													
	Urban	4,648	0.6													
	Total	19,259	2.5			M	L					L				VH
Total - Category - A		124,626	16.4													
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	326,994	43.0													
	Urban	160,977	21.2													
	Total	487,971	64.2			L	VL					L				H/M
Total - Category - B		487,971	64.2													
C1 - Concrete Wall	Rural	2,778	0.4													
	Urban	3,598	0.5													
	Total	6,376	0.9			VL	VL					VL				L/VL
C2 - Wood wall	Rural	42,190	5.6													
	Urban	1,869	0.2													
	Total	44,059	5.8			VL	VL					M				H
Total - Category - C		50,435	6.6													
X - Other Materials	Rural	86,893	11.4													
	Urban	9,848	1.3													
	Total	96,741	12.7			VL	VL					M				VH
Total - Category - X		96,741	12.7													
TOTAL HOUSES*		759,773														
ROOF																
R1 - Light Weight Sloping Roof	Rural	130,233	17.1													
	Urban	72,755	9.6													
	Total	202,988	26.7			L	VL					H				VH
R2 - Heavy Weight Sloping Roof	Rural	348,670	45.9													
	Urban	46,104	6.1													
	Total	394,774	52.0			L	VL					L				H
R3 - Flat Roof	Rural	78,468	10.3													
	Urban	83,543	11.0													
	Total	162,011	21.3													
TOTAL HOUSES*		759,773														

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 532 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : TL 08 **TELANGANA** **NALGONDA**

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
				Area in %				Area in %					
WALL						1.4	98.6					100	
A1 - Mud & Unburnt Brick Wall	Rural	181,494	18.8										
	Urban	18,168	1.9										
	Total	199,662	20.7		M	L					M		
A2 - Stone Wall not packed with mortar	Rural	27,513	2.9										
	Urban	4,503	0.5										
	Total	32,016	3.4		M	L					L		
Total - Category - A		231,678	24.0										
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	512,030	53.1										
	Urban	149,603	15.5										
	Total	661,633	68.6		L	VL					L		
Total - Category - B		661,633	68.6										
C1 - Concrete Wall	Rural	11,074	1.1										
	Urban	3,262	0.3										
	Total	14,336	1.4		VL	VL					VL		
C2 - Wood wall	Rural	4,471	0.5										
	Urban	624	0.1										
	Total	5,095	0.6		VL	VL					M		
Total - Category - C		19,431	2.0										
X - Other Materials	Rural	47,583	4.9										
	Urban	4,831	0.5										
	Total	52,414	5.4		VL	VL					M		
Total - Category - X		52,414	5.4										
TOTAL HOUSES*		965,156											

ROOF										
R1 - Light Weight Sloping Roof	Rural	262,137	27.2							
	Urban	50,730	5.3							
	Total	312,867	32.5		L	VL				H
R2 - Heavy Weight Sloping Roof	Rural	161,945	16.8							
	Urban	23,139	2.4							
	Total	185,084	19.2		L	VL				L
R3 - Flat Roof	Rural	360,083	37.3							
	Urban	107,122	11.1							
	Total	467,205	48.4							
TOTAL HOUSES*		965,156								

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. **440 mm**

Housing Category : Wall Types

- Category - A :** Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B :** Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C :** Reinforced building, well built wooden structures
- Category - X :** Other materials not covered in A,B,C. These are generally light.
- Notes :**
1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1 -** Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2 -** Heavy Weight (Tiles, Stone/Slate)
- Category - R3 -** Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : TL 09 **TELANGANA** **WARANGAL**

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
				Area in %				Area in %					
WALL													
A1 - Mud & Unburnt Brick Wall	Rural	205,535	21.0										
	Urban	24,926	2.5										
	Total	230,461	23.5		M	L					M		
A2 - Stone Wall not packed with mortar	Rural	12,139	1.2										
	Urban	4,572	0.5										
	Total	16,711	1.7		M	L					L		
Total - Category - A		247,172	25.3										
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	404,071	41.3										
	Urban	218,016	22.3										
	Total	622,087	63.6		L	VL					L		
Total - Category - B		622,087	63.6										
C1 - Concrete Wall	Rural	7,121	0.7										
	Urban	7,204	0.7										
	Total	14,325	1.4		VL	VL					VL		
C2 - Wood wall	Rural	7,796	0.8										
	Urban	1,299	0.1										
	Total	9,095	0.9		VL	VL					M		
Total - Category - C		23,420	2.4										
X - Other Materials	Rural	75,541	7.7										
	Urban	9,454	1.0										
	Total	84,995	8.7		VL	VL					M		
Total - Category - X		84,995	8.7										
TOTAL HOUSES*		977,674											

ROOF										
R1 - Light Weight Sloping Roof	Rural	191,242	19.6							
	Urban	53,510	5.5							
	Total	244,752	25.1		L	VL				H
R2 - Heavy Weight Sloping Roof	Rural	310,432	31.8							
	Urban	58,375	6.0							
	Total	368,807	37.8		L	VL				L
R3 - Flat Roof	Rural	210,529	21.5							
	Urban	153,586	15.7							
	Total	364,115	37.2							
TOTAL HOUSES*		977,674								

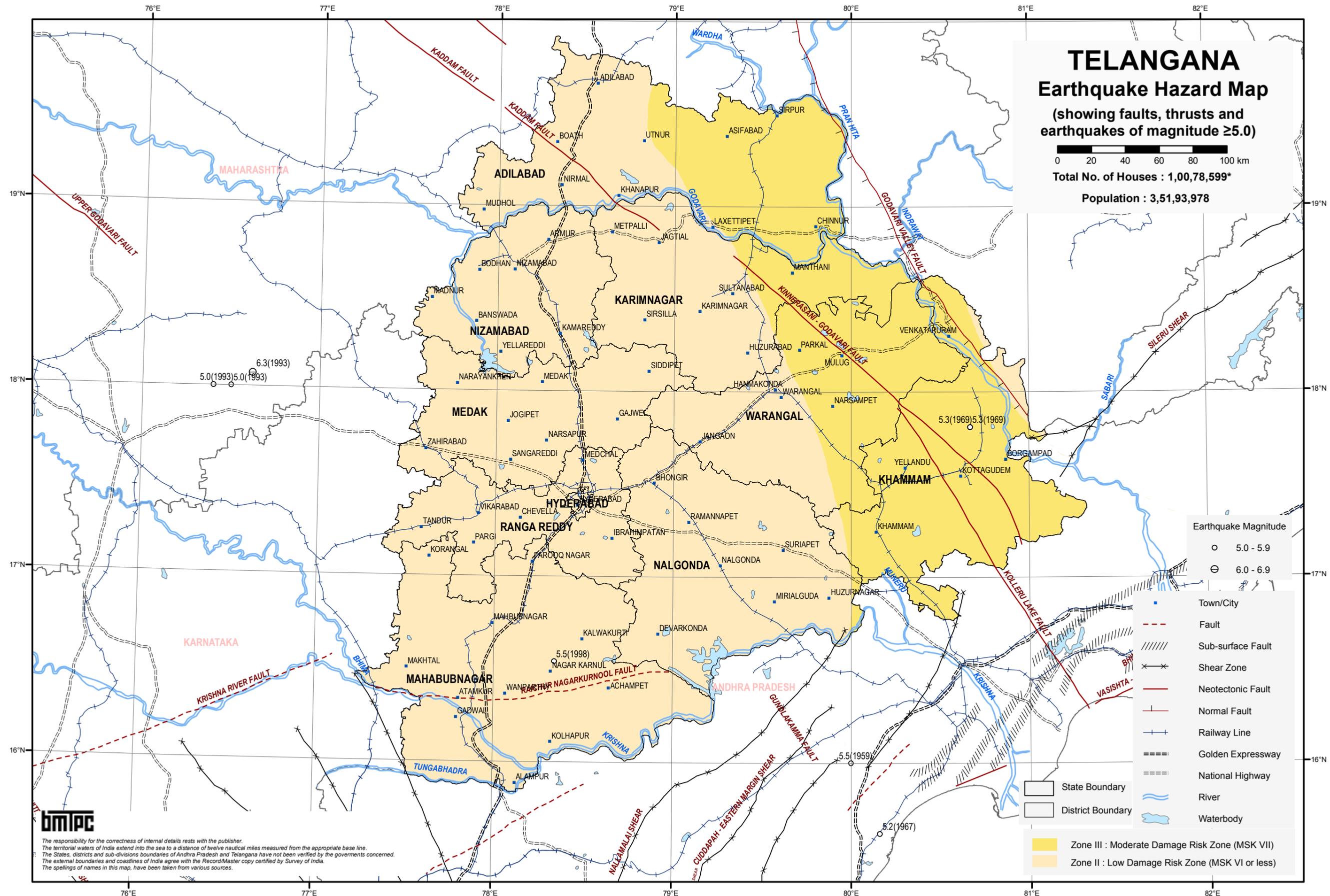
Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. **572 mm**

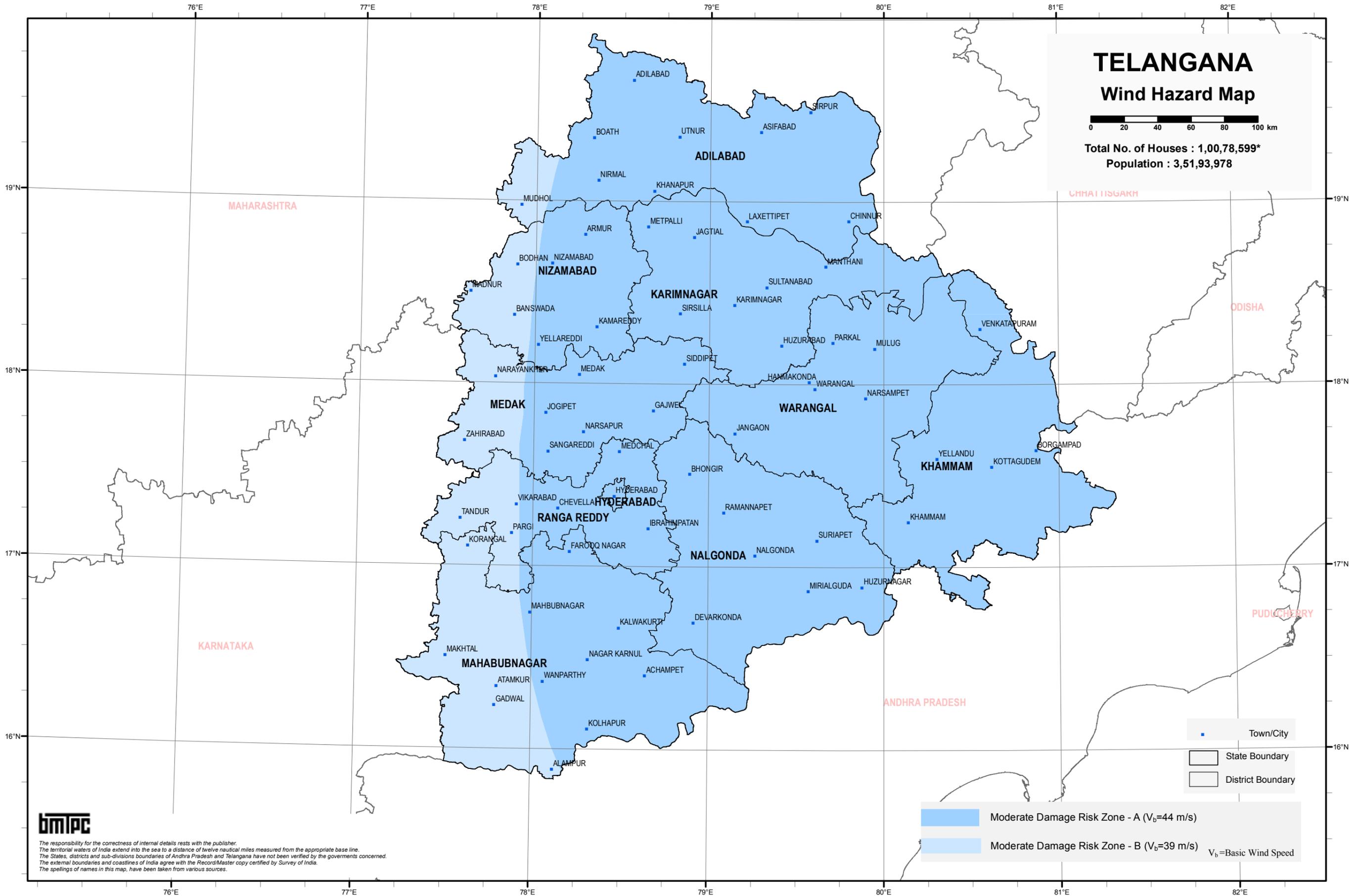
Housing Category : Wall Types

- Category - A :** Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B :** Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C :** Reinforced building, well built wooden structures
- Category - X :** Other materials not covered in A,B,C. These are generally light.
- Notes :**
1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

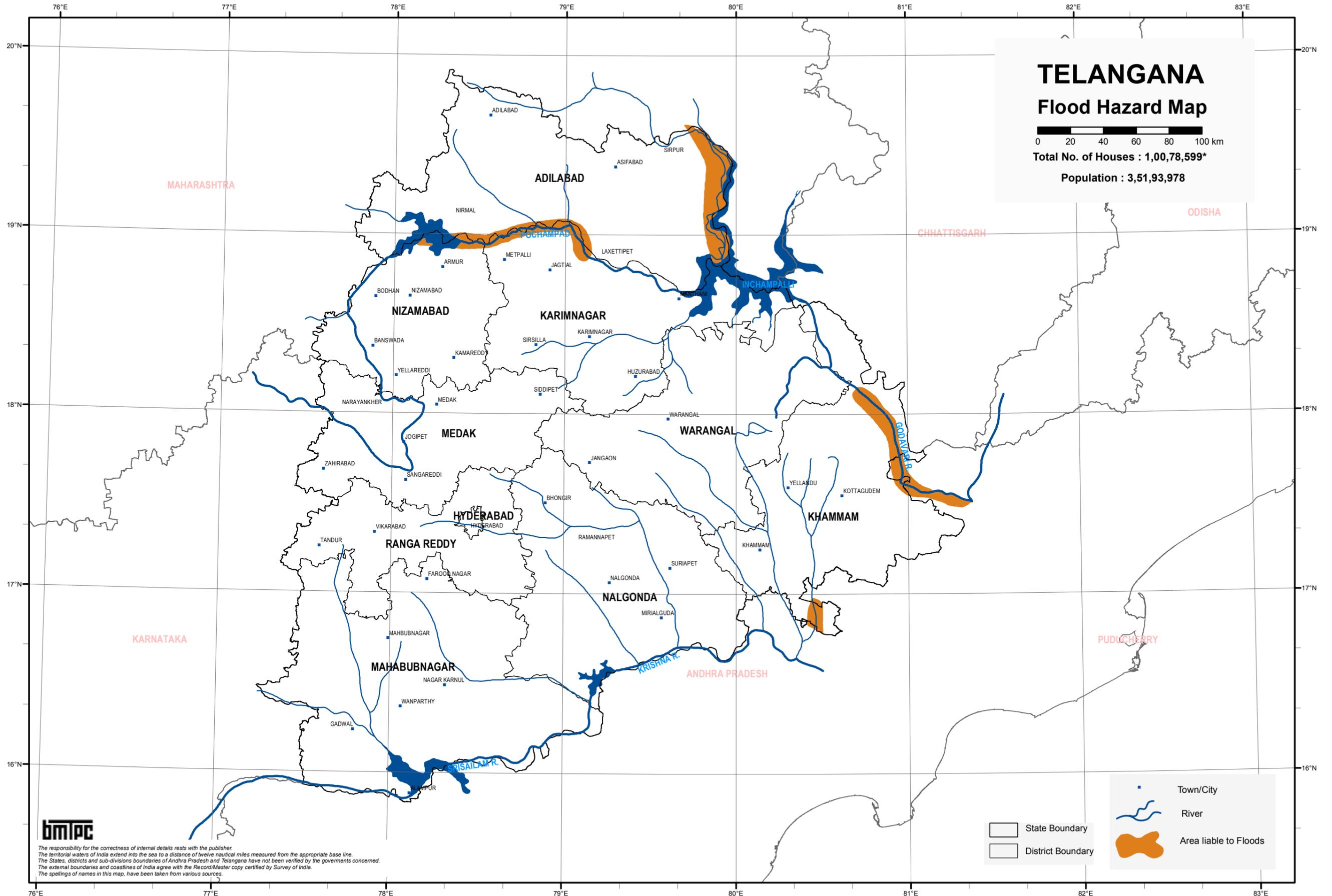
- Category - R1 -** Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2 -** Heavy Weight (Tiles, Stone/Slate)
- Category - R3 -** Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses





The responsibility for the correctness of internal details rests with the publisher.
 The territorial waters of India extend into the sea to a distance of twelve nautical miles measured from the appropriate base line.
 The States, districts and sub-divisions boundaries of Andhra Pradesh and Telangana have not been verified by the governments concerned.
 The external boundaries and coastlines of India agree with the Record Master copy certified by Survey of India.
 The spellings of names in this map, have been taken from various sources.

Moderate Damage Risk Zone - A ($V_b=44$ m/s)
 Moderate Damage Risk Zone - B ($V_b=39$ m/s) V_b =Basic Wind Speed



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The external boundaries and coastlines of India agree with the Record/Master copy certified by Survey of India.
The spellings of names in this map, have been taken from various sources.

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

TRIPURA

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %									
		No. of Houses	%	EQ Zone				Wind Velocity m/s													
				V	IV	III	II	55 & 50	47	44 & 39	33										
				Area in %				Area in %													
STATE - TRIPURA											100										
WALL																					
A1 - Mud & Unburnt Brick Wall	Rural	379,615	37.1																		
	Urban	71,842	7.0																		
	Total	451,457	44.1																		
A2 - Stone Wall not packed with mortar	Rural	2,623	0.3																		
	Urban	2,373	0.2																		
	Total	4,996	0.5																		
Total - Category - A		456,453	44.6																		
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	64,165	6.3																		
	Urban	105,568	10.3																		
	Total	169,733	16.6																		
Total - Category - B		169,733	16.6																		
C1 - Concrete Wall	Rural	2,122	0.2																		
	Urban	3,863	0.4																		
	Total	5,985	0.6																		
C2 - Wood wall	Rural	2,459	0.2																		
	Urban	1,005	0.1																		
	Total	3,464	0.3																		
Total - Category - C		9,449	0.9																		
X - Other Materials	Rural	274,325	26.8																		
	Urban	112,686	11.0																		
	Total	387,011	37.8																		
Total - Category - X		387,011	37.8																		
TOTAL HOUSES*		1,022,646																			

ROOF											
R1 - Light Weight Sloping Roof	Rural	706,411	69.1								
	Urban	239,702	23.4								
	Total	946,113	92.5								
R2 - Heavy Weight Sloping Roof	Rural	8,439	0.8								
	Urban	5,345	0.5								
	Total	13,784	1.3								
R3 - Flat Roof	Rural	10,459	1.0								
	Urban	52,290	5.1								
	Total	62,749	6.1								
<i>Damage Risk as per that for the Wall supporting it</i>											
TOTAL HOUSES*		1,022,646									

Housing Category : Wall Types

Category - A : Buildings in field-stone, rural structures, unburnt brick houses, clay houses

Category - B : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone

Category - C : Reinforced building, well built wooden structures

Category - X : Other materials not covered in A,B,C. These are generally light.

Notes : 1. Flood prone area includes that protected area which may have more severe

damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.

2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building

3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

Category - R1 - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)

Category - R2 - Heavy Weight (Tiles, Stone/Slate)

Category - R3 - Flat Roof (Brick, Concrete)

EQ Zone V : Very High Damage Risk Zone (MSK > IX)

EQ Zone IV : High Damage Risk Zone (MSK VIII)

EQ Zone III : Moderate Damage Risk Zone (MSK VII)

EQ Zone II : Low Damage Risk Zone (MSK < VI)

Level of Risk : VH = Very High; H = High;

M = Moderate; L = Low; VL = Very Low

* Total No. of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : TR 01

State : TRIPURA

WEST TRIPURA

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %									
		No. of Houses	%	EQ Zone				Wind Velocity m/s													
				V	IV	III	II	55 & 50	47	44 & 39	33										
				Area in %				Area in %													
STATE - TRIPURA											100										
WALL																					
A1 - Mud & Unburnt Brick Wall	Rural	170,863	35.2																		
	Urban	53,820	11.1																		
	Total	224,683	46.3																		
A2 - Stone Wall not packed with mortar	Rural	896	0.2																		
	Urban	1,624	0.3																		
	Total	2,520	0.5																		
Total - Category - A		227,203	46.9																		
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	23,907	4.9																		
	Urban	71,273	14.7																		
	Total	95,180	19.6																		
Total - Category - B		95,180	19.6																		
C1 - Concrete Wall	Rural	662	0.1																		
	Urban	3,076	0.6																		
	Total	3,738	0.7																		
C2 - Wood wall	Rural	912	0.2																		
	Urban	628	0.1																		
	Total	1,540	0.3																		
Total - Category - C		5,278	1.1																		
X - Other Materials	Rural	83,467	17.2																		
	Urban	73,746	15.2																		
	Total	157,213	32.4																		
Total - Category - X		157,213	32.4																		
TOTAL HOUSES*		484,874																			

ROOF											
R1 - Light Weight Sloping Roof	Rural	273,501	56.4								
	Urban	159,482	32.9								
	Total	432,983	89.3								
R2 - Heavy Weight Sloping Roof	Rural	3,454	0.7								
	Urban	4,202	0.9								
	Total	7,656	1.6								
R3 - Flat Roof	Rural	3,752	0.8								
	Urban	40,483	8.3								
	Total	44,235	9.1								
<i>Damage Risk as per that for the Wall supporting it</i>											
TOTAL HOUSES*		484,874									

Probable Maximum Precipitation at a Station of the district in 24 hrs is 520 mm

Housing Category : Wall Types

Category - A : Buildings in field-stone, rural structures, unburnt brick houses, clay houses

Category - B : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone

Category - C : Reinforced building, well built wooden structures

Category - X : Other materials not covered in A,B,C. These are generally light.

Notes : 1. Flood prone area includes that protected area which may have more severe

damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.

2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building

3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

Category - R1 - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)

Category - R2 - Heavy Weight (Tiles, Stone/Slate)

Category - R3 - Flat Roof (Brick, Concrete)

EQ Zone V : Very High Damage Risk Zone (MSK > IX)

EQ Zone IV : High Damage Risk Zone (MSK VIII)

EQ Zone III : Moderate Damage Risk Zone (MSK VII)

EQ Zone II : Low Damage Risk Zone (MSK < VI)

Level of Risk : VH = Very High; H = High;

M = Moderate; L = Low; VL = Very Low

* Total No. of Houses excluding Vacant/Locked Houses

**Distribution of Houses by Predominant Materials of Roof and Wall
and Level of Damage Risk**

Table No. : TR 02 State : TRIPURA SOUTH TRIPURA

Wall / Roof		Census Houses		Level of Risk under										Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s				Area in %	Area in %		Area in %
				V	IV	III	II	55 & 50	47	44 & 39	33				
				Area in %				Area in %							
WALL				100						100					
A1 - Mud & Unburnt Brick Wall	Rural	120,293	47.5												
	Urban	11,028	4.4												
	Total	131,321	51.9												
A2 - Stone Wall not packed with mortar	Rural	626	0.2												
	Urban	154	0.1												
	Total	780	0.3												
Total - Category - A		132,101	52.1												
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	14,992	5.9												
	Urban	12,605	5.0												
	Total	27,597	10.9												
Total - Category - B		27,597	10.9												
C1 - Concrete Wall	Rural	482	0.2												
	Urban	411	0.2												
	Total	893	0.4												
C2 - Wood wall	Rural	698	0.3												
	Urban	165	0.1												
	Total	863	0.4												
Total - Category - C		1,756	0.7												
X - Other Materials	Rural	74,741	29.5												
	Urban	17,209	6.8												
	Total	91,950	36.3												
Total - Category - X		91,950	36.3												
TOTAL HOUSES*		253,404													
ROOF															
R1 - Light Weight Sloping Roof	Rural	206,767	81.6												
	Urban	36,395	14.4												
	Total	243,162	96.0												
R2 - Heavy Weight Sloping Roof	Rural	2,232	0.9												
	Urban	607	0.2												
	Total	2,839	1.1												
R3 - Flat Roof	Rural	2,833	1.1												
	Urban	4,570	1.8												
	Total	7,403	2.9												
TOTAL HOUSES*		253,404													

Probable Maximum Precipitation at a Station of the district in 24 hrs is 520 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
EQ Zone IV : High Damage Risk Zone (MSK VIII)
EQ Zone III : Moderate Damage Risk Zone (MSK VII)
EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

**Distribution of Houses by Predominant Materials of Roof and Wall
and Level of Damage Risk**

Table No. : TR 03 State : TRIPURA DHALAI

Wall / Roof		Census Houses		Level of Risk under										Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s				Area in %	Area in %		Area in %
				V	IV	III	II	55 & 50	47	44 & 39	33				
				Area in %				Area in %							
WALL				100						100					
A1 - Mud & Unburnt Brick Wall	Rural	38,566	38.7												
	Urban	3,672	3.7												
	Total	42,238	42.4												
A2 - Stone Wall not packed with mortar	Rural	197	0.2												
	Urban	52	0.1												
	Total	249	0.3												
Total - Category - A		42,487	42.6												
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	6,127	6.1												
	Urban	3,625	3.6												
	Total	9,752	9.7												
Total - Category - B		9,752	9.8												
C1 - Concrete Wall	Rural	329	0.3												
	Urban	31	-												
	Total	360	0.3												
C2 - Wood wall	Rural	106	0.1												
	Urban	52	0.1												
	Total	158	0.2												
Total - Category - C		518	0.5												
X - Other Materials	Rural	41,204	41.3												
	Urban	5,773	5.8												
	Total	46,977	47.1												
Total - Category - X		46,977	47.1												
TOTAL HOUSES*		99,734													
ROOF															
R1 - Light Weight Sloping Roof	Rural	84,173	84.4												
	Urban	11,917	11.9												
	Total	96,090	96.3												
R2 - Heavy Weight Sloping Roof	Rural	1,008	1.0												
	Urban	217	0.2												
	Total	1,225	1.2												
R3 - Flat Roof	Rural	1,348	1.4												
	Urban	1,071	1.1												
	Total	2,419	2.5												
TOTAL HOUSES*		99,734													

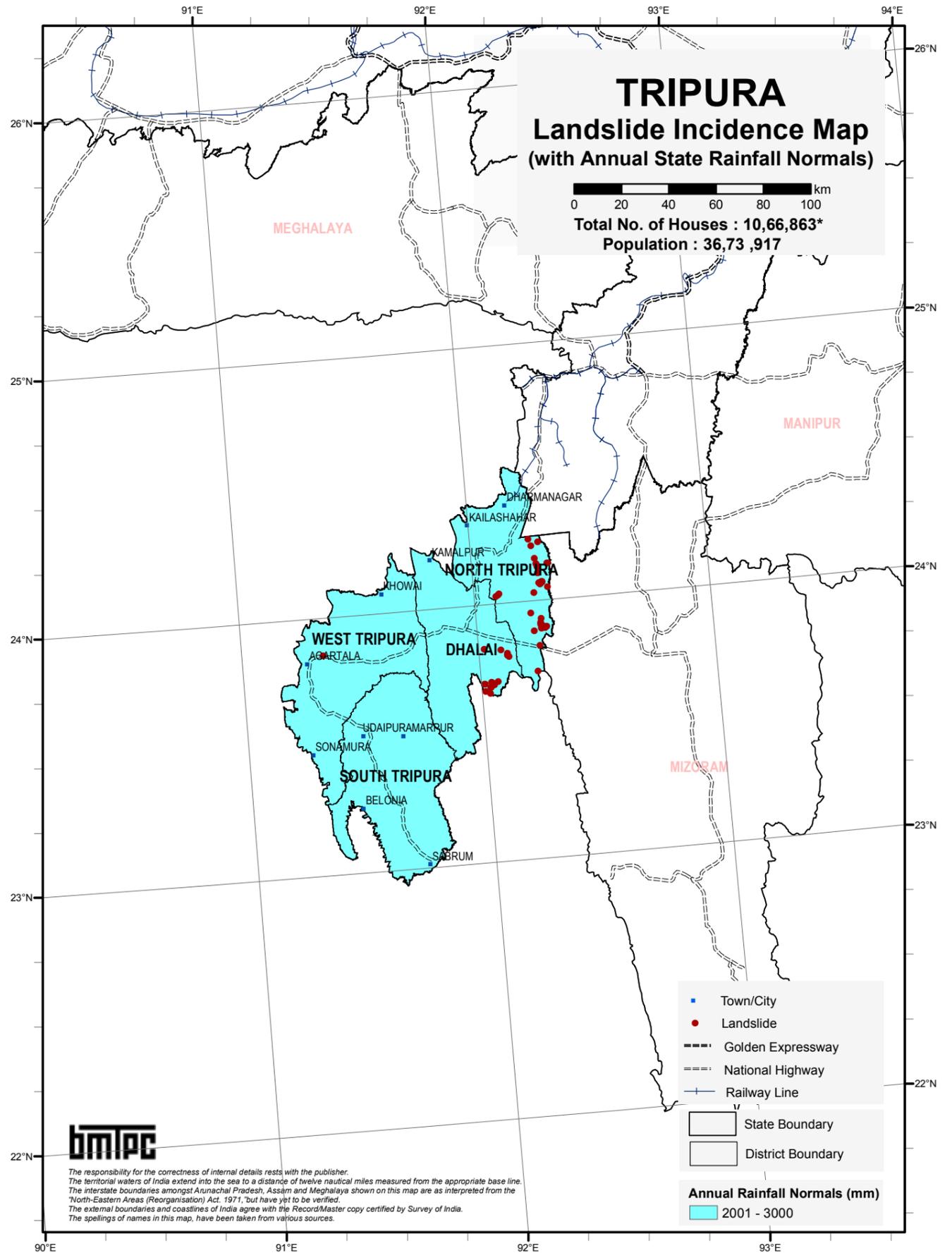
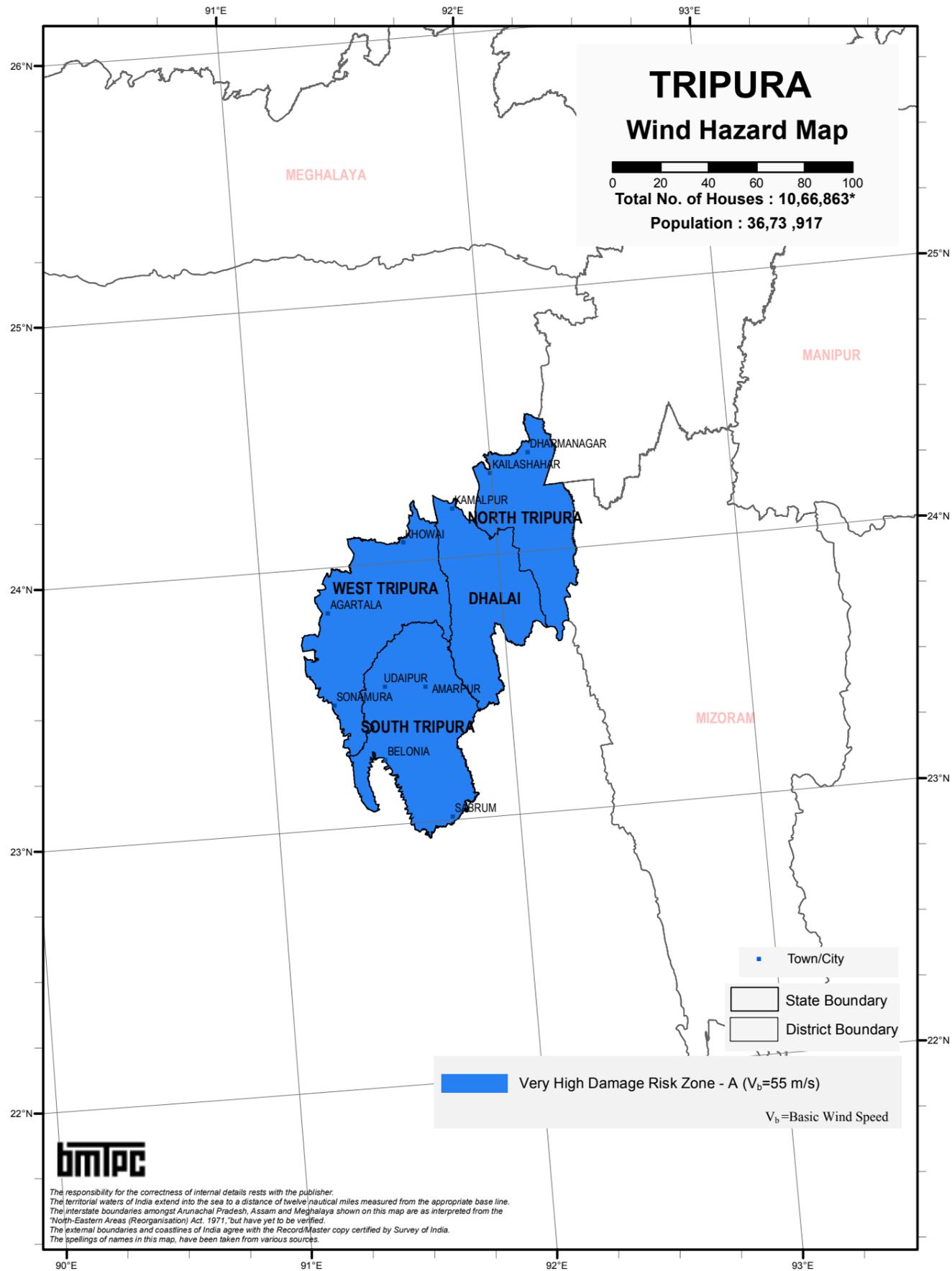
Probable Maximum Precipitation at a Station of the district in 24 hrs is 360 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
EQ Zone IV : High Damage Risk Zone (MSK VIII)
EQ Zone III : Moderate Damage Risk Zone (MSK VII)
EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses



BMTPC : Vulnerability Atlas - 3rd Edition; Peer Group, MoHUA; Map is Based on digitised data of SOI, GOI; Basic Wind Speed Map National Building Code 2016. Houses/Population as per Census 2011; *Houses including vacant & locked houses. Disclaimer: The maps are solely for thematic presentation.

BMTPC: Vulnerability Atlas - 3rd Edition: Peer Group, MoHUA, GOI; Map is Based on digitised data of SOI; Landslide Incidence data GSI; Annual Rainfall data IMD. Houses/Population as per Census 2011; * Houses including vacant & locked houses. Disclaimer: The maps are solely for thematic presentation.

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

UTTAR PRADESH

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
STATE - UTTAR PRADESH				29.0	48.3	22.7		43.2	53.4	3.4		26.0
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	7,671,487	18.0									
	Urban	557,829	1.3									
	Total	8,229,316	19.3		H	M	L	VH	H	M		VH
A2 - Stone Wall not packed with mortar	Rural	328,497	0.8									
	Urban	181,046	0.4									
	Total	509,543	1.2		H	M	L	H	M	L		VH
Total - Category - A		8,738,859	20.5									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	21,620,426	50.7									
	Urban	8,140,057	19.1									
	Total	29,760,483	69.8		M	L	VL	H	M	L		H/M
Total - Category - B		29,760,483	69.9									
C1 - Concrete Wall	Rural	147,358	0.3									
	Urban	114,495	0.3									
	Total	261,853	0.6		L	VL	VL	L	VL	VL		L/VL
C2 - Wood wall	Rural	62,424	0.1									
	Urban	20,630	-									
	Total	83,054	0.1		L	VL	VL	VH	H	M		H
Total - Category - C		344,907	0.8									
X - Other Materials	Rural	3,365,434	7.9									
	Urban	392,676	0.9									
	Total	3,758,110	8.8		VL	VL	VL	VH	H	M		VH
Total - Category - X		3,758,110	8.8									
TOTAL HOUSES*		42,602,359										

ROOF												
R1 - Light Weight Sloping Roof	Rural	11,074,872	26.0									
	Urban	1,223,806	2.9									
	Total	12,298,678	28.9		M	L	VL	VH	VH	H		VH
R2 - Heavy Weight Sloping Roof	Rural	7,767,796	18.2									
	Urban	1,759,998	4.1									
	Total	9,527,794	22.3		M	L	VL	H	M	L		H
R3 - Flat Roof	Rural	14,352,958	33.7									
	Urban	6,422,929	15.1									
	Total	20,775,887	48.8		<i>Damage Risk as per that for the Wall supporting it</i>							
TOTAL HOUSES*		42,602,359										

Housing Category : Wall Types

Category - A : Buildings in field-stone, rural structures, unburnt brick houses, clay houses

Category - B : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone

Category - C : Reinforced building, well built wooden structures

Category - X : Other materials not covered in A,B,C. These are generally light.

Notes : 1. Flood prone area includes that protected area which may have more severe

damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.

2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building

3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

Category - R1 - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)

Category - R2 - Heavy Weight (Tiles, Stone/Slate)

Category - R3 - Flat Roof (Brick, Concrete)

EQ Zone V : Very High Damage Risk Zone (MSK > IX)

EQ Zone IV : High Damage Risk Zone (MSK VIII)

EQ Zone III : Moderate Damage Risk Zone (MSK VII)

EQ Zone II : Low Damage Risk Zone (MSK < VI)

Level of Risk : VH = Very High; H = High;

M = Moderate; L = Low; VL = Very Low

* Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : UP 01

State : UTTAR PRADESH

SAHARANPUR

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %								
		No. of Houses	%	EQ Zone				Wind Velocity m/s												
				V	IV	III	II	55 & 50	47	44 & 39	33									
				Area in %				Area in %												
													100			89.6		10.4		13.9
WALL																				
A1 - Mud & Unburnt Brick Wall	Rural	57,823	6.9																	
	Urban	9,427	1.1																	
	Total	67,250	8.0		H			VH		M		VH								
A2 - Stone Wall not packed with mortar	Rural	4,209	0.5																	
	Urban	3,388	0.4																	
	Total	7,597	0.9		H			H		L		VH								
Total - Category - A		74,847	8.9																	
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	491,385	58.7																	
	Urban	240,885	28.8																	
	Total	732,270	87.5		M			H		L		H/M								
Total - Category - B		732,270	87.5																	
C1 - Concrete Wall	Rural	3,433	0.4																	
	Urban	3,049	0.4																	
	Total	6,482	0.8		L			L		VL		L/VL								
C2 - Wood wall	Rural	648	0.1																	
	Urban	390	-																	
	Total	1,038	0.1		L			VH		M		H								
Total - Category - C		7,520	0.9																	
X - Other Materials	Rural	19,816	2.4																	
	Urban	2,522	0.3																	
	Total	22,338	2.7		VL			VH		M		VH								
Total - Category - X		22,338	2.7																	
TOTAL HOUSES*		836,975																		

ROOF													
R1 - Light Weight Sloping Roof	Rural	181,128	21.6										
	Urban	34,533	4.1										
	Total	215,661	25.7		M			VH		H		VH	
R2 - Heavy Weight Sloping Roof	Rural	18,124	2.2										
	Urban	6,155	0.7										
	Total	24,279	2.9		M			H		L		H	
R3 - Flat Roof	Rural	378,062	45.2										
	Urban	218,973	26.2										
	Total	597,035	71.4		<i>Damage Risk as per that for the Wall supporting it</i>								
TOTAL HOUSES*		836,975											

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 520 mm

Housing Category : Wall Types

Category - A : Buildings in field-stone, rural structures, unburnt brick houses, clay houses

Category - B : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone

Category - C : Reinforced building, well built wooden structures

Category - X : Other materials not covered in A,B,C. These are generally light.

Notes : 1. Flood prone area includes that protected area which may have more severe

damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.

2. Damage Risk for wall types is indicated assuming heavy flat roof

in categories A, B and C (Reinforced Concrete) building

3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

Category - R1 - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)

Category - R2 - Heavy Weight (Tiles, Stone/Slate)

Category - R3 - Flat Roof (Brick, Concrete)

EQ Zone V : Very High Damage Risk Zone (MSK > IX)

EQ Zone IV : High Damage Risk Zone (MSK VIII)

EQ Zone III : Moderate Damage Risk Zone (MSK VII)

EQ Zone II : Low Damage Risk Zone (MSK < VI)

Level of Risk : VH = Very High; H = High;

M = Moderate; L = Low; VL = Very Low

* Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : UP 12

State : UTTAR PRADESH

ALIGARH

Table No. : UP 13

State : UTTAR PRADESH

MAHAMAYA NAGAR

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
				53.5	46.5			63.3	36.7			16.7
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	32,443	4.1									
	Urban	8,600	1.1									
	Total	41,043	5.2	H	M			VH	H			VH
A2 - Stone Wall not packed with mortar	Rural	4,698	0.6									
	Urban	4,567	0.6									
	Total	9,265	1.2	H	M			H	M			VH
Total - Category - A		50,308	6.3									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	496,630	62.1									
	Urban	233,647	29.2									
	Total	730,277	91.3	M	L			H	M			H/M
Total - Category - B		730,277	91.3									
C1 - Concrete Wall	Rural	1,568	0.2									
	Urban	2,396	0.3									
	Total	3,964	0.5	L	VL			L	VL			L/VL
C2 - Wood wall	Rural	512	0.1									
	Urban	234	-									
	Total	746	0.1	L	VL			VH	H			H
Total - Category - C		4,710	0.6									
X - Other Materials	Rural	12,088	1.5									
	Urban	2,781	0.3									
	Total	14,869	1.8	VL	VL			VH	H			VH
Total - Category - X		14,869	1.9									
TOTAL HOUSES*		800,164										

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
				Area in %				Area in %					
WALL													
A1 - Mud & Unburnt Brick Wall	Rural	15,796	4.5										
	Urban	1,878	0.5										
	Total	17,674	5.0			M		VH	H			VH	
A2 - Stone Wall not packed with mortar	Rural	2,672	0.8										
	Urban	1,103	0.3										
	Total	3,775	1.1			M		H	M			VH	
Total - Category - A		21,449	6.1										
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	249,652	71.3										
	Urban	72,153	20.6										
	Total	321,805	91.9			L		H	M			H/M	
Total - Category - B		321,805	91.9										
C1 - Concrete Wall	Rural	451	0.1										
	Urban	242	0.1										
	Total	693	0.2			VL		L	VL			L/VL	
C2 - Wood wall	Rural	216	0.1										
	Urban	139	-										
	Total	355	0.1			VL		VH	H			H	
Total - Category - C		1,048	0.3										
X - Other Materials	Rural	5,293	1.5										
	Urban	752	0.2										
	Total	6,045	1.7			VL		VH	H			VH	
Total - Category - X		6,045	1.7										
TOTAL HOUSES*		350,347											

ROOF												
R1 - Light Weight Sloping Roof	Rural	84,009	10.5									
	Urban	17,139	2.1									
	Total	101,148	12.6	M	L			VH	VH			VH
R2 - Heavy Weight Sloping Roof	Rural	391,216	48.9									
	Urban	112,434	14.1									
	Total	503,650	63.0	M	L			H	M			H
R3 - Flat Roof	Rural	72,714	9.1									
	Urban	122,652	15.3									
	Total	195,366	24.4	Damage Risk as per that for the Wall supporting it								
TOTAL HOUSES*		800,164										

ROOF												
R1 - Light Weight Sloping Roof	Rural	37,792	10.8									
	Urban	3,679	1.1									
	Total	41,471	11.9			L		VH	VH			VH
R2 - Heavy Weight Sloping Roof	Rural	216,235	61.7									
	Urban	61,571	17.6									
	Total	277,806	79.3			L		H	M			H
R3 - Flat Roof	Rural	20,053	5.7									
	Urban	11,017	3.1									
	Total	31,070	8.8	Damage Risk as per that for the Wall supporting it								
TOTAL HOUSES*		350,347										

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 558 mm

Housing Category : Wall Types

- Category - A :** Buildings in field-stone, rural structures, unburnt brick houses, clay houses
 - Category - B :** Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
 - Category - C :** Reinforced building, well built wooden structures
 - Category - X :** Other materials not covered in A,B,C. These are generally light.
- Notes :** 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1 -** Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
 - Category - R2 -** Heavy Weight (Tiles, Stone/Slate)
 - Category - R3 -** Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
 Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
 * Total No.of Houses excluding Vacant/Locked Houses

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 651 mm

Housing Category : Wall Types

- Category - A :** Buildings in field-stone, rural structures, unburnt brick houses, clay houses
 - Category - B :** Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
 - Category - C :** Reinforced building, well built wooden structures
 - Category - X :** Other materials not covered in A,B,C. These are generally light.
- Notes :** 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1 -** Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
 - Category - R2 -** Heavy Weight (Tiles, Stone/Slate)
 - Category - R3 -** Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
 Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
 * Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : UP 16 State : UTTAR PRADESH FIROZABAD

Table No. : UP 17 State : UTTAR PRADESH MAINPURI

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %		
		No. of Houses	%	EQ Zone				Wind Velocity m/s						
				V	IV	III	II	55 & 50	47	44 & 39	33			
				Area in %				Area in %						
WALL						89.4	10.6			100				11.8
A1 - Mud & Unburnt Brick Wall	Rural	33,421	6.5											
	Urban	6,083	1.2											
	Total	39,504	7.7		M	L			H					VH
A2 - Stone Wall not packed with mortar	Rural	2,434	0.5											
	Urban	2,858	0.6											
	Total	5,292	1.1		M	L			M					VH
Total - Category - A		44,796	8.8											
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	286,746	56.2											
	Urban	161,627	31.7											
	Total	448,373	87.9		L	VL			M					H/M
Total - Category - B		448,373	87.9											
C1 - Concrete Wall	Rural	1,180	0.2											
	Urban	1,739	0.3											
	Total	2,919	0.5		VL	VL			VL					L/VL
C2 - Wood wall	Rural	293	0.1											
	Urban	283	0.1											
	Total	576	0.2		VL	VL			H					H
Total - Category - C		3,495	0.7											
X - Other Materials	Rural	11,565	2.3											
	Urban	2,091	0.4											
	Total	13,656	2.7		VL	VL			H					VH
Total - Category - X		13,656	2.7											
TOTAL HOUSES*		510,320												

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %		
		No. of Houses	%	EQ Zone				Wind Velocity m/s						
				V	IV	III	II	55 & 50	47	44 & 39	33			
				Area in %				Area in %						
WALL						96.9	3.1			33.5	66.5			7.7
A1 - Mud & Unburnt Brick Wall	Rural	56,771	14.4											
	Urban	2,110	0.5											
	Total	58,881	14.9			M	L			VH	H			VH
A2 - Stone Wall not packed with mortar	Rural	1,740	0.4											
	Urban	427	0.1											
	Total	2,167	0.5			M	L			H	M			VH
Total - Category - A		61,048	15.5											
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	252,271	64.2											
	Urban	62,379	15.9											
	Total	314,650	80.1			L	VL			H	M			H/M
Total - Category - B		314,650	80.1											
C1 - Concrete Wall	Rural	857	0.2											
	Urban	320	0.1											
	Total	1,177	0.3			VL	VL			L	VL			L/VL
C2 - Wood wall	Rural	380	0.1											
	Urban	60	-											
	Total	440	0.1			VL	VL			VH	H			H
Total - Category - C		1,617	0.4											
X - Other Materials	Rural	14,530	3.7											
	Urban	1,129	0.3											
	Total	15,659	4.0			VL	VL			VH	H			VH
Total - Category - X		15,659	4.0											
TOTAL HOUSES*		392,974												

ROOF										
R1 - Light Weight Sloping Roof	Rural	70,738	13.9							
	Urban	14,811	2.9							
	Total	85,549	16.8		L	VL			VH	
R2 - Heavy Weight Sloping Roof	Rural	131,381	25.7							
	Urban	44,765	8.8							
	Total	176,146	34.5		L	VL			M	
R3 - Flat Roof	Rural	133,520	26.2							
	Urban	115,105	22.6							
	Total	248,625	48.8							
TOTAL HOUSES*		510,320								

ROOF										
R1 - Light Weight Sloping Roof	Rural	102,265	26.0							
	Urban	6,999	1.8							
	Total	109,264	27.8		L	VL			VH	VH
R2 - Heavy Weight Sloping Roof	Rural	23,575	6.0							
	Urban	2,348	0.6							
	Total	25,923	6.6		L	VL			H	M
R3 - Flat Roof	Rural	200,709	51.1							
	Urban	57,078	14.5							
	Total	257,787	65.6							
TOTAL HOUSES*		392,974								

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 652 mm

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 558 mm

Housing Category : Wall Types

- Category - A :** Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B :** Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C :** Reinforced building, well built wooden structures
- Category - X :** Other materials not covered in A,B,C. These are generally light.

- Notes :** 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
- 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
- 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1 - Light Weight** (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2 - Heavy Weight** (Tiles, Stone/Slate)
- Category - R3 - Flat Roof** (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)

- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

Housing Category : Wall Types

- Category - A :** Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B :** Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C :** Reinforced building, well built wooden structures
- Category - X :** Other materials not covered in A,B,C. These are generally light.

- Notes :** 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
- 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
- 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1 - Light Weight** (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2 - Heavy Weight** (Tiles, Stone/Slate)
- Category - R3 - Flat Roof** (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)

- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : UP 20 State : UTTAR PRADESH PILIBHIT

Table No. : UP 21 State : UTTAR PRADESH SHAHJAHANPUR

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
				79.5	20.5			100				23.8
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	53,385	12.1									
	Urban	5,574	1.3									
	Total	58,959	13.4	H	M			VH				VH
A2 - Stone Wall not packed with mortar	Rural	2,227	0.5									
	Urban	968	0.2									
	Total	3,195	0.7	H	M			H				VH
Total - Category - A		62,154	14.1									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	257,584	58.4									
	Urban	71,934	16.3									
	Total	329,518	74.7	M	L			H				H/M
Total - Category - B		329,518	74.7									
C1 - Concrete Wall	Rural	618	0.1									
	Urban	321	0.1									
	Total	939	0.2	L	VL			L				L/VL
C2 - Wood wall	Rural	1,079	0.2									
	Urban	229	0.1									
	Total	1,308	0.3	L	VL			VH				H
Total - Category - C		2,247	0.5									
X - Other Materials	Rural	44,752	10.1									
	Urban	2,569	0.6									
	Total	47,321	10.7	VL	VL			VH				VH
Total - Category - X		47,321	10.7									
TOTAL HOUSES*		441,240										

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
				2.6	97.4			100				44.9
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	121,496	19.4									
	Urban	7,890	1.3									
	Total	129,386	20.7	H	M			VH				VH
A2 - Stone Wall not packed with mortar	Rural	3,283	0.5									
	Urban	1,639	0.3									
	Total	4,922	0.8	H	M			H				VH
Total - Category - A		134,308	21.4									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	316,863	50.5									
	Urban	104,979	16.7									
	Total	421,842	67.2	M	L			H				H/M
Total - Category - B		421,842	67.2									
C1 - Concrete Wall	Rural	1,337	0.2									
	Urban	640	0.1									
	Total	1,977	0.3	L	VL			L				L/VL
C2 - Wood wall	Rural	986	0.2									
	Urban	483	0.1									
	Total	1,469	0.3	L	VL			VH				H
Total - Category - C		3,446	0.5									
X - Other Materials	Rural	59,401	9.5									
	Urban	8,663	1.4									
	Total	68,064	10.9	VL	VL			VH				VH
Total - Category - X		68,064	10.8									
TOTAL HOUSES*		627,660										

ROOF												
R1 - Light Weight Sloping Roof	Rural	108,863	24.7									
	Urban	12,848	2.9									
	Total	121,711	27.6	M	L			VH				VH
R2 - Heavy Weight Sloping Roof	Rural	50,375	11.4									
	Urban	4,666	1.1									
	Total	55,041	12.5	M	L			H				H
R3 - Flat Roof	Rural	200,407	45.4									
	Urban	64,081	14.5									
	Total	264,488	59.9	<i>Damage Risk as per that for the Wall supporting it</i>								
TOTAL HOUSES*		441,240										

ROOF												
R1 - Light Weight Sloping Roof	Rural	238,787	38.0									
	Urban	23,758	3.8									
	Total	262,545	41.8	M	L			VH				VH
R2 - Heavy Weight Sloping Roof	Rural	21,923	3.5									
	Urban	5,150	0.8									
	Total	27,073	4.3	M	L			H				H
R3 - Flat Roof	Rural	242,656	38.7									
	Urban	95,386	15.2									
	Total	338,042	53.9	<i>Damage Risk as per that for the Wall supporting it</i>								
TOTAL HOUSES*		627,660										

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 525 mm

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 542 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
- 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
- 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)

- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
- 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
- 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)

- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : UP 22 State : UTTAR PRADESH KHERI

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %		
		No. of Houses	%	EQ Zone				Wind Velocity m/s						
				V	IV	III	II	55 & 50	47	44 & 39	33			
				Area in %				Area in %						
					62.9	37.1			100				23.9	
WALL														
A1 - Mud & Unburnt Brick Wall	Rural	120,648	14.4											
	Urban	5,335	0.6											
	Total	125,983	15.0		H	M			VH					VH
A2 - Stone Wall not packed with mortar	Rural	3,548	0.4											
	Urban	995	0.1											
	Total	4,543	0.5		H	M			H					VH
Total - Category - A		130,526	15.6											
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	415,936	49.6											
	Urban	84,684	10.1											
	Total	500,620	59.7		M	L			H					H/M
Total - Category - B		500,620	59.7											
C1 - Concrete Wall	Rural	1,182	0.1											
	Urban	232	-											
	Total	1,414	0.1		L	VL			L					L/VL
C2 - Wood wall	Rural	2,085	0.2											
	Urban	488	0.1											
	Total	2,573	0.3		L	VL			VH					H
Total - Category - C		3,987	0.5											
X - Other Materials	Rural	194,884	23.3											
	Urban	8,031	1.0											
	Total	202,915	24.3		VL	VL			VH					VH
Total - Category - X		202,915	24.2											
TOTAL HOUSES*		838,048												
ROOF														
R1 - Light Weight Sloping Roof	Rural	346,500	41.3											
	Urban	18,471	2.2											
	Total	364,971	43.5		M	L			VH					VH
R2 - Heavy Weight Sloping Roof	Rural	15,029	1.8											
	Urban	2,361	0.3											
	Total	17,390	2.1		M	L			H					H
R3 - Flat Roof	Rural	376,754	45.0											
	Urban	78,933	9.4											
	Total	455,687	54.4											
TOTAL HOUSES*		838,048												

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 542 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
 - Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
 - Category - C** : Reinforced building, well built wooden structures
 - Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and chocked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
 - Category - R2** - Heavy Weight (Tiles, Stone/Slate)
 - Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : UP 23 State : UTTAR PRADESH SITAPUR

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %		
		No. of Houses	%	EQ Zone				Wind Velocity m/s						
				V	IV	III	II	55 & 50	47	44 & 39	33			
				Area in %				Area in %						
					1.4	98.6			100				18.6	
WALL														
A1 - Mud & Unburnt Brick Wall	Rural	278,854	30.7											
	Urban	7,614	0.8											
	Total	286,468	31.5		H	M			VH					VH
A2 - Stone Wall not packed with mortar	Rural	4,324	0.5											
	Urban	1,194	0.1											
	Total	5,518	0.6		H	M			H					VH
Total - Category - A		291,986	32.1											
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	393,672	43.3											
	Urban	86,108	9.5											
	Total	479,780	52.8		M	L			H					H/M
Total - Category - B		479,780	52.7											
C1 - Concrete Wall	Rural	1,959	0.2											
	Urban	366	-											
	Total	2,325	0.2		L	VL			L					L/VL
C2 - Wood wall	Rural	1,433	0.2											
	Urban	244	-											
	Total	1,677	0.2		L	VL			VH					H
Total - Category - C		4,002	0.4											
X - Other Materials	Rural	126,731	13.9											
	Urban	7,214	0.8											
	Total	133,945	14.7		VL	VL			VH					VH
Total - Category - X		133,945	14.7											
TOTAL HOUSES*		909,713												
ROOF														
R1 - Light Weight Sloping Roof	Rural	416,824	45.8											
	Urban	17,235	1.9											
	Total	434,059	47.7		M	L			VH					VH
R2 - Heavy Weight Sloping Roof	Rural	12,108	1.3											
	Urban	3,630	0.4											
	Total	15,738	1.7		M	L			H					H
R3 - Flat Roof	Rural	378,041	41.6											
	Urban	81,875	9.0											
	Total	459,916	50.6											
TOTAL HOUSES*		909,713												

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 542 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
 - Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
 - Category - C** : Reinforced building, well built wooden structures
 - Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and chocked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
 - Category - R2** - Heavy Weight (Tiles, Stone/Slate)
 - Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : UP 26 State : UTTAR PRADESH LUCKNOW

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %		
		No. of Houses	%	EQ Zone				Wind Velocity m/s						
				V	IV	III	II	55 & 50	47	44 & 39	33			
				Area in %				Area in %						
						100				88.7	11.3			31.9
WALL														
A1 - Mud & Unburnt Brick Wall	Rural	80,948	8.4											
	Urban	19,007	2.0											
	Total	99,955	10.4			M		VH	H					VH
A2 - Stone Wall not packed with mortar	Rural	3,330	0.3											
	Urban	12,253	1.3											
	Total	15,583	1.6			M		H	M					VH
Total - Category - A		115,538	12.0											
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	202,578	21.1											
	Urban	560,996	58.4											
	Total	763,574	79.5			L		H	M					H/M
Total - Category - B		763,574	79.6											
C1 - Concrete Wall	Rural	1,805	0.2											
	Urban	7,697	0.8											
	Total	9,502	1.0			VL		L	VL					L/VL
C2 - Wood wall	Rural	511	0.1											
	Urban	713	0.1											
	Total	1,224	0.2			VL		VH	H					H
Total - Category - C		10,726	1.1											
X - Other Materials	Rural	32,387	3.4											
	Urban	37,618	3.9											
	Total	70,005	7.3			VL		VH	H					VH
Total - Category - X		70,005	7.3											
TOTAL HOUSES*		959,843												
ROOF														
R1 - Light Weight Sloping Roof	Rural	120,471	12.6											
	Urban	64,843	6.8											
	Total	185,314	19.4			L		VH	VH					VH
R2 - Heavy Weight Sloping Roof	Rural	12,583	1.3											
	Urban	35,875	3.7											
	Total	48,458	5.0			L		H	M					H
R3 - Flat Roof	Rural	188,505	19.6											
	Urban	537,566	56.0											
	Total	726,071	75.6											
TOTAL HOUSES*		959,843												

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 558 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
 - Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
 - Category - C** : Reinforced building, well built wooden structures
 - Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and chocked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
 - Category - R2** - Heavy Weight (Tiles, Stone/Slate)
 - Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : UP 27 State : UTTAR PRADESH RAE BARELI

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %		
		No. of Houses	%	EQ Zone				Wind Velocity m/s						
				V	IV	III	II	55 & 50	47	44 & 39	33			
				Area in %				Area in %						
						95.1	4.9					100		25.2
WALL														
A1 - Mud & Unburnt Brick Wall	Rural	234,750	31.8											
	Urban	5,212	0.7											
	Total	239,962	32.5			M		L					H	VH
A2 - Stone Wall not packed with mortar	Rural	5,344	0.7											
	Urban	930	0.1											
	Total	6,274	0.8			M		L					M	VH
Total - Category - A		246,236	33.4											
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	360,337	48.8											
	Urban	53,236	7.2											
	Total	413,573	56.0			L		VL					M	H/M
Total - Category - B		413,573	56.1											
C1 - Concrete Wall	Rural	3,783	0.5											
	Urban	469	0.1											
	Total	4,252	0.6			VL		VL					VL	L/VL
C2 - Wood wall	Rural	620	0.1											
	Urban	262	-											
	Total	882	0.1			VL		VL					H	H
Total - Category - C		5,134	0.7											
X - Other Materials	Rural	66,802	9.1											
	Urban	5,978	0.8											
	Total	72,780	9.9			VL		VL					H	VH
Total - Category - X		72,780	9.9											
TOTAL HOUSES*		737,723												
ROOF														
R1 - Light Weight Sloping Roof	Rural	305,162	41.4											
	Urban	9,842	1.3											
	Total	315,004	42.7			L		VL					VH	VH
R2 - Heavy Weight Sloping Roof	Rural	20,203	2.7											
	Urban	3,017	0.4											
	Total	23,220	3.1			L		VL					M	H
R3 - Flat Roof	Rural	346,271	46.9											
	Urban	53,228	7.2											
	Total	399,499	54.1											
TOTAL HOUSES*		737,723												

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 630 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
 - Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
 - Category - C** : Reinforced building, well built wooden structures
 - Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and chocked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
 - Category - R2** - Heavy Weight (Tiles, Stone/Slate)
 - Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

**Distribution of Houses by Predominant Materials of Roof and Wall
and Level of Damage Risk**

Table No. : UP 30

State : UTTAR PRADESH

ETAWAH

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %			
		No. of Houses	%	EQ Zone				Wind Velocity m/s							
				V	IV	III	II	55 & 50	47	44 & 39	33				
				Area in %				Area in %							
						4.6	95.4			100				17.9	
WALL															
A1 - Mud & Unburnt Brick Wall	Rural	38,728	11.7												
	Urban	2,692	0.8												
	Total	41,420	12.5			M	L			H					VH
A2 - Stone Wall not packed with mortar	Rural	2,016	0.6												
	Urban	945	0.3												
	Total	2,961	0.9			M	L			M					VH
Total - Category - A		44,381	13.4												
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	180,620	54.7												
	Urban	62,562	18.9												
	Total	243,182	73.6			L	VL			M					H/M
Total - Category - B		243,182	73.6												
C1 - Concrete Wall	Rural	2,511	0.8												
	Urban	1,620	0.5												
	Total	4,131	1.3			VL	VL			VL					L/VL
C2 - Wood wall	Rural	232	0.1												
	Urban	212	0.1												
	Total	444	0.2			VL	VL			H					H
Total - Category - C		4,575	1.4												
X - Other Materials	Rural	28,174	8.5												
	Urban	9,906	3.0												
	Total	38,080	11.5			VL	VL			H					VH
Total - Category - X		38,080	11.5												
TOTAL HOUSES*		330,218													
ROOF															
R1 - Light Weight Sloping Roof	Rural	76,151	23.1												
	Urban	8,676	2.6												
	Total	84,827	25.7			L	VL			VH					VH
R2 - Heavy Weight Sloping Roof	Rural	45,262	13.7												
	Urban	5,652	1.7												
	Total	50,914	15.4			L	VL			M					H
R3 - Flat Roof	Rural	130,868	39.6												
	Urban	63,609	19.3												
	Total	194,477	58.9												
TOTAL HOUSES*		330,218													

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. **558 mm**

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

**Distribution of Houses by Predominant Materials of Roof and Wall
and Level of Damage Risk**

Table No. : UP 31

State : UTTAR PRADESH

AURAIYA

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %			
		No. of Houses	%	EQ Zone				Wind Velocity m/s							
				V	IV	III	II	55 & 50	47	44 & 39	33				
				Area in %				Area in %							
						11.1	88.9			100				17.6	
WALL															
A1 - Mud & Unburnt Brick Wall	Rural	43,985	14.9												
	Urban	2,327	0.8												
	Total	46,312	15.7			M	L			H					VH
A2 - Stone Wall not packed with mortar	Rural	1,497	0.5												
	Urban	431	0.1												
	Total	1,928	0.6			M	L			M					VH
Total - Category - A		48,240	16.3												
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	177,387	59.9												
	Urban	45,462	15.4												
	Total	222,849	75.3			L	VL			M					H/M
Total - Category - B		222,849	75.3												
C1 - Concrete Wall	Rural	1,398	0.5												
	Urban	374	0.1												
	Total	1,772	0.6			VL	VL			VL					L/VL
C2 - Wood wall	Rural	330	0.1												
	Urban	116	-												
	Total	446	0.1			VL	VL			H					H
Total - Category - C		2,218	0.7												
X - Other Materials	Rural	19,367	6.5												
	Urban	3,252	1.1												
	Total	22,619	7.6			VL	VL			H					VH
Total - Category - X		22,619	7.6												
TOTAL HOUSES*		295,926													
ROOF															
R1 - Light Weight Sloping Roof	Rural	97,497	32.9												
	Urban	7,429	2.5												
	Total	104,926	35.4			L	VL			VH					VH
R2 - Heavy Weight Sloping Roof	Rural	15,106	5.1												
	Urban	1,967	0.7												
	Total	17,073	5.8			L	VL			M					H
R3 - Flat Roof	Rural	131,361	44.4												
	Urban	42,566	14.4												
	Total	173,927	58.8												
TOTAL HOUSES*		295,926													

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. **571 mm**

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : UP 32 State : UTTAR PRADESH KANPUR DEHAT

Table No. : UP 33 State : UTTAR PRADESH KANPUR NAGAR

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
				Area in %				Area in %					
WALL						12.2	87.8			100			3.6
A1 - Mud & Unburnt Brick Wall	Rural	80,019	20.7										
	Urban	3,243	0.8										
	Total	83,262	21.5		M	L			H				VH
A2 - Stone Wall not packed with mortar	Rural	2,523	0.7										
	Urban	552	0.1										
	Total	3,075	0.8		M	L			M				VH
Total - Category - A		86,337	22.3										
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	231,981	59.9										
	Urban	29,572	7.6										
	Total	261,553	67.5		L	VL			M				H/M
Total - Category - B		261,553	67.5										
C1 - Concrete Wall	Rural	3,190	0.8										
	Urban	753	0.2										
	Total	3,943	1.0		VL	VL			VL				L/VL
C2 - Wood wall	Rural	354	0.1										
	Urban	50	-										
	Total	404	0.1		VL	VL			H				H
Total - Category - C		4,347	1.1										
X - Other Materials	Rural	31,424	8.1										
	Urban	3,706	1.0										
	Total	35,130	9.1		VL	VL			H				VH
Total - Category - X		35,130	9.1										
TOTAL HOUSES*		387,367											

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
				Area in %				Area in %					
WALL						45.7	54.3			3.3	96.7		13.1
A1 - Mud & Unburnt Brick Wall	Rural	71,945	7.4										
	Urban	37,398	3.9										
	Total	109,343	11.3		M	L			VH	H			VH
A2 - Stone Wall not packed with mortar	Rural	3,902	0.4										
	Urban	14,335	1.5										
	Total	18,237	1.9		M	L			H	M			VH
Total - Category - A		127,580	13.2										
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	235,908	24.3										
	Urban	514,212	53.0										
	Total	750,120	77.3		L	VL			H	M			H/M
Total - Category - B		750,120	77.3										
C1 - Concrete Wall	Rural	2,669	0.3										
	Urban	12,629	1.3										
	Total	15,298	1.6		VL	VL			L	VL			L/VL
C2 - Wood wall	Rural	483	-										
	Urban	970	0.1										
	Total	1,453	0.1		VL	VL			VH	H			H
Total - Category - C		16,751	1.7										
X - Other Materials	Rural	31,653	3.3										
	Urban	44,064	4.5										
	Total	75,717	7.8		VL	VL			VH	H			VH
Total - Category - X		75,717	7.8										
TOTAL HOUSES*		970,168											

ROOF									
R1 - Light Weight Sloping Roof	Rural	189,945	49.0						
	Urban	10,326	2.7						
	Total	200,271	51.7		L	VL			VH
R2 - Heavy Weight Sloping Roof	Rural	21,496	5.5						
	Urban	2,854	0.7						
	Total	24,350	6.2		L	VL			H
R3 - Flat Roof	Rural	138,050	35.6						
	Urban	24,696	6.4						
	Total	162,746	42.0						<i>Damage Risk as per that for the Wall supporting it</i>
TOTAL HOUSES*		387,367							

ROOF									
R1 - Light Weight Sloping Roof	Rural	173,382	17.9						
	Urban	85,233	8.8						
	Total	258,615	26.7		L	VL			VH
R2 - Heavy Weight Sloping Roof	Rural	19,286	2.0						
	Urban	60,397	6.2						
	Total	79,683	8.2		L	VL			H
R3 - Flat Roof	Rural	153,892	15.9						
	Urban	477,978	49.3						
	Total	631,870	65.2						<i>Damage Risk as per that for the Wall supporting it</i>
TOTAL HOUSES*		970,168							

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. **570 mm**

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. **594 mm**

Housing Category : Wall Types

- Category - A :** Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B :** Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C :** Reinforced building, well built wooden structures
- Category - X :** Other materials not covered in A,B,C. These are generally light.

- Notes :** 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
- 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
- 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1 -** Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2 -** Heavy Weight (Tiles, Stone/Slate)
- Category - R3 -** Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)

- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

Housing Category : Wall Types

- Category - A :** Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B :** Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C :** Reinforced building, well built wooden structures
- Category - X :** Other materials not covered in A,B,C. These are generally light.

- Notes :** 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
- 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
- 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1 -** Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2 -** Heavy Weight (Tiles, Stone/Slate)
- Category - R3 -** Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)

- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

**Distribution of Houses by Predominant Materials of Roof and Wall
and Level of Damage Risk**

Table No. : UP 38 State : UTTAR PRADESH MAHOBA

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
				Area in %				Area in %					
							100				100		
WALL													
A1 - Mud & Unburnt Brick Wall	Rural	97,404	42.5										
	Urban	12,700	5.5										
	Total	110,104	48.0				L			H			
A2 - Stone Wall not packed with mortar	Rural	3,212	1.4										
	Urban	1,092	0.5										
	Total	4,304	1.9				L			M			
Total - Category - A		114,408	49.9										
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	73,718	32.2										
	Urban	25,887	11.3										
	Total	99,605	43.5				VL			M			
Total - Category - B		99,605	43.5										
C1 - Concrete Wall	Rural	1,366	0.6										
	Urban	691	0.3										
	Total	2,057	0.9				VL			VL			
C2 - Wood wall	Rural	240	0.1										
	Urban	57	-										
	Total	297	0.1				VL			H			
Total - Category - C		2,354	1.0										
X - Other Materials	Rural	9,684	4.2										
	Urban	3,039	1.3										
	Total	12,723	5.5				VL			H			
Total - Category - X		12,723	5.6										
TOTAL HOUSES*		229,090											
ROOF													
R1 - Light Weight Sloping Roof	Rural	32,695	14.3										
	Urban	6,829	3.0										
	Total	39,524	17.3				VL			VH			
R2 - Heavy Weight Sloping Roof	Rural	96,292	42.0										
	Urban	13,195	5.8										
	Total	109,487	47.8				VL			M			
R3 - Flat Roof	Rural	56,637	24.7										
	Urban	23,442	10.2										
	Total	80,079	34.9										
TOTAL HOUSES*		229,090											

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 513 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

**Distribution of Houses by Predominant Materials of Roof and Wall
and Level of Damage Risk**

Table No. : UP 39 State : UTTAR PRADESH BANDA

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %									
		No. of Houses	%	EQ Zone				Wind Velocity m/s													
				V	IV	III	II	55 & 50	47	44 & 39	33										
				Area in %				Area in %													
													100							13.3	
WALL																					
A1 - Mud & Unburnt Brick Wall	Rural	263,236	62.4																		
	Urban	14,865	3.5																		
	Total	278,101	65.9											L					H		VH
A2 - Stone Wall not packed with mortar	Rural	1,381	0.3																		
	Urban	711	0.2																		
	Total	2,092	0.5											L					M		VH
Total - Category - A		280,193	66.4																		
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	85,129	20.2																		
	Urban	43,182	10.2																		
	Total	128,311	30.4											VL					M		H/M
Total - Category - B		128,311	30.4																		
C1 - Concrete Wall	Rural	866	0.2																		
	Urban	697	0.2																		
	Total	1,563	0.4											VL					VL		L/VL
C2 - Wood wall	Rural	240	0.1																		
	Urban	56	-																		
	Total	296	0.1											VL					H		H
Total - Category - C		1,859	0.4																		
X - Other Materials	Rural	9,389	2.2																		
	Urban	2,229	0.5																		
	Total	11,618	2.7											VL					H		VH
Total - Category - X		11,618	2.8																		
TOTAL HOUSES*		421,981																			
ROOF																					
R1 - Light Weight Sloping Roof	Rural	69,050	16.4																		
	Urban	8,974	2.1																		
	Total	78,024	18.5											VL					VH		VH
R2 - Heavy Weight Sloping Roof	Rural	244,602	58.0																		
	Urban	20,777	4.9																		
	Total	265,379	62.9											VL					M		H
R3 - Flat Roof	Rural	46,589	11.0																		
	Urban	31,989	7.6																		
	Total	78,578	18.6																		
TOTAL HOUSES*		421,981																			

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 562 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : UP 42 State : UTTAR PRADESH PRATAPGARH

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %			
		No. of Houses	%	EQ Zone				Wind Velocity m/s							
				V	IV	III	II	55 & 50	47	44 & 39	33				
				Area in %				Area in %							
						77.2	22.8			100				34.1	
WALL															
A1 - Mud & Unburnt Brick Wall	Rural	278,689	38.8												
	Urban	4,556	0.6												
	Total	283,245	39.4			M	L			H					VH
A2 - Stone Wall not packed with mortar	Rural	6,806	0.9												
	Urban	778	0.1												
	Total	7,584	1.0			M	L			M					VH
Total - Category - A		290,829	40.5												
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	331,523	46.2												
	Urban	29,290	4.1												
	Total	360,813	50.3			L	VL			M					H/M
Total - Category - B		360,813	50.3												
C1 - Concrete Wall	Rural	3,240	0.5												
	Urban	530	0.1												
	Total	3,770	0.6			VL	VL			VL					L/VL
C2 - Wood wall	Rural	940	0.1												
	Urban	14	-												
	Total	954	0.1			VL	VL			H					H
Total - Category - C		4,724	0.7												
X - Other Materials	Rural	59,501	8.3												
	Urban	2,163	0.3												
	Total	61,664	8.6			VL	VL			H					VH
Total - Category - X		61,664	8.6												
TOTAL HOUSES*		718,030													
ROOF															
R1 - Light Weight Sloping Roof	Rural	204,204	28.4												
	Urban	4,062	0.6												
	Total	208,266	29.0			L	VL			VH					VH
R2 - Heavy Weight Sloping Roof	Rural	161,476	22.5												
	Urban	3,470	0.5												
	Total	164,946	23.0			L	VL			M					H
R3 - Flat Roof	Rural	315,019	43.9												
	Urban	29,799	4.2												
	Total	344,818	48.1												
TOTAL HOUSES*		718,030													

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 630 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
 - Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
 - Category - C** : Reinforced building, well built wooden structures
 - Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and chocked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
 - Category - R2** - Heavy Weight (Tiles, Stone/Slate)
 - Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : UP 43 State : UTTAR PRADESH KAUSHAMBI

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %											
		No. of Houses	%	EQ Zone				Wind Velocity m/s															
				V	IV	III	II	55 & 50	47	44 & 39	33												
				Area in %				Area in %															
															100						27.6		
WALL																							
A1 - Mud & Unburnt Brick Wall	Rural	146,305	41.0																				
	Urban	5,475	1.5																				
	Total	151,780	42.5																				VH
A2 - Stone Wall not packed with mortar	Rural	2,807	0.8																				
	Urban	303	0.1																				
	Total	3,110	0.9																				VH
Total - Category - A		154,890	43.4																				
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	161,125	45.1																				
	Urban	19,608	5.5																				
	Total	180,733	50.6																				H/M
Total - Category - B		180,733	50.6																				
C1 - Concrete Wall	Rural	925	0.3																				
	Urban	106	-																				
	Total	1,031	0.3																				L/VL
C2 - Wood wall	Rural	292	0.1																				
	Urban	59	-																				
	Total	351	0.1																				H
Total - Category - C		1,382	0.4																				
X - Other Materials	Rural	18,246	5.1																				
	Urban	1,816	0.5																				
	Total	20,062	5.6																				VH
Total - Category - X		20,062	5.6																				
TOTAL HOUSES*		357,067																					
ROOF																							
R1 - Light Weight Sloping Roof	Rural	156,854	43.9																				
	Urban	6,761	1.9																				
	Total	163,615	45.8																				VH
R2 - Heavy Weight Sloping Roof	Rural	41,178	11.5																				
	Urban	2,809	0.8																				
	Total	43,987	12.3																				H
R3 - Flat Roof	Rural	131,668	36.9																				
	Urban	17,797	5.0																				
	Total	149,465	41.9																				
TOTAL HOUSES*		357,067																					

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 619 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
 - Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
 - Category - C** : Reinforced building, well built wooden structures
 - Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and chocked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
 - Category - R2** - Heavy Weight (Tiles, Stone/Slate)
 - Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : UP 44 State : UTTAR PRADESH ALLAHABAD

Table No. : UP 45 State : UTTAR PRADESH BARA BANKI

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %			
		No. of Houses	%	EQ Zone				Wind Velocity m/s							
				V	IV	III	II	55 & 50	47	44 & 39	33				
				Area in %				Area in %							
						8.5	91.5			100				25.1	
WALL															
A1 - Mud & Unburnt Brick Wall	Rural	370,955	31.4												
	Urban	17,811	1.5												
	Total	388,766	32.9			M	L			H					VH
A2 - Stone Wall not packed with mortar	Rural	16,607	1.4												
	Urban	5,910	0.5												
	Total	22,517	1.9			M	L			M					VH
Total - Category - A		411,283	34.8												
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	472,394	40.0												
	Urban	199,387	16.9												
	Total	671,781	56.9			L	VL			M					H/M
Total - Category - B		671,781	56.9												
C1 - Concrete Wall	Rural	4,712	0.4												
	Urban	3,974	0.3												
	Total	8,686	0.7			VL	VL			VL					L/VL
C2 - Wood wall	Rural	1,675	0.1												
	Urban	356	-												
	Total	2,031	0.1			VL	VL			H					H
Total - Category - C		10,717	0.9												
X - Other Materials	Rural	71,833	6.1												
	Urban	15,300	1.3												
	Total	87,133	7.4			VL	VL			H					VH
Total - Category - X		87,133	7.4												
TOTAL HOUSES*		1,180,914													

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %			
		No. of Houses	%	EQ Zone				Wind Velocity m/s							
				V	IV	III	II	55 & 50	47	44 & 39	33				
				Area in %				Area in %							
						100									13.8
WALL															
A1 - Mud & Unburnt Brick Wall	Rural	116,857	17.1												
	Urban	6,526	1.0												
	Total	123,383	18.1			M				VH	H				VH
A2 - Stone Wall not packed with mortar	Rural	4,396	0.6												
	Urban	702	0.1												
	Total	5,098	0.7			M				H	M				VH
Total - Category - A		128,481	18.8												
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	381,441	55.9												
	Urban	56,218	8.2												
	Total	437,659	64.1			L				H	M				H/M
Total - Category - B		437,659	64.1												
C1 - Concrete Wall	Rural	3,087	0.5												
	Urban	683	0.1												
	Total	3,770	0.6			VL				L	VL				L/VL
C2 - Wood wall	Rural	1,525	0.2												
	Urban	167	-												
	Total	1,692	0.2			VL				VH	H				H
Total - Category - C		5,462	0.8												
X - Other Materials	Rural	104,339	15.3												
	Urban	7,030	1.0												
	Total	111,369	16.3			VL				VH	H				VH
Total - Category - X		111,369	16.3												
TOTAL HOUSES*		682,971													

ROOF															
R1 - Light Weight Sloping Roof	Rural	289,548	24.5												
	Urban	26,347	2.2												
	Total	315,895	26.7			L	VL			VH					VH
R2 - Heavy Weight Sloping Roof	Rural	290,176	24.6												
	Urban	33,476	2.8												
	Total	323,652	27.4			L	VL			M					H
R3 - Flat Roof	Rural	358,452	30.4												
	Urban	182,915	15.5												
	Total	541,367	45.9												
TOTAL HOUSES*		1,180,914													

ROOF															
R1 - Light Weight Sloping Roof	Rural	242,563	35.5												
	Urban	13,728	2.0												
	Total	256,291	37.5			L				VH	VH				VH
R2 - Heavy Weight Sloping Roof	Rural	20,028	2.9												
	Urban	2,299	0.3												
	Total	22,327	3.2			L				H	M				H
R3 - Flat Roof	Rural	349,054	51.1												
	Urban	55,299	8.1												
	Total	404,353	59.2												
TOTAL HOUSES*		682,971													

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. **624 mm**

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. **558 mm**

Housing Category : Wall Types

- Category - A :** Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B :** Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C :** Reinforced building, well built wooden structures
- Category - X :** Other materials not covered in A,B,C. These are generally light.

- Notes :** 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
- 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
- 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1 -** Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2 -** Heavy Weight (Tiles, Stone/Slate)
- Category - R3 -** Flat Roof (Brick, Concrete)
- EQ Zone V :** Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV :** High Damage Risk Zone (MSK VIII)
- EQ Zone III :** Moderate Damage Risk Zone (MSK VII)
- EQ Zone II :** Low Damage Risk Zone (MSK < VI)

- Level of Risk :** VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

Housing Category : Wall Types

- Category - A :** Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B :** Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C :** Reinforced building, well built wooden structures
- Category - X :** Other materials not covered in A,B,C. These are generally light.

- Notes :** 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
- 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
- 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1 -** Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2 -** Heavy Weight (Tiles, Stone/Slate)
- Category - R3 -** Flat Roof (Brick, Concrete)
- EQ Zone V :** Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV :** High Damage Risk Zone (MSK VIII)
- EQ Zone III :** Moderate Damage Risk Zone (MSK VII)
- EQ Zone II :** Low Damage Risk Zone (MSK < VI)

- Level of Risk :** VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : UP 46 State : UTTAR PRADESH FAIZABAD

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %				
		No. of Houses	%	EQ Zone				Wind Velocity m/s								
				V	IV	III	II	55 & 50	47	44 & 39	33					
				Area in %				Area in %								
						100					100				13.0	
WALL																
A1 - Mud & Unburnt Brick Wall	Rural	146,843	26.5													
	Urban	5,970	1.1													
	Total	152,813	27.6			M					H					VH
A2 - Stone Wall not packed with mortar	Rural	3,720	0.7													
	Urban	1,447	0.3													
	Total	5,167	1.0			M				M						VH
Total - Category - A		157,980	28.5													
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	258,015	46.5													
	Urban	55,376	10.0													
	Total	313,391	56.5			L				M						H/M
Total - Category - B		313,391	56.5													
C1 - Concrete Wall	Rural	1,749	0.3													
	Urban	643	0.1													
	Total	2,392	0.4			VL				VL						L/VL
C2 - Wood wall	Rural	1,084	0.2													
	Urban	276	-													
	Total	1,360	0.2			VL				H						H
Total - Category - C		3,752	0.7													
X - Other Materials	Rural	71,695	12.9													
	Urban	7,608	1.4													
	Total	79,303	14.3			VL				H						VH
Total - Category - X		79,303	14.3													
TOTAL HOUSES*		554,426														
ROOF																
R1 - Light Weight Sloping Roof	Rural	164,876	29.7													
	Urban	11,480	2.1													
	Total	176,356	31.8			L				VH						VH
R2 - Heavy Weight Sloping Roof	Rural	72,189	13.0													
	Urban	4,291	0.8													
	Total	76,480	13.8			L				M						H
R3 - Flat Roof	Rural	246,041	44.4													
	Urban	55,549	10.0													
	Total	301,590	54.4													
TOTAL HOUSES*		554,426														

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 630 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
 - Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
 - Category - C** : Reinforced building, well built wooden structures
 - Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and chocked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
 - Category - R2** - Heavy Weight (Tiles, Stone/Slate)
 - Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : UP 47 State : UTTAR PRADESH AMBEDKAR NAGAR

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %				
		No. of Houses	%	EQ Zone				Wind Velocity m/s								
				V	IV	III	II	55 & 50	47	44 & 39	33					
				Area in %				Area in %								
						100					100				29.5	
WALL																
A1 - Mud & Unburnt Brick Wall	Rural	148,859	27.5													
	Urban	7,777	1.4													
	Total	156,636	28.9			M				H						VH
A2 - Stone Wall not packed with mortar	Rural	3,123	0.6													
	Urban	782	0.1													
	Total	3,905	0.7			M				M						VH
Total - Category - A		160,541	29.7													
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	278,754	51.5													
	Urban	43,668	8.1													
	Total	322,422	59.6			L				M						H/M
Total - Category - B		322,422	59.6													
C1 - Concrete Wall	Rural	1,961	0.4													
	Urban	624	0.1													
	Total	2,585	0.5			VL				VL						L/VL
C2 - Wood wall	Rural	707	0.1													
	Urban	130	-													
	Total	837	0.1			VL				H						H
Total - Category - C		3,422	0.6													
X - Other Materials	Rural	49,343	9.1													
	Urban	5,248	1.0													
	Total	54,591	10.1			VL				H						VH
Total - Category - X		54,591	10.1													
TOTAL HOUSES*		540,976														
ROOF																
R1 - Light Weight Sloping Roof	Rural	156,513	28.9													
	Urban	13,516	2.5													
	Total	170,029	31.4			L				VH						VH
R2 - Heavy Weight Sloping Roof	Rural	121,591	22.5													
	Urban	5,959	1.1													
	Total	127,550	23.6			L				M						H
R3 - Flat Roof	Rural	204,643	37.8													
	Urban	38,754	7.2													
	Total	243,397	45.0													
TOTAL HOUSES*		540,976														

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 440 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
 - Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
 - Category - C** : Reinforced building, well built wooden structures
 - Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and chocked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
 - Category - R2** - Heavy Weight (Tiles, Stone/Slate)
 - Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : UP 52

State : UTTAR PRADESH

GONDA

Table No. : UP 53

State : UTTAR PRADESH

SIDDHARTHANAGAR

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
				14.7	85.3			64.4	35.6			49.8
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	99,979	14.4									
	Urban	2,218	0.3									
	Total	102,197	14.7	H	M			VH	H			VH
A2 - Stone Wall not packed with mortar	Rural	5,208	0.8									
	Urban	665	0.1									
	Total	5,873	0.9	H	M			H	M			VH
Total - Category - A		108,070	15.6									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	373,829	53.9									
	Urban	38,894	5.6									
	Total	412,723	59.5	M	L			H	M			H/M
Total - Category - B		412,723	59.5									
C1 - Concrete Wall	Rural	3,791	0.5									
	Urban	397	0.1									
	Total	4,188	0.6	L	VL			L	VL			L/VL
C2 - Wood wall	Rural	1,923	0.3									
	Urban	326	-									
	Total	2,249	0.3	L	VL			VH	H			H
Total - Category - C		6,437	0.9									
X - Other Materials	Rural	161,350	23.3									
	Urban	4,562	0.7									
	Total	165,912	24.0	VL	VL			VH	H			VH
Total - Category - X		165,912	23.9									
TOTAL HOUSES*		693,142										

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
				100				100				49.9
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	57,498	11.7									
	Urban	2,173	0.4									
	Total	59,671	12.1	H				VH				VH
A2 - Stone Wall not packed with mortar	Rural	4,343	0.9									
	Urban	457	0.1									
	Total	4,800	1.0	H				H				VH
Total - Category - A		64,471	13.2									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	341,603	69.8									
	Urban	25,152	5.1									
	Total	366,755	74.9	M				H				H/M
Total - Category - B		366,755	74.9									
C1 - Concrete Wall	Rural	3,077	0.6									
	Urban	260	0.1									
	Total	3,337	0.7	L				L				L/VL
C2 - Wood wall	Rural	619	0.1									
	Urban	80	-									
	Total	699	0.1	L				VH				H
Total - Category - C		4,036	0.8									
X - Other Materials	Rural	51,989	10.6									
	Urban	2,438	0.5									
	Total	54,427	11.1	VL				VH				VH
Total - Category - X		54,427	11.1									
TOTAL HOUSES*		489,689										

ROOF												
R1 - Light Weight Sloping Roof	Rural	223,676	32.3									
	Urban	4,424	0.6									
	Total	228,100	32.9	M	L			VH	VH			VH
R2 - Heavy Weight Sloping Roof	Rural	36,010	5.2									
	Urban	1,518	0.2									
	Total	37,528	5.4	M	L			H	M			H
R3 - Flat Roof	Rural	386,394	55.7									
	Urban	41,120	5.9									
	Total	427,514	61.6	<i>Damage Risk as per that for the Wall supporting it</i>								
TOTAL HOUSES*		693,142										

ROOF												
R1 - Light Weight Sloping Roof	Rural	89,530	18.3									
	Urban	3,424	0.7									
	Total	92,954	19.0	M				VH				VH
R2 - Heavy Weight Sloping Roof	Rural	38,639	7.9									
	Urban	1,246	0.3									
	Total	39,885	8.2	M				H				H
R3 - Flat Roof	Rural	330,960	67.6									
	Urban	25,890	5.3									
	Total	356,850	72.9	<i>Damage Risk as per that for the Wall supporting it</i>								
TOTAL HOUSES*		489,689										

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 630 mm

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 523 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
- 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
- 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)

- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
- 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
- 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)

- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : UP 54 State : UTTAR PRADESH BASTI

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %		
		No. of Houses	%	EQ Zone				Wind Velocity m/s						
				V	IV	III	II	55 & 50	47	44 & 39	33			
				Area in %				Area in %						
					19.1	80.9			10.7	89.3			35.0	
WALL														
A1 - Mud & Unburnt Brick Wall	Rural	54,760	10.5											
	Urban	1,441	0.3											
	Total	56,201	10.8		H	M			VH	H				VH
A2 - Stone Wall not packed with mortar	Rural	4,003	0.8											
	Urban	464	0.1											
	Total	4,467	0.9		H	M			H	M				VH
Total - Category - A		60,668	11.6											
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	353,037	67.6											
	Urban	23,828	4.6											
	Total	376,865	72.2		M	L			H	M				H/M
Total - Category - B		376,865	72.2											
C1 - Concrete Wall	Rural	1,947	0.4											
	Urban	195	-											
	Total	2,142	0.4		L	VL			L	VL				L/VL
C2 - Wood wall	Rural	985	0.2											
	Urban	98	-											
	Total	1,083	0.2		L	VL			VH	H				H
Total - Category - C		3,225	0.6											
X - Other Materials	Rural	78,876	15.1											
	Urban	2,393	0.5											
	Total	81,269	15.6		VL	VL			VH	H				VH
Total - Category - X		81,269	15.6											
TOTAL HOUSES*		522,027												
ROOF														
R1 - Light Weight Sloping Roof	Rural	141,153	27.0											
	Urban	3,482	0.7											
	Total	144,635	27.7		M	L			VH	VH				VH
R2 - Heavy Weight Sloping Roof	Rural	25,237	4.8											
	Urban	626	0.1											
	Total	25,863	4.9		M	L			H	M				H
R3 - Flat Roof	Rural	327,218	62.7											
	Urban	24,311	4.7											
	Total	351,529	67.4											
TOTAL HOUSES*		522,027												

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 523 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
 - Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
 - Category - C** : Reinforced building, well built wooden structures
 - Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes :** 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and chocked drainage.
2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
 - Category - R2** - Heavy Weight (Tiles, Stone/Slate)
 - Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
EQ Zone IV : High Damage Risk Zone (MSK VIII)
EQ Zone III : Moderate Damage Risk Zone (MSK VII)
EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : UP 55 State : UTTAR PRADESH SANT KABIR NAGAR

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %		
		No. of Houses	%	EQ Zone				Wind Velocity m/s						
				V	IV	III	II	55 & 50	47	44 & 39	33			
				Area in %				Area in %						
					50.3	49.7			13.1	86.9			33.9	
WALL														
A1 - Mud & Unburnt Brick Wall	Rural	43,515	12.9											
	Urban	2,313	0.7											
	Total	45,828	13.6		H	M			VH	H				VH
A2 - Stone Wall not packed with mortar	Rural	2,884	0.9											
	Urban	362	0.1											
	Total	3,246	1.0		H	M			H	M				VH
Total - Category - A		49,074	14.6											
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	225,478	66.9											
	Urban	19,531	5.8											
	Total	245,009	72.7		M	L			H	M				H/M
Total - Category - B		245,009	72.7											
C1 - Concrete Wall	Rural	1,109	0.3											
	Urban	80	-											
	Total	1,189	0.3		L	VL			L	VL				L/VL
C2 - Wood wall	Rural	837	0.2											
	Urban	45	-											
	Total	882	0.2		L	VL			VH	H				H
Total - Category - C		2,071	0.6											
X - Other Materials	Rural	38,882	11.5											
	Urban	1,860	0.6											
	Total	40,742	12.1		VL	VL			VH	H				VH
Total - Category - X		40,742	12.1											
TOTAL HOUSES*		336,896												
ROOF														
R1 - Light Weight Sloping Roof	Rural	83,584	24.8											
	Urban	3,796	1.1											
	Total	87,380	25.9		M	L			VH	VH				VH
R2 - Heavy Weight Sloping Roof	Rural	25,341	7.5											
	Urban	1,549	0.5											
	Total	26,890	8.0		M	L			H	M				H
R3 - Flat Roof	Rural	203,780	60.5											
	Urban	18,846	5.6											
	Total	222,626	66.1											
TOTAL HOUSES*		336,896												

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 523 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
 - Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
 - Category - C** : Reinforced building, well built wooden structures
 - Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes :** 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and chocked drainage.
2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
 - Category - R2** - Heavy Weight (Tiles, Stone/Slate)
 - Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
EQ Zone IV : High Damage Risk Zone (MSK VIII)
EQ Zone III : Moderate Damage Risk Zone (MSK VII)
EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : UP 60 State : UTTAR PRADESH AZAMGARH

Table No. : UP 61 State : UTTAR PRADESH MAU

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %				
		No. of Houses	%	EQ Zone				Wind Velocity m/s								
				V	IV	III	II	55 & 50	47	44 & 39	33					
				Area in %				Area in %								
						100					100				19.6	
WALL																
A1 - Mud & Unburnt Brick Wall	Rural	248,893	26.8													
	Urban	5,853	0.6													
	Total	254,746	27.4				M					H				VH
A2 - Stone Wall not packed with mortar	Rural	6,723	0.7													
	Urban	1,221	0.1													
	Total	7,944	0.8				M				M					VH
Total - Category - A		262,690	28.3													
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	511,411	55.2													
	Urban	58,599	6.3													
	Total	570,010	61.5				L				M					H/M
Total - Category - B		570,010	61.5													
C1 - Concrete Wall	Rural	6,453	0.7													
	Urban	1,091	0.1													
	Total	7,544	0.8				VL				VL					L/VL
C2 - Wood wall	Rural	1,321	0.1													
	Urban	134	-													
	Total	1,455	0.1				VL				H					H
Total - Category - C		8,999	1.0													
X - Other Materials	Rural	80,931	8.7													
	Urban	4,598	0.5													
	Total	85,529	9.2				VL				H					VH
Total - Category - X		85,529	9.2													
TOTAL HOUSES*		927,228														

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %				
		No. of Houses	%	EQ Zone				Wind Velocity m/s								
				V	IV	III	II	55 & 50	47	44 & 39	33					
				Area in %				Area in %								
						100					100					51.8
WALL																
A1 - Mud & Unburnt Brick Wall	Rural	77,908	18.2													
	Urban	8,050	1.9													
	Total	85,958	20.1				M				H					VH
A2 - Stone Wall not packed with mortar	Rural	3,255	0.8													
	Urban	1,226	0.3													
	Total	4,481	1.1				M				M					VH
Total - Category - A		90,439	21.1													
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	223,430	52.2													
	Urban	74,670	17.4													
	Total	298,100	69.6				L				M					H/M
Total - Category - B		298,100	69.6													
C1 - Concrete Wall	Rural	2,216	0.5													
	Urban	539	0.1													
	Total	2,755	0.6				VL				VL					L/VL
C2 - Wood wall	Rural	756	0.2													
	Urban	252	0.1													
	Total	1,008	0.3				VL				H					H
Total - Category - C		3,763	0.9													
X - Other Materials	Rural	31,600	7.4													
	Urban	4,114	1.0													
	Total	35,714	8.4				VL				H					VH
Total - Category - X		35,714	8.3													
TOTAL HOUSES*		428,016														

ROOF																
R1 - Light Weight Sloping Roof		Census Houses		Level of Risk under								Flood Prone Area in %				
		No. of Houses	%	EQ Zone				Wind Velocity m/s								
				V	IV	III	II	55 & 50	47	44 & 39	33					
R1 - Light Weight Sloping Roof	Rural	253,742	27.4													
	Urban	8,499	0.9													
	Total	262,241	28.3				L				VH					VH
R2 - Heavy Weight Sloping Roof	Rural	215,092	23.2													
	Urban	6,211	0.7													
	Total	221,303	23.9				L				M					H
R3 - Flat Roof	Rural	386,898	41.7													
	Urban	56,786	6.1													
	Total	443,684	47.8													
TOTAL HOUSES*		927,228														

ROOF																
R1 - Light Weight Sloping Roof		Census Houses		Level of Risk under								Flood Prone Area in %				
		No. of Houses	%	EQ Zone				Wind Velocity m/s								
				V	IV	III	II	55 & 50	47	44 & 39	33					
R1 - Light Weight Sloping Roof	Rural	111,256	26.0													
	Urban	15,704	3.7													
	Total	126,960	29.7				L				VH					VH
R2 - Heavy Weight Sloping Roof	Rural	51,714	12.1													
	Urban	6,632	1.5													
	Total	58,346	13.6				L				M					H
R3 - Flat Roof	Rural	176,195	41.2													
	Urban	66,515	15.5													
	Total	242,710	56.7													
TOTAL HOUSES*		428,016														

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 343 mm

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 433 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
- 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
- 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)

- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
- 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
- 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)

- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : UP 62 State : UTTAR PRADESH BALLIA

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %		
		No. of Houses	%	EQ Zone				Wind Velocity m/s						
				V	IV	III	II	55 & 50	47	44 & 39	33			
				Area in %				Area in %						
					8.4	91.6				100			48.7	
WALL														
A1 - Mud & Unburnt Brick Wall	Rural	81,762	13.5											
	Urban	5,087	0.8											
	Total	86,849	14.3		H	M				H				VH
A2 - Stone Wall not packed with mortar	Rural	6,142	1.0											
	Urban	887	0.1											
	Total	7,029	1.1		H	M				M				VH
Total - Category - A		93,878	15.5											
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	358,510	59.1											
	Urban	46,617	7.7											
	Total	405,127	66.8		M	L				M				H/M
Total - Category - B		405,127	66.8											
C1 - Concrete Wall	Rural	4,717	0.8											
	Urban	1,039	0.2											
	Total	5,756	1.0		L	VL				VL				L/VL
C2 - Wood wall	Rural	1,846	0.3											
	Urban	242	-											
	Total	2,088	0.3		L	VL				H				H
Total - Category - C		7,844	1.3											
X - Other Materials	Rural	94,217	15.5											
	Urban	5,076	0.8											
	Total	99,293	16.3		VL	VL				H				VH
Total - Category - X		99,293	16.4											
TOTAL HOUSES*		606,142												
ROOF														
R1 - Light Weight Sloping Roof	Rural	173,437	28.6											
	Urban	10,272	1.7											
	Total	183,709	30.3		M	L				VH				VH
R2 - Heavy Weight Sloping Roof	Rural	114,183	18.8											
	Urban	12,012	2.0											
	Total	126,195	20.8		M	L				M				H
R3 - Flat Roof	Rural	259,574	42.8											
	Urban	36,664	6.0											
	Total	296,238	48.8											
TOTAL HOUSES*		606,142												

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 523 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
 - Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
 - Category - C** : Reinforced building, well built wooden structures
 - Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and chocked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
 - Category - R2** - Heavy Weight (Tiles, Stone/Slate)
 - Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : UP 63 State : UTTAR PRADESH JAUNPUR

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %		
		No. of Houses	%	EQ Zone				Wind Velocity m/s						
				V	IV	III	II	55 & 50	47	44 & 39	33			
				Area in %				Area in %						
WALL														
A1 - Mud & Unburnt Brick Wall	Rural	254,959	26.6											
	Urban	4,402	0.5											
	Total	259,361	27.1							M		H		VH
A2 - Stone Wall not packed with mortar	Rural	8,601	0.9											
	Urban	955	0.1											
	Total	9,556	1.0							M		M		VH
Total - Category - A		268,917	28.1											
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	539,441	56.3											
	Urban	60,639	6.3											
	Total	600,080	62.6								L		M	H/M
Total - Category - B		600,080	62.7											
C1 - Concrete Wall	Rural	3,942	0.4											
	Urban	862	0.1											
	Total	4,804	0.5								VL		VL	L/VL
C2 - Wood wall	Rural	1,533	0.2											
	Urban	412	-											
	Total	1,945	0.2								VL		H	H
Total - Category - C		6,749	0.7											
X - Other Materials	Rural	77,635	8.1											
	Urban	3,938	0.4											
	Total	81,573	8.5								VL		H	VH
Total - Category - X		81,573	8.5											
TOTAL HOUSES*		957,319												
ROOF														
R1 - Light Weight Sloping Roof	Rural	249,755	26.1											
	Urban	8,174	0.9											
	Total	257,929	27.0								L		VH	VH
R2 - Heavy Weight Sloping Roof	Rural	493,896	51.6											
	Urban	47,891	5.0											
	Total	541,787	56.6								L		M	H
R3 - Flat Roof	Rural	142,460	14.9											
	Urban	15,143	1.6											
	Total	157,603	16.5											
TOTAL HOUSES*		957,319												

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 430 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
 - Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
 - Category - C** : Reinforced building, well built wooden structures
 - Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and chocked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
 - Category - R2** - Heavy Weight (Tiles, Stone/Slate)
 - Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : UP 64

State : UTTAR PRADESH

GAZIPUR

Table No. : UP 65

State : UTTAR PRADESH

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Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %				
		No. of Houses	%	EQ Zone				Wind Velocity m/s								
				V	IV	III	II	55 & 50	47	44 & 39	33					
				Area in %				Area in %								
						100					100				33.0	
WALL																
A1 - Mud & Unburnt Brick Wall	Rural	167,159	22.9													
	Urban	5,260	0.7													
	Total	172,419	23.6			M					H					VH
A2 - Stone Wall not packed with mortar	Rural	7,783	1.1													
	Urban	1,324	0.2													
	Total	9,107	1.3			M				M						VH
Total - Category - A		181,526	24.8													
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	418,371	57.2													
	Urban	44,943	6.1													
	Total	463,314	63.3			L				M						H/M
Total - Category - B		463,314	63.4													
C1 - Concrete Wall	Rural	2,499	0.3													
	Urban	566	0.1													
	Total	3,065	0.4			VL				VL						L/VL
C2 - Wood wall	Rural	3,052	0.4													
	Urban	427	0.1													
	Total	3,479	0.5			VL				H						H
Total - Category - C		6,544	0.9													
X - Other Materials	Rural	76,755	10.5													
	Urban	2,656	0.4													
	Total	79,411	10.9			VL				H						VH
Total - Category - X		79,411	10.9													
TOTAL HOUSES*		730,795														

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %					
		No. of Houses	%	EQ Zone				Wind Velocity m/s									
				V	IV	III	II	55 & 50	47	44 & 39	33						
				Area in %				Area in %									
						100											46.7
WALL																	
A1 - Mud & Unburnt Brick Wall	Rural	125,512	33.2														
	Urban	3,824	1.0														
	Total	129,336	34.2			M				H	M						VH
A2 - Stone Wall not packed with mortar	Rural	3,057	0.8														
	Urban	672	0.2														
	Total	3,729	1.0			M				M	L						VH
Total - Category - A		133,065	35.2														
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	181,509	48.1														
	Urban	38,901	10.3														
	Total	220,410	58.4			L				M	L						H/M
Total - Category - B		220,410	58.4														
C1 - Concrete Wall	Rural	1,731	0.5														
	Urban	703	0.2														
	Total	2,434	0.7			VL				VL	VL						L/VL
C2 - Wood wall	Rural	472	0.1														
	Urban	66	-														
	Total	538	0.1			VL				H	M						H
Total - Category - C		2,972	0.8														
X - Other Materials	Rural	19,497	5.2														
	Urban	1,640	0.4														
	Total	21,137	5.6			VL				H	M						VH
Total - Category - X		21,137	5.6														
TOTAL HOUSES*		377,584															

ROOF																
R1 - Light Weight Sloping Roof	Rural	225,413	30.8													
	Urban	8,863	1.2													
	Total	234,276	32.0			L				VH						VH
R2 - Heavy Weight Sloping Roof	Rural	296,312	40.5													
	Urban	18,849	2.6													
	Total	315,161	43.1			L				M						H
R3 - Flat Roof	Rural	153,894	21.1													
	Urban	27,464	3.8													
	Total	181,358	24.9													
<i>Damage Risk as per that for the Wall supporting it</i>																
TOTAL HOUSES*		730,795														

ROOF																
R1 - Light Weight Sloping Roof	Rural	84,136	22.3													
	Urban	5,524	1.5													
	Total	89,660	23.8			L				VH	H					VH
R2 - Heavy Weight Sloping Roof	Rural	184,987	49.0													
	Urban	14,150	3.7													
	Total	199,137	52.7			L				M	L					H
R3 - Flat Roof	Rural	62,655	16.6													
	Urban	26,132	6.9													
	Total	88,787	23.5													
<i>Damage Risk as per that for the Wall supporting it</i>																
TOTAL HOUSES*		377,584														

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 523 mm

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 517 mm

Housing Category : Wall Types

- Category - A :** Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B :** Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C :** Reinforced building, well built wooden structures
- Category - X :** Other materials not covered in A,B,C. These are generally light.

- Notes :** 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
- 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
- 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1 -** Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2 -** Heavy Weight (Tiles, Stone/Slate)
- Category - R3 -** Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)

- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

Housing Category : Wall Types

- Category - A :** Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B :** Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C :** Reinforced building, well built wooden structures
- Category - X :** Other materials not covered in A,B,C. These are generally light.

- Notes :** 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
- 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
- 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1 -** Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2 -** Heavy Weight (Tiles, Stone/Slate)
- Category - R3 -** Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)

- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : UP 66 State : UTTAR PRADESH VARANASI

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %				
		No. of Houses	%	EQ Zone				Wind Velocity m/s								
				V	IV	III	II	55 & 50	47	44 & 39	33					
				Area in %				Area in %								
						100					100				49.3	
WALL																
A1 - Mud & Unburnt Brick Wall	Rural	108,568	15.4													
	Urban	18,444	2.6													
	Total	127,012	18.0			M					H					VH
A2 - Stone Wall not packed with mortar	Rural	4,863	0.7													
	Urban	7,944	1.1													
	Total	12,807	1.8			M				M						VH
Total - Category - A		139,819	19.8													
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	277,445	39.3													
	Urban	249,812	35.4													
	Total	527,257	74.7			L				M						H/M
Total - Category - B		527,257	74.8													
C1 - Concrete Wall	Rural	2,237	0.3													
	Urban	4,190	0.6													
	Total	6,427	0.9			VL				VL						L/VL
C2 - Wood wall	Rural	854	0.1													
	Urban	726	0.1													
	Total	1,580	0.2			VL				H						H
Total - Category - C		8,007	1.1													
X - Other Materials	Rural	20,833	3.0													
	Urban	9,175	1.3													
	Total	30,008	4.3			VL				H						VH
Total - Category - X		30,008	4.3													
TOTAL HOUSES*		705,091														
ROOF																
R1 - Light Weight Sloping Roof	Rural	92,500	13.1													
	Urban	24,254	3.4													
	Total	116,754	16.5			L				VH						VH
R2 - Heavy Weight Sloping Roof	Rural	224,670	31.9													
	Urban	139,670	19.8													
	Total	364,340	51.7			L				M						H
R3 - Flat Roof	Rural	97,630	13.8													
	Urban	126,367	17.9													
	Total	223,997	31.7													
TOTAL HOUSES*		705,091														

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 517 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
 - Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
 - Category - C** : Reinforced building, well built wooden structures
 - Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and chocked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
 - Category - R2** - Heavy Weight (Tiles, Stone/Slate)
 - Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : UP 67 State : UTTAR PRADESH SANT RAVIDAS NAGAR (BHADOHI)

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %				
		No. of Houses	%	EQ Zone				Wind Velocity m/s								
				V	IV	III	II	55 & 50	47	44 & 39	33					
				Area in %				Area in %								
						59.0	41.0				100				51.5	
WALL																
A1 - Mud & Unburnt Brick Wall	Rural	91,541	28.4													
	Urban	5,128	1.6													
	Total	96,669	30.0			M	L			H						VH
A2 - Stone Wall not packed with mortar	Rural	2,964	0.9													
	Urban	721	0.2													
	Total	3,685	1.1			M	L			M						VH
Total - Category - A		100,354	31.2													
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	162,548	50.5													
	Urban	34,426	10.7													
	Total	196,974	61.2			L	VL			M						H/M
Total - Category - B		196,974	61.2													
C1 - Concrete Wall	Rural	1,071	0.3													
	Urban	287	0.1													
	Total	1,358	0.4			VL	VL			VL						L/VL
C2 - Wood wall	Rural	545	0.2													
	Urban	91	-													
	Total	636	0.2			VL	VL			H						H
Total - Category - C		1,994	0.6													
X - Other Materials	Rural	20,960	6.5													
	Urban	1,792	0.6													
	Total	22,752	7.1			VL	VL			H						VH
Total - Category - X		22,752	7.1													
TOTAL HOUSES*		322,074														
ROOF																
R1 - Light Weight Sloping Roof	Rural	67,610	21.0													
	Urban	7,198	2.2													
	Total	74,808	23.2			L	VL			VH						VH
R2 - Heavy Weight Sloping Roof	Rural	182,481	56.7													
	Urban	28,052	8.7													
	Total	210,533	65.4			L	VL			M						H
R3 - Flat Roof	Rural	29,538	9.2													
	Urban	7,195	2.2													
	Total	36,733	11.4													
TOTAL HOUSES*		322,074														

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 517 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
 - Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
 - Category - C** : Reinforced building, well built wooden structures
 - Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and chocked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
 - Category - R2** - Heavy Weight (Tiles, Stone/Slate)
 - Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : UP 68 State : UTTAR PRADESH MIRZAPUR

Table No. : UP 69 State : UTTAR PRADESH SONBHADRA

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
				Area in %				Area in %					
WALL						47.1	52.9			89.7	10.3		15.4
A1 - Mud & Unburnt Brick Wall	Rural	195,135	38.0										
	Urban	11,404	2.2										
	Total	206,539	40.2		M	L			H	M			VH
A2 - Stone Wall not packed with mortar	Rural	8,372	1.6										
	Urban	2,076	0.4										
	Total	10,448	2.0		M	L			M	L			VH
Total - Category - A		216,987	42.2										
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	208,548	40.6										
	Urban	53,381	10.4										
	Total	261,929	51.0		L	VL			M	L			H/M
Total - Category - B		261,929	51.0										
C1 - Concrete Wall	Rural	1,272	0.2										
	Urban	505	0.1										
	Total	1,777	0.3		VL	VL			VL	VL			L/VL
C2 - Wood wall	Rural	1,047	0.2										
	Urban	384	0.1										
	Total	1,431	0.3		VL	VL			H	M			H
Total - Category - C		3,208	0.6										
X - Other Materials	Rural	28,371	5.5										
	Urban	3,191	0.6										
	Total	31,562	6.1		VL	VL			H	M			VH
Total - Category - X		31,562	6.1										
TOTAL HOUSES*		513,686											

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
				Area in %				Area in %					
WALL						99.9	.1			1.0	99.0		
A1 - Mud & Unburnt Brick Wall	Rural	257,173	65.6										
	Urban	12,994	3.3										
	Total	270,167	68.9		M	L			H	M			
A2 - Stone Wall not packed with mortar	Rural	2,073	0.5										
	Urban	769	0.2										
	Total	2,842	0.7		M	L			M	L			
Total - Category - A		273,009	69.6										
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	46,675	11.9										
	Urban	55,822	14.2										
	Total	102,497	26.1		L	VL			M	L			
Total - Category - B		102,497	26.1										
C1 - Concrete Wall	Rural	1,045	0.3										
	Urban	903	0.2										
	Total	1,948	0.5		VL	VL			VL	VL			
C2 - Wood wall	Rural	343	0.1										
	Urban	391	0.1										
	Total	734	0.2		VL	VL			H	M			
Total - Category - C		2,682	0.7										
X - Other Materials	Rural	10,001	2.5										
	Urban	4,112	1.0										
	Total	14,113	3.5		VL	VL			H	M			
Total - Category - X		14,113	3.6										
TOTAL HOUSES*		392,301											

ROOF										
R1 - Light Weight Sloping Roof	Rural	93,575	18.2							
	Urban	11,190	2.2							
	Total	104,765	20.4		L	VL		VH	H	VH
R2 - Heavy Weight Sloping Roof	Rural	303,660	59.1							
	Urban	47,429	9.2							
	Total	351,089	68.3		L	VL		M	L	H
R3 - Flat Roof	Rural	45,510	8.9							
	Urban	12,322	2.4							
	Total	57,832	11.3	<i>Damage Risk as per that for the Wall supporting it</i>						
TOTAL HOUSES*		513,686								

ROOF										
R1 - Light Weight Sloping Roof	Rural	74,863	19.1							
	Urban	22,491	5.7							
	Total	97,354	24.8		L	VL		VH	H	
R2 - Heavy Weight Sloping Roof	Rural	212,556	54.2							
	Urban	11,417	2.9							
	Total	223,973	57.1		L	VL		M	L	
R3 - Flat Roof	Rural	29,891	7.6							
	Urban	41,083	10.5							
	Total	70,974	18.1	<i>Damage Risk as per that for the Wall supporting it</i>						
TOTAL HOUSES*		392,301								

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. **567 mm**

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. **482 mm**

Housing Category : Wall Types

- Category - A :** Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B :** Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C :** Reinforced building, well built wooden structures
- Category - X :** Other materials not covered in A,B,C. These are generally light.

- Notes :** 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
- 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
- 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1 - Light Weight** (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2 - Heavy Weight** (Tiles, Stone/Slate)
- Category - R3 - Flat Roof** (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)

- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

Housing Category : Wall Types

- Category - A :** Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B :** Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C :** Reinforced building, well built wooden structures
- Category - X :** Other materials not covered in A,B,C. These are generally light.

- Notes :** 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
- 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
- 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1 - Light Weight** (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2 - Heavy Weight** (Tiles, Stone/Slate)
- Category - R3 - Flat Roof** (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)

- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

**Distribution of Houses by Predominant Materials of Roof and Wall
and Level of Damage Risk**

Table No. : UP 70

State : UTTAR PRADESH

ETAH

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
				Area in %				Area in %					
WALL						100				69.9	30.1		
A1 - Mud & Unburnt Brick Wall	Rural	37,349	9.8										
	Urban	1,732	0.5										
	Total	39,081	10.3			M		VH	H				
A2 - Stone Wall not packed with mortar	Rural	2,438	0.6										
	Urban	1,089	0.3										
	Total	3,527	0.9			M		H	M				
Total - Category - A		42,608	11.1										
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	266,871	69.8										
	Urban	58,230	15.2										
	Total	325,101	85.0			L		H	M				
Total - Category - B		325,101	85.0										
C1 - Concrete Wall	Rural	620	0.2										
	Urban	401	0.1										
	Total	1,021	0.3			VL		L	VL				
C2 - Wood wall	Rural	257	0.1										
	Urban	50	-										
	Total	307	0.1			VL		VH	H				
Total - Category - C		1,328	0.3										
X - Other Materials	Rural	12,843	3.4										
	Urban	706	0.2										
	Total	13,549	3.6			VL		VH	H				
Total - Category - X		13,549	3.5										
TOTAL HOUSES*		382,586											
ROOF													
R1 - Light Weight Sloping Roof	Rural	71,814	18.8										
	Urban	4,652	1.2										
	Total	76,466	20.0			L		VH	VH				
R2 - Heavy Weight Sloping Roof	Rural	60,018	15.7										
	Urban	7,949	2.1										
	Total	67,967	17.8			L		H	M				
R3 - Flat Roof	Rural	188,546	49.3										
	Urban	49,607	13.0										
	Total	238,153	62.3										
TOTAL HOUSES*		382,586											

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. **553 mm**

Housing Category : Wall Types

Category - A : Buildings in field-stone, rural structures, unburnt brick houses, clay houses

Category - B : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone

Category - C : Reinforced building, well built wooden structures

Category - X : Other materials not covered in A,B,C. These are generally light.

Notes : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.

2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building

3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

Category - R1 - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene,

GI Metal, Asbestos Sheets, Other Materials)

Category - R2 - Heavy Weight (Tiles, Stone/Slate)

Category - R3 - Flat Roof (Brick, Concrete)

EQ Zone V : Very High Damage Risk Zone (MSK > IX)

EQ Zone IV : High Damage Risk Zone (MSK VIII)

EQ Zone III : Moderate Damage Risk Zone (MSK VII)

EQ Zone II : Low Damage Risk Zone (MSK < VI)

Level of Risk : VH = Very High; H = High;

M = Moderate; L = Low; VL = Very Low

* Total No. of Houses excluding Vacant/Locked Houses

**Distribution of Houses by Predominant Materials of Roof and Wall
and Level of Damage Risk**

Table No. : UP 71

State : UTTAR PRADESH

KANSHIRAM NAGAR

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
				Area in %				Area in %					
WALL						100				100			
A1 - Mud & Unburnt Brick Wall	Rural	27,914	8.6										
	Urban	2,302	0.7										
	Total	30,216	9.3			M		VH					VH
A2 - Stone Wall not packed with mortar	Rural	1,947	0.6										
	Urban	1,083	0.3										
	Total	3,030	0.9			M		H					VH
Total - Category - A		33,246	10.3										
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	193,542	59.8										
	Urban	55,251	17.1										
	Total	248,793	76.9			L		H					H/M
Total - Category - B		248,793	76.9										
C1 - Concrete Wall	Rural	1,409	0.4										
	Urban	459	0.1										
	Total	1,868	0.5			VL		L					L/VL
C2 - Wood wall	Rural	432	0.1										
	Urban	79	-										
	Total	511	0.1			VL		VH					H
Total - Category - C		2,379	0.7										
X - Other Materials	Rural	33,492	10.4										
	Urban	5,522	1.7										
	Total	39,014	12.1			VL		VH					VH
Total - Category - X		39,014	12.1										
TOTAL HOUSES*		323,432											
ROOF													
R1 - Light Weight Sloping Roof	Rural	65,730	20.3										
	Urban	6,854	2.1										
	Total	72,584	22.4			L		VH					VH
R2 - Heavy Weight Sloping Roof	Rural	21,825	6.7										
	Urban	5,061	1.6										
	Total	26,886	8.3			L		H					H
R3 - Flat Roof	Rural	171,181	52.9										
	Urban	52,781	16.3										
	Total	223,962	69.2										
TOTAL HOUSES*		323,432											

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. **547 mm**

Housing Category : Wall Types

Category - A : Buildings in field-stone, rural structures, unburnt brick houses, clay houses

Category - B : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone

Category - C : Reinforced building, well built wooden structures

Category - X : Other materials not covered in A,B,C. These are generally light.

Notes : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.

2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building

3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

Category - R1 - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene,

GI Metal, Asbestos Sheets, Other Materials)

Category - R2 - Heavy Weight (Tiles, Stone/Slate)

Category - R3 - Flat Roof (Brick, Concrete)

EQ Zone V : Very High Damage Risk Zone (MSK > IX)

EQ Zone IV : High Damage Risk Zone (MSK VIII)

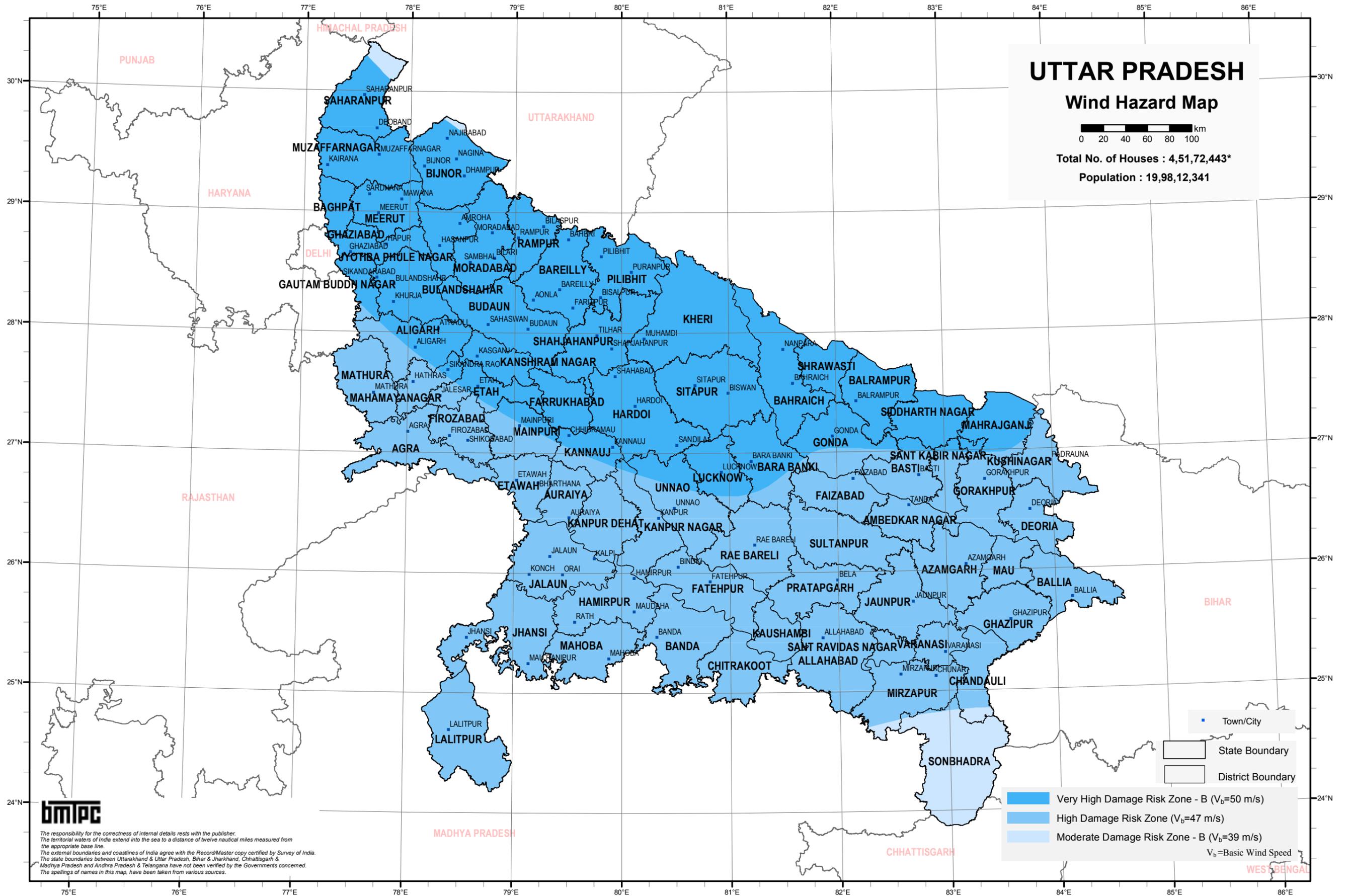
EQ Zone III : Moderate Damage Risk Zone (MSK VII)

EQ Zone II : Low Damage Risk Zone (MSK < VI)

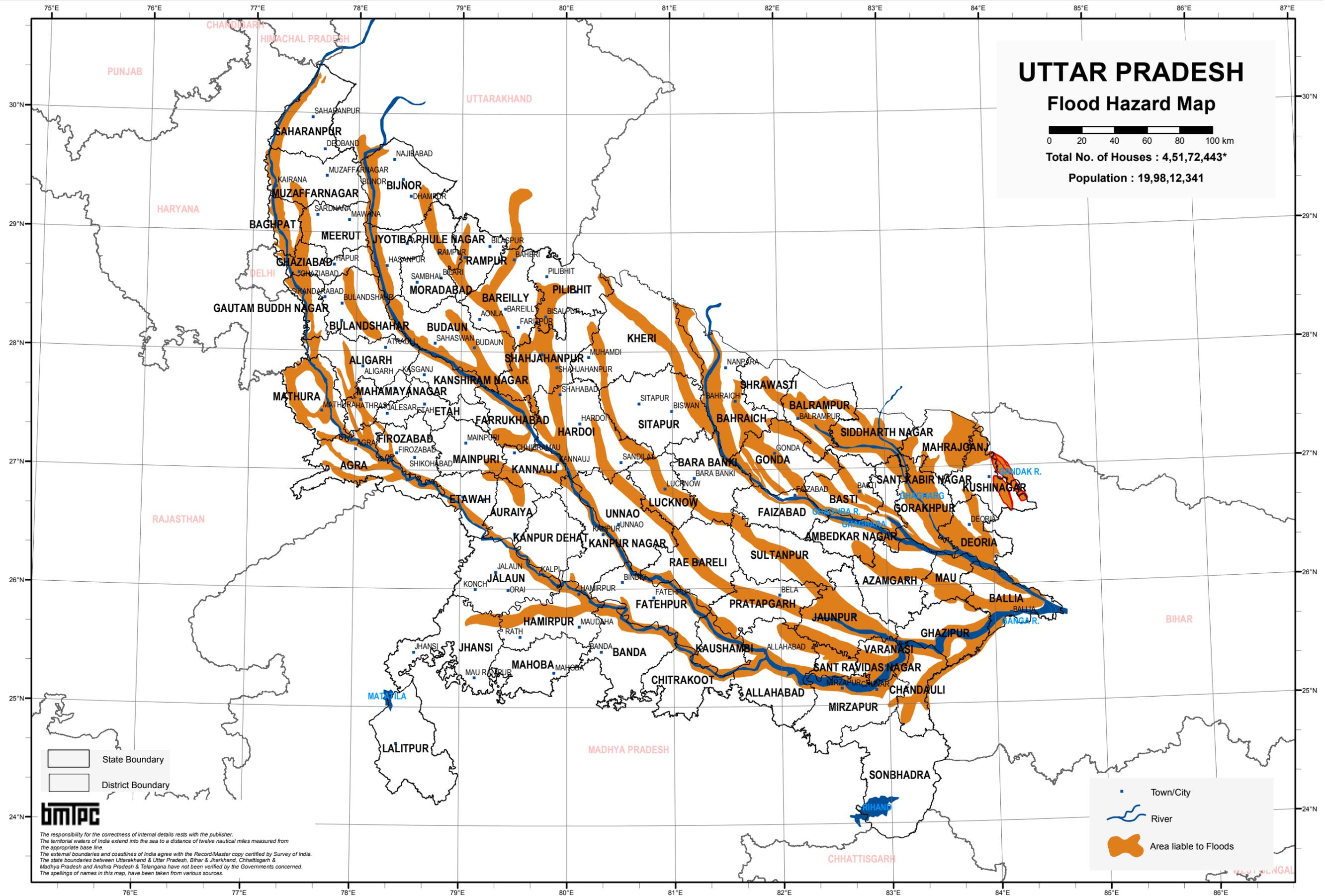
Level of Risk : VH = Very High; H = High;

M = Moderate; L = Low; VL = Very Low

* Total No. of Houses excluding Vacant/Locked Houses



The responsibility for the correctness of internal details rests with the publisher.
 The territorial waters of India extend into the sea to a distance of twelve nautical miles measured from the appropriate base line.
 The external boundaries and coastlines of India agree with the Record/Master copy certified by Survey of India.
 The state boundaries between Uttarakhand & Uttar Pradesh, Bihar & Jharkhand, Chhattisgarh & Madhya Pradesh and Andhra Pradesh & Telangana have not been verified by the Governments concerned.
 The spellings of names in this map, have been taken from various sources.



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 The spellings of names in this map, have been taken from various sources.

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

UTTARAKHAND

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %		
		No. of Houses	%	EQ Zone				Wind Velocity m/s						
				V	IV	III	II	55 & 50	47	44 & 39	33			
				Area in %				Area in %						
STATE - UTTARAKHAND				39.4	60.6					9.1		90.9		1.6
WALL														
A1 - Mud & Unburnt Brick Wall	Rural	106,593	3.5											
	Urban	23,208	0.8											
	Total	129,801	4.3	VH	H					VH		M		VH
A2 - Stone Wall not packed with mortar	Rural	401,676	13.3											
	Urban	14,518	0.5											
	Total	416,194	13.8	VH	H					H		L		VH
Total - Category - A		545,995	18.0											
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	1,605,627	53.0											
	Urban	701,235	23.1											
	Total	2,306,862	76.1	H	M					H		L		H/M
Total - Category - B		2,306,862	76.1											
C1 - Concrete Wall	Rural	28,041	0.9											
	Urban	22,547	0.7											
	Total	50,588	1.6	M	L					L		VL		L/VL
C2 - Wood wall	Rural	25,769	0.9											
	Urban	3,767	0.1											
	Total	29,536	1.0	M	L					VH		M		H
Total - Category - C		80,124	2.6											
X - Other Materials	Rural	76,813	2.5											
	Urban	20,123	0.7											
	Total	96,936	3.2	M	VL					VH		M		VH
Total - Category - X		96,936	3.2											
TOTAL HOUSES*		3,029,917												

ROOF														
R1 - Light Weight Sloping Roof	Rural	355,538	11.7											
	Urban	120,303	4.0											
	Total	475,841	15.7	M	M					VH		H		VH
R2 - Heavy Weight Sloping Roof	Rural	755,310	24.9											
	Urban	21,263	0.7											
	Total	776,573	25.6	H	M					H		L		H
R3 - Flat Roof	Rural	1,133,671	37.4											
	Urban	643,832	21.2											
	Total	1,777,503	58.6											
<i>Damage Risk as per that for the Wall supporting it</i>														
TOTAL HOUSES*		3,029,917												

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : UK 01

State : UTTARAKHAND

UTTARKASHI

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %		
		No. of Houses	%	EQ Zone				Wind Velocity m/s						
				V	IV	III	II	55 & 50	47	44 & 39	33			
				Area in %				Area in %						
STATE - UTTARAKHAND				14.4	85.6									
WALL														
A1 - Mud & Unburnt Brick Wall	Rural	2,656	2.5											
	Urban	154	0.1											
	Total	2,810	2.6	VH	H							M		
A2 - Stone Wall not packed with mortar	Rural	32,798	30.4											
	Urban	352	0.3											
	Total	33,150	30.7	VH	H							L		
Total - Category - A		35,960	33.4											
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	51,956	48.2											
	Urban	6,647	6.2											
	Total	58,603	54.4	H	M							L		
Total - Category - B		58,603	54.4											
C1 - Concrete Wall	Rural	1,259	1.2											
	Urban	48	-											
	Total	1,307	1.2	M	L							VL		
C2 - Wood wall	Rural	9,265	8.6											
	Urban	228	0.2											
	Total	9,493	8.8	M	L							M		
Total - Category - C		10,800	10.0											
X - Other Materials	Rural	1,948	1.8											
	Urban	449	0.4											
	Total	2,397	2.2	M	VL							M		
Total - Category - X		2,397	2.2											
TOTAL HOUSES*		107,760												

ROOF														
R1 - Light Weight Sloping Roof	Rural	20,599	19.1											
	Urban	1,366	1.3											
	Total	21,965	20.4	M	M							H		
R2 - Heavy Weight Sloping Roof	Rural	43,607	40.5											
	Urban	313	0.3											
	Total	43,920	40.8	H	M							L		
R3 - Flat Roof	Rural	35,676	33.1											
	Urban	6,199	5.8											
	Total	41,875	38.9											
<i>Damage Risk as per that for the Wall supporting it</i>														
TOTAL HOUSES*		107,760												

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 272 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : UK 02 State : UTTARAKHAND CHAMOLI

Table No. : UK 03 State : UTTARAKHAND RUDRAPRAYAG

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
		100								100		
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	2,977	1.8									
	Urban	397	0.2									
	Total	3,374	2.0	VH						M		
A2 - Stone Wall not packed with mortar	Rural	65,053	39.5									
	Urban	1,715	1.0									
	Total	66,768	40.5	VH						L		
Total - Category - A		70,142	42.5									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	72,621	44.0									
	Urban	17,292	10.5									
	Total	89,913	54.5	H						L		
Total - Category - B		89,913	54.5									
C1 - Concrete Wall	Rural	1,379	0.8									
	Urban	136	0.1									
	Total	1,515	0.9	M						VL		
C2 - Wood wall	Rural	931	0.6									
	Urban	80	-									
	Total	1,011	0.6	M						M		
Total - Category - C		2,526	1.5									
X - Other Materials	Rural	1,304	0.8									
	Urban	994	0.6									
	Total	2,298	1.4	M						M		
Total - Category - X		2,298	1.4									
TOTAL HOUSES*		164,879										

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
		84.9	15.1								100	
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	1,665	1.6									
	Urban	64	0.1									
	Total	1,729	1.7	VH	H					M		
A2 - Stone Wall not packed with mortar	Rural	46,362	44.2									
	Urban	198	0.2									
	Total	46,560	44.4	VH	H					L		
Total - Category - A		48,289	46.0									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	51,004	48.6									
	Urban	3,377	3.2									
	Total	54,381	51.8	H	M					L		
Total - Category - B		54,381	51.8									
C1 - Concrete Wall	Rural	1,011	1.0									
	Urban	15	-									
	Total	1,026	1.0	M	L					VL		
C2 - Wood wall	Rural	386	0.4									
	Urban	35	-									
	Total	421	0.4	M	L					M		
Total - Category - C		1,447	1.4									
X - Other Materials	Rural	724	0.7									
	Urban	107	0.1									
	Total	831	0.8	M	VL					M		
Total - Category - X		831	0.8									
TOTAL HOUSES*		104,948										

ROOF											
R1 - Light Weight Sloping Roof	Rural	16,485	10.0								
	Urban	3,444	2.1								
	Total	19,929	12.1	M						H	
R2 - Heavy Weight Sloping Roof	Rural	82,971	50.3								
	Urban	1,361	0.8								
	Total	84,332	51.1	H						L	
R3 - Flat Roof	Rural	44,809	27.2								
	Urban	15,809	9.6								
	Total	60,618	36.8								<i>Damage Risk as per that for the Wall supporting it</i>
TOTAL HOUSES*		164,879									

ROOF											
R1 - Light Weight Sloping Roof	Rural	8,759	8.3								
	Urban	594	0.6								
	Total	9,353	8.9	M	M					H	
R2 - Heavy Weight Sloping Roof	Rural	47,853	45.6								
	Urban	104	0.1								
	Total	47,957	45.7	H	M					L	
R3 - Flat Roof	Rural	44,540	42.4								
	Urban	3,098	3.0								
	Total	47,638	45.4								<i>Damage Risk as per that for the Wall supporting it</i>
TOTAL HOUSES*		104,948									

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. **434 mm**

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. **314 mm**

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
- 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
- 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)

- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
- 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
- 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)

- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : UK 04 State : UTTARAKHAND TEHRI GARHWAL

Wall / Roof		Census Houses		Level of Risk under										Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s				Area in %	Area in %		
				V	IV	III	II	55 & 50	47	44 & 39	33				
				Area in %				Area in %							
				3.3	96.7									100	
WALL															
A1 - Mud & Unburnt Brick Wall	Rural	6,852	3.2												
	Urban	392	0.2												
	Total	7,244	3.4	VH	H									M	
A2 - Stone Wall not packed with mortar	Rural	63,599	29.6												
	Urban	187	0.1												
	Total	63,786	29.7	VH	H									L	
Total - Category - A		71,030	33.0												
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	115,797	53.9												
	Urban	20,332	9.5												
	Total	136,129	63.4	H	M									L	
Total - Category - B		136,129	63.3												
C1 - Concrete Wall	Rural	2,696	1.3												
	Urban	822	0.4												
	Total	3,518	1.7	M	L									VL	
C2 - Wood wall	Rural	1,136	0.5												
	Urban	51	-												
	Total	1,187	0.5	M	L									M	
Total - Category - C		4,705	2.2												
X - Other Materials	Rural	2,021	0.9												
	Urban	1,122	0.5												
	Total	3,143	1.4	M	VL									M	
Total - Category - X		3,143	1.5												
TOTAL HOUSES*		215,007													
ROOF															
R1 - Light Weight Sloping Roof	Rural	21,748	10.1												
	Urban	2,947	1.4												
	Total	24,695	11.5	M	M									H	
R2 - Heavy Weight Sloping Roof	Rural	75,013	34.9												
	Urban	432	0.2												
	Total	75,445	35.1	H	M									L	
R3 - Flat Roof	Rural	95,340	44.3												
	Urban	19,527	9.1												
	Total	114,867	53.4	Damage Risk as per that for the Wall supporting it											
TOTAL HOUSES*		215,007													

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 340 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
 - Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
 - Category - C** : Reinforced building, well built wooden structures
 - Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes :**
1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
 - Category - R2** - Heavy Weight (Tiles, Stone/Slate)
 - Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : UK 05 State : UTTARAKHAND DEHRADUN

Wall / Roof		Census Houses		Level of Risk under										Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s				Area in %	Area in %		
				V	IV	III	II	55 & 50	47	44 & 39	33				
				Area in %				Area in %							
				100											
WALL															
A1 - Mud & Unburnt Brick Wall	Rural	21,177	4.7												
	Urban	7,197	1.6												
	Total	28,374	6.3	H										M	
A2 - Stone Wall not packed with mortar	Rural	12,384	2.8												
	Urban	3,089	0.7												
	Total	15,473	3.5	H										L	
Total - Category - A		43,847	9.8												
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	159,718	35.7												
	Urban	217,821	48.6												
	Total	377,539	84.3	M										L	
Total - Category - B		377,539	84.3												
C1 - Concrete Wall	Rural	3,532	0.8												
	Urban	8,689	1.9												
	Total	12,221	2.7	L										VL	
C2 - Wood wall	Rural	4,860	1.1												
	Urban	1,014	0.2												
	Total	5,874	1.3	L										M	
Total - Category - C		18,095	4.0												
X - Other Materials	Rural	5,021	1.1												
	Urban	3,395	0.8												
	Total	8,416	1.9	VL										M	
Total - Category - X		8,416	1.9												
TOTAL HOUSES*		447,897													
ROOF															
R1 - Light Weight Sloping Roof	Rural	44,929	10.0												
	Urban	35,318	7.9												
	Total	80,247	17.9	M										H	
R2 - Heavy Weight Sloping Roof	Rural	26,662	6.0												
	Urban	5,121	1.1												
	Total	31,783	7.1	M										L	
R3 - Flat Roof	Rural	135,101	30.2												
	Urban	200,766	44.8												
	Total	335,867	75.0	Damage Risk as per that for the Wall supporting it											
TOTAL HOUSES*		447,897													

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 505 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
 - Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
 - Category - C** : Reinforced building, well built wooden structures
 - Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes :**
1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
 - Category - R2** - Heavy Weight (Tiles, Stone/Slate)
 - Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : UK 06

State : UTTARAKHAND

GARHWAL

Table No. : UK 07

State : UTTARAKHAND

PITHORAGARH

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
		6.0	94.0					1.3			98.7	
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	5,717	2.1									
	Urban	908	0.3									
	Total	6,625	2.4	VH	H			VH		M		
A2 - Stone Wall not packed with mortar	Rural	79,335	28.7									
	Urban	1,502	0.5									
	Total	80,837	29.2	VH	H			H		L		
Total - Category - A		87,462	31.7									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	152,459	55.2									
	Urban	28,914	10.5									
	Total	181,373	65.7	H	M			H		L		
Total - Category - B		181,373	65.6									
C1 - Concrete Wall	Rural	1,511	0.5									
	Urban	1,001	0.4									
	Total	2,512	0.9	M	L			L		VL		
C2 - Wood wall	Rural	882	0.3									
	Urban	271	0.1									
	Total	1,153	0.4	M	L			VH		M		
Total - Category - C		3,665	1.3									
X - Other Materials	Rural	2,972	1.1									
	Urban	820	0.3									
	Total	3,792	1.4	M	VL			VH		M		
Total - Category - X		3,792	1.4									
TOTAL HOUSES*		276,292										

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
		95.4	4.6								100	
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	783	0.4									
	Urban	212	0.1									
	Total	995	0.5	VH	H					M		
A2 - Stone Wall not packed with mortar	Rural	24,430	13.4									
	Urban	494	0.3									
	Total	24,924	13.7	VH	H					L		
Total - Category - A		25,919	14.2									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	130,072	71.1									
	Urban	21,365	11.7									
	Total	151,437	82.8	H	M					L		
Total - Category - B		151,437	82.8									
C1 - Concrete Wall	Rural	2,595	1.4									
	Urban	361	0.2									
	Total	2,956	1.6	M	L					VL		
C2 - Wood wall	Rural	792	0.4									
	Urban	228	0.1									
	Total	1,020	0.5	M	L					M		
Total - Category - C		3,976	2.2									
X - Other Materials	Rural	1,040	0.6									
	Urban	471	0.3									
	Total	1,511	0.9	M	VL					M		
Total - Category - X		1,511	0.8									
TOTAL HOUSES*		182,843										

ROOF												
R1 - Light Weight Sloping Roof	Rural	14,655	5.3									
	Urban	4,827	1.7									
	Total	19,482	7.0	M	M			VH		H		
R2 - Heavy Weight Sloping Roof	Rural	134,263	48.6									
	Urban	927	0.3									
	Total	135,190	48.9	H	M			H		L		
R3 - Flat Roof	Rural	93,958	34.0									
	Urban	27,662	10.0									
	Total	121,620	44.0	Damage Risk as per that for the Wall supporting it								
TOTAL HOUSES*		276,292										

ROOF												
R1 - Light Weight Sloping Roof	Rural	15,169	8.3									
	Urban	2,961	1.6									
	Total	18,130	9.9	M	M					H		
R2 - Heavy Weight Sloping Roof	Rural	73,494	40.2									
	Urban	1,157	0.6									
	Total	74,651	40.8	H	M					L		
R3 - Flat Roof	Rural	71,049	38.9									
	Urban	19,013	10.4									
	Total	90,062	49.3	Damage Risk as per that for the Wall supporting it								
TOTAL HOUSES*		182,843										

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 409 mm

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 410 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
- 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
- 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)

- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
- 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
- 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)

- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : UK 08 State : UTTARAKHAND BAGESHWAR

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
				Area in %				Area in %					
				100								100	
WALL													
A1 - Mud & Unburnt Brick Wall	Rural	926	1.1										
	Urban	101	0.1										
	Total	1,027	1.2	VH							M		
A2 - Stone Wall not packed with mortar	Rural	10,657	12.1										
	Urban	83	0.1										
	Total	10,740	12.2	VH							L		
Total - Category - A		11,767	13.4										
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	70,860	80.4										
	Urban	2,986	3.4										
	Total	73,846	83.8	H							L		
Total - Category - B		73,846	83.8										
C1 - Concrete Wall	Rural	1,169	1.3										
	Urban	192	0.2										
	Total	1,361	1.5	M							VL		
C2 - Wood wall	Rural	549	0.6										
	Urban	8	-										
	Total	557	0.6	M							M		
Total - Category - C		1,918	2.2										
X - Other Materials	Rural	534	0.6										
	Urban	26	-										
	Total	560	0.6	M							M		
Total - Category - X		560	0.6										
TOTAL HOUSES*		88,091											
ROOF													
R1 - Light Weight Sloping Roof	Rural	10,114	11.5										
	Urban	342	0.4										
	Total	10,456	11.9	M							H		
R2 - Heavy Weight Sloping Roof	Rural	37,217	42.2										
	Urban	172	0.2										
	Total	37,389	42.4	H							L		
R3 - Flat Roof	Rural	37,364	42.4										
	Urban	2,882	3.3										
	Total	40,246	45.7										
TOTAL HOUSES*		88,091											

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 410 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
 - Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
 - Category - C** : Reinforced building, well built wooden structures
 - Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
 - Category - R2** - Heavy Weight (Tiles, Stone/Slate)
 - Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : UK 09 State : UTTARAKHAND ALMORA

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
				Area in %				Area in %					
				25.6	74.4								
WALL													
A1 - Mud & Unburnt Brick Wall	Rural	2,193	0.9										
	Urban	294	0.1										
	Total	2,487	1.0	VH							H		M
A2 - Stone Wall not packed with mortar	Rural	27,008	11.2										
	Urban	1,557	0.6										
	Total	28,565	11.8	VH							H		L
Total - Category - A		31,052	12.9										
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	187,918	78.0										
	Urban	15,853	6.6										
	Total	203,771	84.6	H							M		L
Total - Category - B		203,771	84.5										
C1 - Concrete Wall	Rural	2,651	1.1										
	Urban	265	0.1										
	Total	2,916	1.2	M							L		VL
C2 - Wood wall	Rural	1,363	0.6										
	Urban	279	0.1										
	Total	1,642	0.7	M							L		M
Total - Category - C		4,558	1.9										
X - Other Materials	Rural	1,100	0.5										
	Urban	582	0.2										
	Total	1,682	0.7	M							VL		M
Total - Category - X		1,682	0.7										
TOTAL HOUSES*		241,063											
ROOF													
R1 - Light Weight Sloping Roof	Rural	15,263	6.3										
	Urban	4,593	1.9										
	Total	19,856	8.2	M							M		H
R2 - Heavy Weight Sloping Roof	Rural	144,540	60.0										
	Urban	1,549	0.6										
	Total	146,089	60.6	H							M		L
R3 - Flat Roof	Rural	62,430	25.9										
	Urban	12,688	5.3										
	Total	75,118	31.2										
TOTAL HOUSES*		241,063											

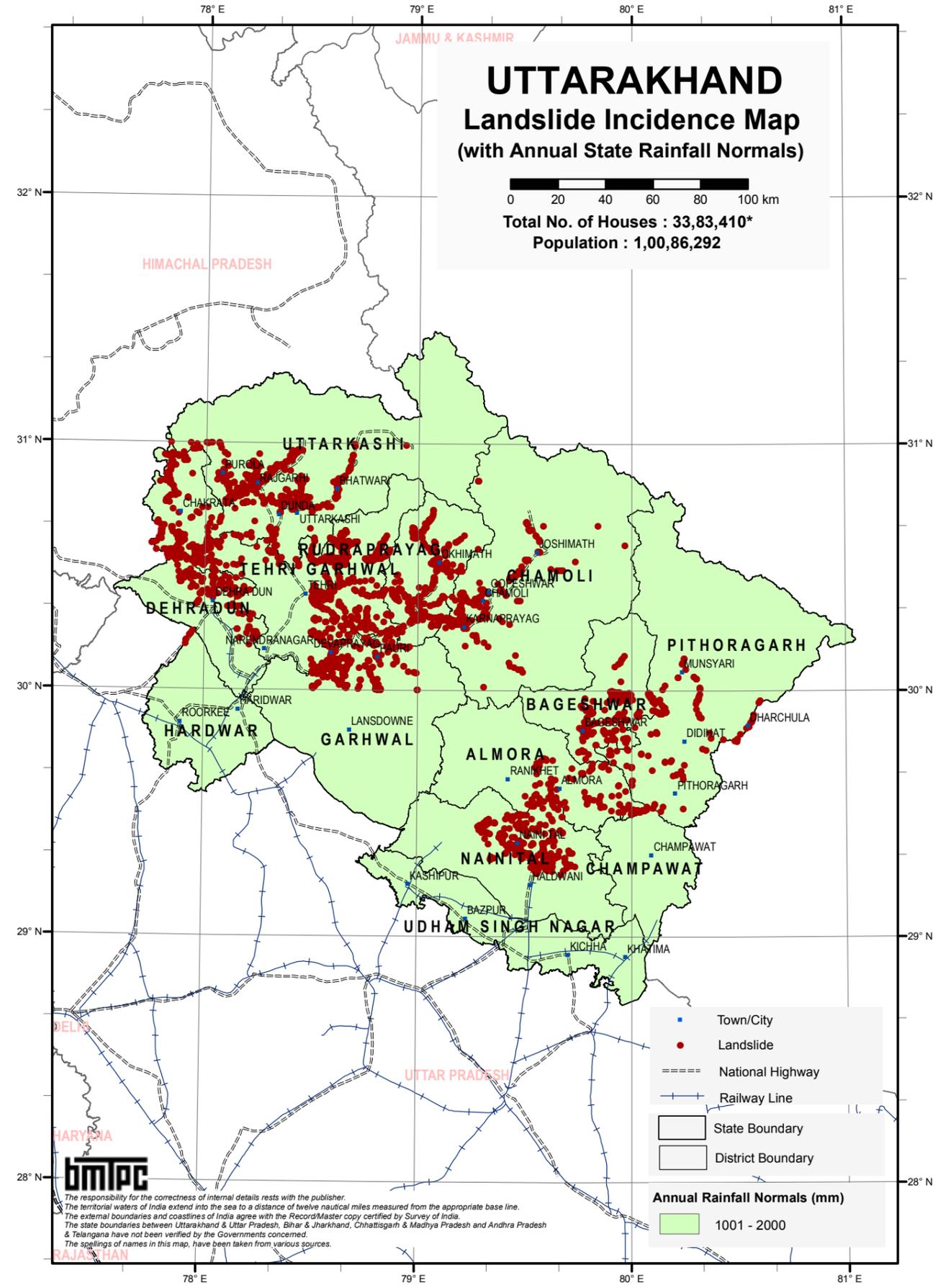
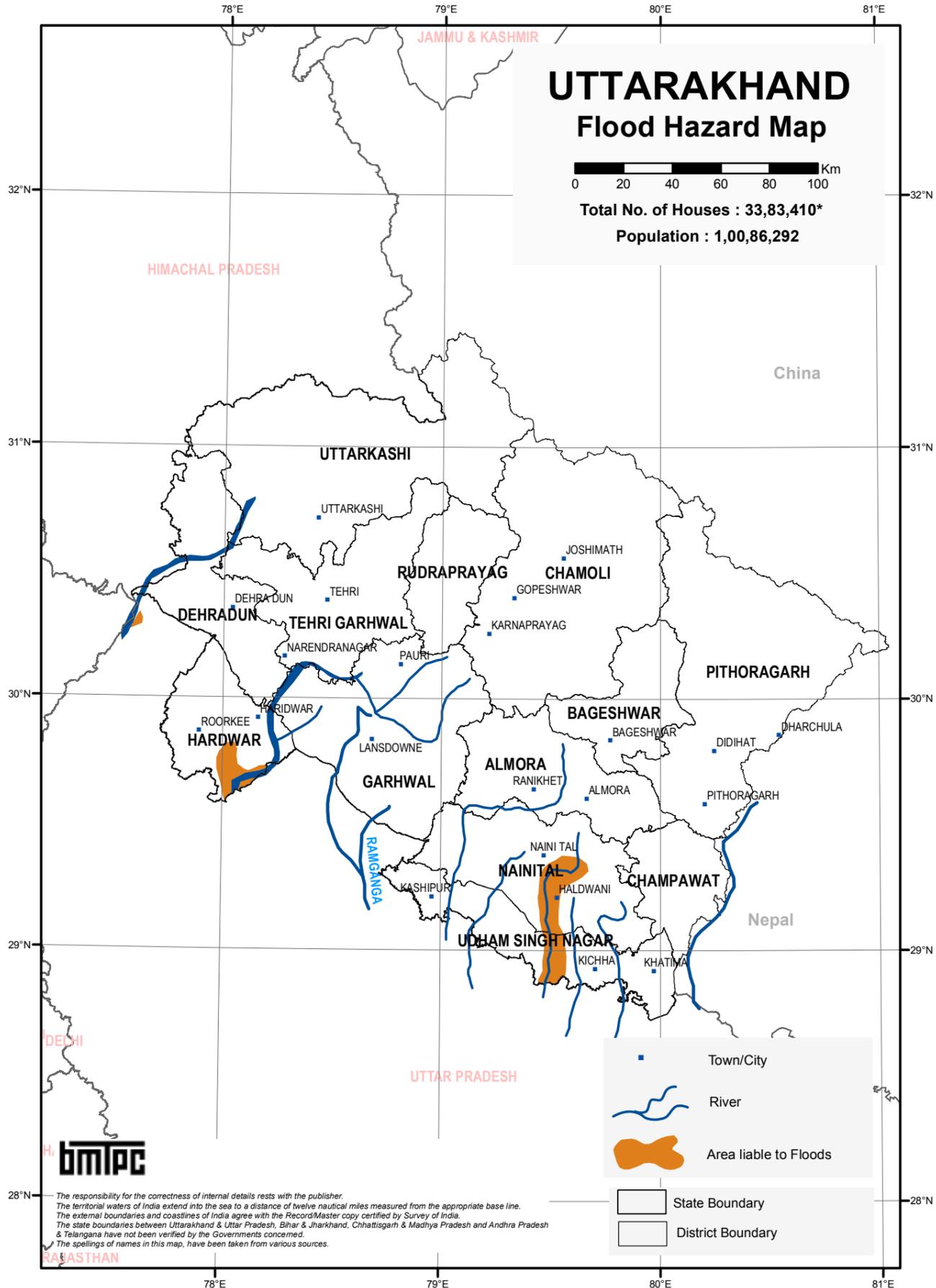
Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 410 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
 - Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
 - Category - C** : Reinforced building, well built wooden structures
 - Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
 - Category - R2** - Heavy Weight (Tiles, Stone/Slate)
 - Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses



BMTPC : Vulnerability Atlas - 3rd Edition; Peer Group, MoHUA; Map is Based on digitised data of SOI, GOI; Census of India 2011; Flood Atlas, Task Force Report, C.W.C., G.O.I. Houses/Population as per Census 2011; * Houses including vacant & locked houses. Disclaimer: The maps are solely for thematic representation

BMTPC: Vulnerability Atlas - 3rd Edition: Peer Group, MoHUA,GOI; Map is Based on digitised data of SOI; Landslide Incidence data GSI; Annual Rainfall data IMD. Houses/Population as per Census 2011; * Houses including vacant & locked houses. Disclaimer: The maps are solely for thematic presentation.

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

WEST BENGAL

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
STATE - WEST BENGAL		3.2	31.0	56.1	9.7	35.1	63.0	1.9			45.5	
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	5,880,154	24.3									
	Urban	572,219	2.4									
	Total	6,452,373	26.7	VH	H	M	L	VH	H	M	VH	
A2 - Stone Wall not packed with mortar	Rural	64,022	0.3									
	Urban	70,276	0.3									
	Total	134,298	0.6	VH	H	M	L	H	M	L	VH	
Total - Category - A		6,586,671	27.2									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	5,502,576	22.7									
	Urban	5,758,558	23.8									
	Total	11,261,134	46.5	H	M	L	VL	H	M	L	H/M	
Total - Category - B		11,261,134	46.5									
C1 - Concrete Wall	Rural	383,637	1.6									
	Urban	589,974	2.4									
	Total	973,611	4.0	M	L	VL	VL	L	VL	VL	L/VL	
C2 - Wood wall	Rural	139,682	0.6									
	Urban	62,480	0.3									
	Total	202,162	0.9	M	L	VL	VL	VH	H	M	H	
Total - Category - C		1,175,773	4.9									
X - Other Materials	Rural	4,444,978	18.3									
	Urban	769,573	3.2									
	Total	5,214,551	21.5	M	VL	VL	VL	VH	H	M	VH	
Total - Category - X		5,214,551	21.5									
TOTAL HOUSES*		24,238,129										
ROOF												
R1 - Light Weight Sloping Roof	Rural	8,968,984	37.0									
	Urban	1,631,114	6.7									
	Total	10,600,098	43.7	M	M	L	VL	VH	VH	H	VH	
R2 - Heavy Weight Sloping Roof	Rural	4,766,668	19.7									
	Urban	2,247,709	9.3									
	Total	7,014,377	29.0	H	M	L	VL	H	M	L	H	
R3 - Flat Roof	Rural	2,679,397	11.1									
	Urban	3,944,257	16.3									
	Total	6,623,654	27.4	<i>Damage Risk as per that for the Wall supporting it</i>								
TOTAL HOUSES*		24,238,129										

Housing Category : Wall Types

Category - A : Buildings in field-stone, rural structures, unburnt brick houses, clay houses

Category - B : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone

Category - C : Reinforced building, well built wooden structures

Category - X : Other materials not covered in A,B,C. These are generally light.

Notes : 1. Flood prone area includes that protected area which may have more severe

damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.

2. *Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building*

3. *Source of Housing Data : Census of Housing, GOI, 2011*

Housing Category : Roof Type

Category - R1 - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)

Category - R2 - Heavy Weight (Tiles, Stone/Slate)

Category - R3 - Flat Roof (Brick, Concrete)

EQ Zone V : Very High Damage Risk Zone (MSK > IX)

EQ Zone IV : High Damage Risk Zone (MSK VIII)

EQ Zone III : Moderate Damage Risk Zone (MSK VII)

EQ Zone II : Low Damage Risk Zone (MSK < VI)

Level of Risk : VH = Very High; H = High;

M = Moderate; L = Low; VL = Very Low

* Total No. of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : WB 01

State : WEST BENGAL

DARJILING

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
		100								100		2.1
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	20,397	4.2									
	Urban	4,364	0.9									
	Total	24,761	5.1	H				H			VH	
A2 - Stone Wall not packed with mortar	Rural	5,436	1.1									
	Urban	2,544	0.5									
	Total	7,980	1.6	H				M			VH	
Total - Category - A		32,741	6.7									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	75,486	15.5									
	Urban	104,123	21.4									
	Total	179,609	36.9	M				M			H/M	
Total - Category - B		179,609	37.0									
C1 - Concrete Wall	Rural	13,835	2.8									
	Urban	35,118	7.2									
	Total	48,953	10.0	L				VL			L/VL	
C2 - Wood wall	Rural	65,282	13.4									
	Urban	21,208	4.4									
	Total	86,490	17.8	L				H			H	
Total - Category - C		135,443	27.9									
X - Other Materials	Rural	108,446	22.3									
	Urban	29,694	6.1									
	Total	138,140	28.4	VL				H			VH	
Total - Category - X		138,140	28.4									
TOTAL HOUSES*		485,933										
ROOF												
R1 - Light Weight Sloping Roof	Rural	263,499	54.2									
	Urban	110,072	22.7									
	Total	373,571	76.9	M				VH			VH	
R2 - Heavy Weight Sloping Roof	Rural	5,952	1.2									
	Urban	6,494	1.3									
	Total	12,446	2.5	M				M			H	
R3 - Flat Roof	Rural	19,431	4.0									
	Urban	80,485	16.6									
	Total	99,916	20.6	<i>Damage Risk as per that for the Wall supporting it</i>								
TOTAL HOUSES*		485,933										

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 720 mm

Housing Category : Wall Types

Category - A : Buildings in field-stone, rural structures, unburnt brick houses, clay houses

Category - B : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone

Category - C : Reinforced building, well built wooden structures

Category - X : Other materials not covered in A,B,C. These are generally light.

Notes : 1. Flood prone area includes that protected area which may have more severe

damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.

2. *Damage Risk for wall types is indicated assuming heavy flat roof*

in categories A, B and C (Reinforced Concrete) building

3. *Source of Housing Data : Census of Housing, GOI, 2011*

Housing Category : Roof Type

Category - R1 - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)

Category - R2 - Heavy Weight (Tiles, Stone/Slate)

Category - R3 - Flat Roof (Brick, Concrete)

EQ Zone V : Very High Damage Risk Zone (MSK > IX)

EQ Zone IV : High Damage Risk Zone (MSK VIII)

EQ Zone III : Moderate Damage Risk Zone (MSK VII)

EQ Zone II : Low Damage Risk Zone (MSK < VI)

Level of Risk : VH = Very High; H = High;

M = Moderate; L = Low; VL = Very Low

* Total No. of Houses excluding Vacant/Locked Houses

**Distribution of Houses by Predominant Materials of Roof and Wall
and Level of Damage Risk**

Table No. : WB 02 State : WEST BENGAL JALPAIGURI

Wall / Roof		Census Houses		Level of Risk under										
		No. of Houses	%	EQ Zone				Wind Velocity m/s				Flood Prone Area in %		
				V	IV	III	II	55 & 50	47	44 & 39	33			
				Area in %				Area in %						
		23.7	76.3							100			27.6	
WALL														
A1 - Mud & Unburnt Brick Wall	Rural	9,648	0.9											
	Urban	2,211	0.2											
	Total	11,859	1.1	VH	H					H				VH
A2 - Stone Wall not packed with mortar	Rural	6,341	0.6											
	Urban	3,345	0.3											
	Total	9,686	0.9	VH	H					M				VH
Total - Category - A		21,545	2.0											
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	148,213	13.7											
	Urban	157,371	14.5											
	Total	305,584	28.2	H	M					M				H/M
Total - Category - B		305,584	28.2											
C1 - Concrete Wall	Rural	22,727	2.1											
	Urban	19,915	1.8											
	Total	42,642	3.9	M	L					VL				L/VL
C2 - Wood wall	Rural	36,830	3.4											
	Urban	12,825	1.2											
	Total	49,655	4.6	M	L					H				H
Total - Category - C		92,297	8.5											
X - Other Materials	Rural	557,770	51.5											
	Urban	105,332	9.7											
	Total	663,102	61.2	M	VL					H				VH
Total - Category - X		663,102	61.3											
TOTAL HOUSES*		1,082,528												

ROOF														
R1 - Light Weight Sloping Roof	Rural	750,130	69.3											
	Urban	230,433	21.3											
	Total	980,563	90.6	M	M					VH				VH
R2 - Heavy Weight Sloping Roof	Rural	16,505	1.5											
	Urban	7,830	0.7											
	Total	24,335	2.2	H	M					M				H
R3 - Flat Roof	Rural	14,894	1.4											
	Urban	62,736	5.8											
	Total	77,630	7.2											
TOTAL HOUSES*		1,082,528												

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. **720 mm**

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
EQ Zone IV : High Damage Risk Zone (MSK VIII)
EQ Zone III : Moderate Damage Risk Zone (MSK VII)
EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

**Distribution of Houses by Predominant Materials of Roof and Wall
and Level of Damage Risk**

Table No. : WB 03 State : WEST BENGAL KOCH BIHAR

Wall / Roof		Census Houses		Level of Risk under										
		No. of Houses	%	EQ Zone				Wind Velocity m/s				Flood Prone Area in %		
				V	IV	III	II	55 & 50	47	44 & 39	33			
				Area in %				Area in %						
		37.8	62.2							100			52.3	
WALL														
A1 - Mud & Unburnt Brick Wall	Rural	2,505	0.3											
	Urban	450	0.1											
	Total	2,955	0.4	VH	H					H				VH
A2 - Stone Wall not packed with mortar	Rural	2,293	0.3											
	Urban	1,137	0.1											
	Total	3,430	0.4	VH	H					M				VH
Total - Category - A		6,385	0.7											
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	60,143	6.8											
	Urban	51,318	5.8											
	Total	111,461	12.6	H	M					M				H/M
Total - Category - B		111,461	12.7											
C1 - Concrete Wall	Rural	8,682	1.0											
	Urban	2,785	0.3											
	Total	11,467	1.3	M	L					VL				L/VL
C2 - Wood wall	Rural	5,987	0.7											
	Urban	2,476	0.3											
	Total	8,463	1.0	M	L					H				H
Total - Category - C		19,930	2.3											
X - Other Materials	Rural	706,481	80.4											
	Urban	34,033	3.9											
	Total	740,514	84.3	M	VL					H				VH
Total - Category - X		740,514	84.3											
TOTAL HOUSES*		878,290												

ROOF														
R1 - Light Weight Sloping Roof	Rural	769,566	87.6											
	Urban	69,859	8.0											
	Total	839,425	95.6	M	M					VH				VH
R2 - Heavy Weight Sloping Roof	Rural	9,331	1.1											
	Urban	2,197	0.3											
	Total	11,528	1.4	H	M					M				H
R3 - Flat Roof	Rural	7,194	0.8											
	Urban	20,143	2.3											
	Total	27,337	3.1											
TOTAL HOUSES*		878,290												

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. **640 mm**

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
EQ Zone IV : High Damage Risk Zone (MSK VIII)
EQ Zone III : Moderate Damage Risk Zone (MSK VII)
EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : WB 06

State : WEST BENGAL

MALDAH

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %		
		No. of Houses	%	EQ Zone				Wind Velocity m/s						
				V	IV	III	II	55 & 50	47	44 & 39	33			
				Area in %				Area in %						
				92.4	7.6					100			69.1	
WALL														
A1 - Mud & Unburnt Brick Wall	Rural	296,373	31.6											
	Urban	12,524	1.3											
	Total	308,897	32.9		H	M				H				VH
A2 - Stone Wall not packed with mortar	Rural	1,862	0.2											
	Urban	620	0.1											
	Total	2,482	0.3		H	M				M				VH
Total - Category - A		311,379	33.2											
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	301,564	32.2											
	Urban	91,096	9.7											
	Total	392,660	41.9		M	L				M				H/M
Total - Category - B		392,660	41.9											
C1 - Concrete Wall	Rural	8,751	0.9											
	Urban	4,932	0.5											
	Total	13,683	1.4		L	VL				VL				L/VL
C2 - Wood wall	Rural	3,931	0.4											
	Urban	557	0.1											
	Total	4,488	0.5		L	VL				H				H
Total - Category - C		18,171	1.9											
X - Other Materials	Rural	201,087	21.5											
	Urban	13,802	1.5											
	Total	214,889	23.0		VL	VL				H				VH
Total - Category - X		214,889	22.9											
TOTAL HOUSES*		937,099												

ROOF														
R1 - Light Weight Sloping Roof	Rural	235,864	25.2											
	Urban	17,632	1.9											
	Total	253,496	27.1		M	L				VH				VH
R2 - Heavy Weight Sloping Roof	Rural	479,323	51.1											
	Urban	54,164	5.8											
	Total	533,487	56.9		M	L				M				H
R3 - Flat Roof	Rural	98,381	10.5											
	Urban	51,735	5.5											
	Total	150,116	16.0											
TOTAL HOUSES*		937,099												

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 694 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes :**
1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)

- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 - EQ Zone IV : High Damage Risk Zone (MSK VIII)
 - EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 - EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
M = Moderate; L = Low; VL = Very Low

* Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : WB 07

State : WEST BENGAL

MURSHIDABAD

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %		
		No. of Houses	%	EQ Zone				Wind Velocity m/s						
				V	IV	III	II	55 & 50	47	44 & 39	33			
				Area in %				Area in %						
WALL														
A1 - Mud & Unburnt Brick Wall	Rural	439,936	24.4											
	Urban	30,669	1.7											
	Total	470,605	26.1							M				VH
A2 - Stone Wall not packed with mortar	Rural	4,505	0.2											
	Urban	1,233	0.1											
	Total	5,738	0.3							M		M		VH
Total - Category - A		476,343	26.4											
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	662,453	36.7											
	Urban	262,252	14.5											
	Total	924,705	51.2							L		M		H/M
Total - Category - B		924,705	51.3											
C1 - Concrete Wall	Rural	26,166	1.5											
	Urban	13,898	0.8											
	Total	40,064	2.3							VL		VL		L/VL
C2 - Wood wall	Rural	2,470	0.1											
	Urban	1,167	0.1											
	Total	3,637	0.2							VL		H		H
Total - Category - C		43,701	2.4											
X - Other Materials	Rural	332,156	18.4											
	Urban	26,175	1.5											
	Total	358,331	19.9							VL		H		VH
Total - Category - X		358,331	19.9											
TOTAL HOUSES*		1,803,080												

ROOF														
R1 - Light Weight Sloping Roof	Rural	525,453	29.1											
	Urban	37,076	2.1											
	Total	562,529	31.2							L		VH		VH
R2 - Heavy Weight Sloping Roof	Rural	599,675	33.3											
	Urban	141,968	7.9											
	Total	741,643	41.2							L		M		H
R3 - Flat Roof	Rural	342,558	19.0											
	Urban	156,350	8.7											
	Total	498,908	27.7											
TOTAL HOUSES*		1,803,080												

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 690 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Notes :**
1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)

- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 - EQ Zone IV : High Damage Risk Zone (MSK VIII)
 - EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 - EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
M = Moderate; L = Low; VL = Very Low

* Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : WB 12

State : WEST BENGAL

HUGLI

Table No. : WB 13

State : WEST BENGAL

BANKURA

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %		
		No. of Houses	%	EQ Zone				Wind Velocity m/s						
				V	IV	III	II	55 & 50	47	44 & 39	33			
				Area in %				Area in %						
						100				95.4	4.6			94.1
WALL														
A1 - Mud & Unburnt Brick Wall	Rural	356,100	23.0											
	Urban	31,463	2.0											
	Total	387,563	25.0			M		VH	H					VH
A2 - Stone Wall not packed with mortar	Rural	4,552	0.3											
	Urban	5,265	0.3											
	Total	9,817	0.6			M		H	M					VH
Total - Category - A		397,380	25.7											
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	467,094	30.2											
	Urban	493,008	31.8											
	Total	960,102	62.0			L		H	M					H/M
Total - Category - B		960,102	62.0											
C1 - Concrete Wall	Rural	36,253	2.3											
	Urban	33,284	2.2											
	Total	69,537	4.5			VL		L	VL					L/VL
C2 - Wood wall	Rural	1,528	0.1											
	Urban	2,038	0.1											
	Total	3,566	0.2			VL		VH	H					H
Total - Category - C		73,103	4.7											
X - Other Materials	Rural	84,010	5.4											
	Urban	33,458	2.2											
	Total	117,468	7.6			VL		VH	H					VH
Total - Category - X		117,468	7.6											
TOTAL HOUSES*		1,548,053												

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %		
		No. of Houses	%	EQ Zone				Wind Velocity m/s						
				V	IV	III	II	55 & 50	47	44 & 39	33			
				Area in %				Area in %						
						80.1	19.9			1.7	98.3			7.3
WALL														
A1 - Mud & Unburnt Brick Wall	Rural	532,864	56.5											
	Urban	18,574	2.0											
	Total	551,438	58.5			M	L	VH	H					VH
A2 - Stone Wall not packed with mortar	Rural	2,888	0.3											
	Urban	563	0.1											
	Total	3,451	0.4			M	L	H	M					VH
Total - Category - A		554,889	58.8											
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	247,143	26.2											
	Urban	57,831	6.1											
	Total	304,974	32.3			L	VL	H	M					H/M
Total - Category - B		304,974	32.3											
C1 - Concrete Wall	Rural	16,237	1.7											
	Urban	4,520	0.5											
	Total	20,757	2.2			VL	VL	L	VL					L/VL
C2 - Wood wall	Rural	1,053	0.1											
	Urban	543	0.1											
	Total	1,596	0.2			VL	VL	VH	H					H
Total - Category - C		22,353	2.4											
X - Other Materials	Rural	58,283	6.2											
	Urban	2,618	0.3											
	Total	60,901	6.5			VL	VL	VH	H					VH
Total - Category - X		60,901	6.5											
TOTAL HOUSES*		943,117												

ROOF											
R1 - Light Weight Sloping Roof	Rural	339,837	22.0								
	Urban	56,037	3.6								
	Total	395,874	25.6			L		VH	VH		VH
R2 - Heavy Weight Sloping Roof	Rural	304,610	19.7								
	Urban	211,585	13.7								
	Total	516,195	33.4			L		H	M		H
R3 - Flat Roof	Rural	305,090	19.7								
	Urban	330,894	21.4								
	Total	635,984	41.1								
TOTAL HOUSES*		1,548,053									

ROOF											
R1 - Light Weight Sloping Roof	Rural	568,468	60.3								
	Urban	21,926	2.3								
	Total	590,394	62.6			L	VL	VH	VH		VH
R2 - Heavy Weight Sloping Roof	Rural	120,832	12.8								
	Urban	12,343	1.3								
	Total	133,175	14.1			L	VL	H	M		H
R3 - Flat Roof	Rural	169,168	17.9								
	Urban	50,380	5.3								
	Total	219,548	23.2								
TOTAL HOUSES*		943,117									

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. **524 mm**

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. **664 mm**

Housing Category : Wall Types

- Category - A :** Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B :** Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C :** Reinforced building, well built wooden structures
- Category - X :** Other materials not covered in A,B,C. These are generally light.

- Notes :** 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
- 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
- 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1 - Light Weight** (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2 - Heavy Weight** (Tiles, Stone/Slate)
- Category - R3 - Flat Roof** (Brick, Concrete)

- EQ Zone V :** Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV :** High Damage Risk Zone (MSK VIII)
- EQ Zone III :** Moderate Damage Risk Zone (MSK VII)
- EQ Zone II :** Low Damage Risk Zone (MSK < VI)
- Level of Risk :** VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

Housing Category : Wall Types

- Category - A :** Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B :** Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C :** Reinforced building, well built wooden structures
- Category - X :** Other materials not covered in A,B,C. These are generally light.

- Notes :** 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
- 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
- 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1 - Light Weight** (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2 - Heavy Weight** (Tiles, Stone/Slate)
- Category - R3 - Flat Roof** (Brick, Concrete)

- EQ Zone V :** Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV :** High Damage Risk Zone (MSK VIII)
- EQ Zone III :** Moderate Damage Risk Zone (MSK VII)
- EQ Zone II :** Low Damage Risk Zone (MSK < VI)
- Level of Risk :** VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : WB 16 State : WEST BENGAL KOLKATA

Table No. : WB 17 State : WEST BENGAL SOUTH TWENTY FOUR PARGANAS

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %				
		No. of Houses	%	EQ Zone				Wind Velocity m/s								
				V	IV	III	II	55 & 50	47	44 & 39	33					
				Area in %				Area in %								
						100				100					72.3	
WALL																
A1 - Mud & Unburnt Brick Wall	Rural		-													
	Urban	21,070	1.7													
	Total	21,070	1.7			M					VH					
A2 - Stone Wall not packed with mortar	Rural		-													
	Urban	15,488	1.3													
	Total	15,488	1.3			M				H						VH
Total - Category - A		36,558	3.0													
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural		-													
	Urban	1,008,844	82.9													
	Total	1,008,844	82.9			L				H						H/M
Total - Category - B		1,008,844	82.9													
C1 - Concrete Wall	Rural		-													
	Urban	123,241	10.1													
	Total	123,241	10.1			VL				L						L/VL
C2 - Wood wall	Rural		-													
	Urban	3,847	0.3													
	Total	3,847	0.3			VL				VH						H
Total - Category - C		127,088	10.4													
X - Other Materials	Rural		-													
	Urban	44,488	3.7													
	Total	44,488	3.7			VL				VH						VH
Total - Category - X		44,488	3.7													
TOTAL HOUSES*		1,216,978														

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %				
		No. of Houses	%	EQ Zone				Wind Velocity m/s								
				V	IV	III	II	55 & 50	47	44 & 39	33					
				Area in %				Area in %								
						85.2	14.8			100						26.7
WALL																
A1 - Mud & Unburnt Brick Wall	Rural	603,957	28.9													
	Urban	62,111	3.0													
	Total	666,068	31.9			H		M			VH					VH
A2 - Stone Wall not packed with mortar	Rural	4,240	0.2													
	Urban	3,944	0.2													
	Total	8,184	0.4			H		M			H					VH
Total - Category - A		674,252	32.3													
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	596,148	28.6													
	Urban	405,807	19.4													
	Total	1,001,955	48.0			M		L			H					H/M
Total - Category - B		1,001,955	48.0													
C1 - Concrete Wall	Rural	38,703	1.9													
	Urban	45,866	2.2													
	Total	84,569	4.1			L		VL			L					L/VL
C2 - Wood wall	Rural	3,888	0.2													
	Urban	2,184	0.1													
	Total	6,072	0.3			L		VL			VH					H
Total - Category - C		90,641	4.3													
X - Other Materials	Rural	271,741	13.0													
	Urban	48,386	2.3													
	Total	320,127	15.3			VL		VL			VH					VH
Total - Category - X		320,127	15.3													
TOTAL HOUSES*		2,086,975														

ROOF																
R1 - Light Weight Sloping Roof	Rural		-													
	Urban	157,490	12.9													
	Total	157,490	12.9			L				VH						VH
R2 - Heavy Weight Sloping Roof	Rural		-													
	Urban	307,347	25.3													
	Total	307,347	25.3			L				H						H
R3 - Flat Roof	Rural		-													
	Urban	752,141	61.8													
	Total	752,141	61.8													
TOTAL HOUSES*		1,216,978														

ROOF																
R1 - Light Weight Sloping Roof	Rural	707,711	33.9													
	Urban	132,544	6.4													
	Total	840,255	40.3			M		L			VH					VH
R2 - Heavy Weight Sloping Roof	Rural	617,852	29.6													
	Urban	222,129	10.6													
	Total	839,981	40.2			M		L			H					H
R3 - Flat Roof	Rural	193,114	9.3													
	Urban	213,625	10.2													
	Total	406,739	19.5													
TOTAL HOUSES*		2,086,975														

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 524 mm

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 524 mm

Housing Category : Wall Types

Housing Category : Roof Type

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)

- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
- 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
- 3. Source of Housing Data : Census of Housing, GOI, 2011

- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low

* Total No.of Houses excluding Vacant/Locked Houses

Housing Category : Wall Types

Housing Category : Roof Type

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)

- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
- 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
- 3. Source of Housing Data : Census of Housing, GOI, 2011

- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low

* Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : WB 18 State : WEST BENGAL PASCHIM MEDINIPUR

Wall / Roof		Census Houses		Level of Risk under										
		No. of Houses	%	EQ Zone				Wind Velocity m/s				Flood Prone Area in %		
				V	IV	III	II	55 & 50	47	44 & 39	33			
				Area in %				Area in %						
						73.1	26.9	91.6	8.4				30.7	
WALL														
A1 - Mud & Unburnt Brick Wall	Rural	724,898	48.1											
	Urban	42,734	2.8											
	Total	767,632	50.9			M	L	VH	H					VH
A2 - Stone Wall not packed with mortar	Rural	3,378	0.2											
	Urban	1,332	0.1											
	Total	4,710	0.3			M	L	H	M					VH
Total - Category - A		772,342	51.2											
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	235,385	15.6											
	Urban	122,306	8.1											
	Total	357,691	23.7			L	VL	H	M					H/M
Total - Category - B		357,691	23.7											
C1 - Concrete Wall	Rural	24,139	1.6											
	Urban	7,955	0.5											
	Total	32,094	2.1			VL	VL	L	VL					L/VL
C2 - Wood wall	Rural	1,920	0.1											
	Urban	564	-											
	Total	2,484	0.1			VL	VL	VH	H					H
Total - Category - C		34,578	2.3											
X - Other Materials	Rural	329,921	21.9											
	Urban	12,759	0.8											
	Total	342,680	22.7			VL	VL	VH	H					VH
Total - Category - X		342,680	22.7											
TOTAL HOUSES*		1,507,291												

ROOF														
R1 - Light Weight Sloping Roof	Rural	1,039,701	69.0											
	Urban	73,733	4.9											
	Total	1,113,434	73.9			L	VL	VH	VH					VH
R2 - Heavy Weight Sloping Roof	Rural	120,690	8.0											
	Urban	17,074	1.1											
	Total	137,764	9.1			L	VL	H	M					H
R3 - Flat Roof	Rural	159,250	10.6											
	Urban	96,843	6.4											
	Total	256,093	17.0											
TOTAL HOUSES*		1,507,291												

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. **704 mm**

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
- M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : WB 19 State : WEST BENGAL PURBA MEDINIPUR

Wall / Roof		Census Houses		Level of Risk under										
		No. of Houses	%	EQ Zone				Wind Velocity m/s				Flood Prone Area in %		
				V	IV	III	II	55 & 50	47	44 & 39	33			
				Area in %				Area in %						
WALL														
A1 - Mud & Unburnt Brick Wall	Rural	422,792	32.2											
	Urban	26,538	2.0											
	Total	449,330	34.2			M		VH						VH
A2 - Stone Wall not packed with mortar	Rural	3,804	0.3											
	Urban	808	0.1											
	Total	4,612	0.4			M		H						VH
Total - Category - A		453,942	34.6											
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	443,645	33.8											
	Urban	104,556	8.0											
	Total	548,201	41.8			L		H						H/M
Total - Category - B		548,201	41.7											
C1 - Concrete Wall	Rural	29,166	2.2											
	Urban	6,774	0.5											
	Total	35,940	2.7			VL		L						L/VL
C2 - Wood wall	Rural	3,222	0.2											
	Urban	792	0.1											
	Total	4,014	0.3			VL		VH						H
Total - Category - C		39,954	3.0											
X - Other Materials	Rural	255,017	19.4											
	Urban	16,106	1.2											
	Total	271,123	20.6			VL		VH						VH
Total - Category - X		271,123	20.6											
TOTAL HOUSES*		1,313,220												

ROOF														
R1 - Light Weight Sloping Roof	Rural	382,663	29.1											
	Urban	23,530	1.8											
	Total	406,193	30.9			L		VH						VH
R2 - Heavy Weight Sloping Roof	Rural	611,890	46.6											
	Urban	61,596	4.7											
	Total	673,486	51.3			L		H						H
R3 - Flat Roof	Rural	163,093	12.4											
	Urban	70,448	5.4											
	Total	233,541	17.8											
TOTAL HOUSES*		1,313,220												

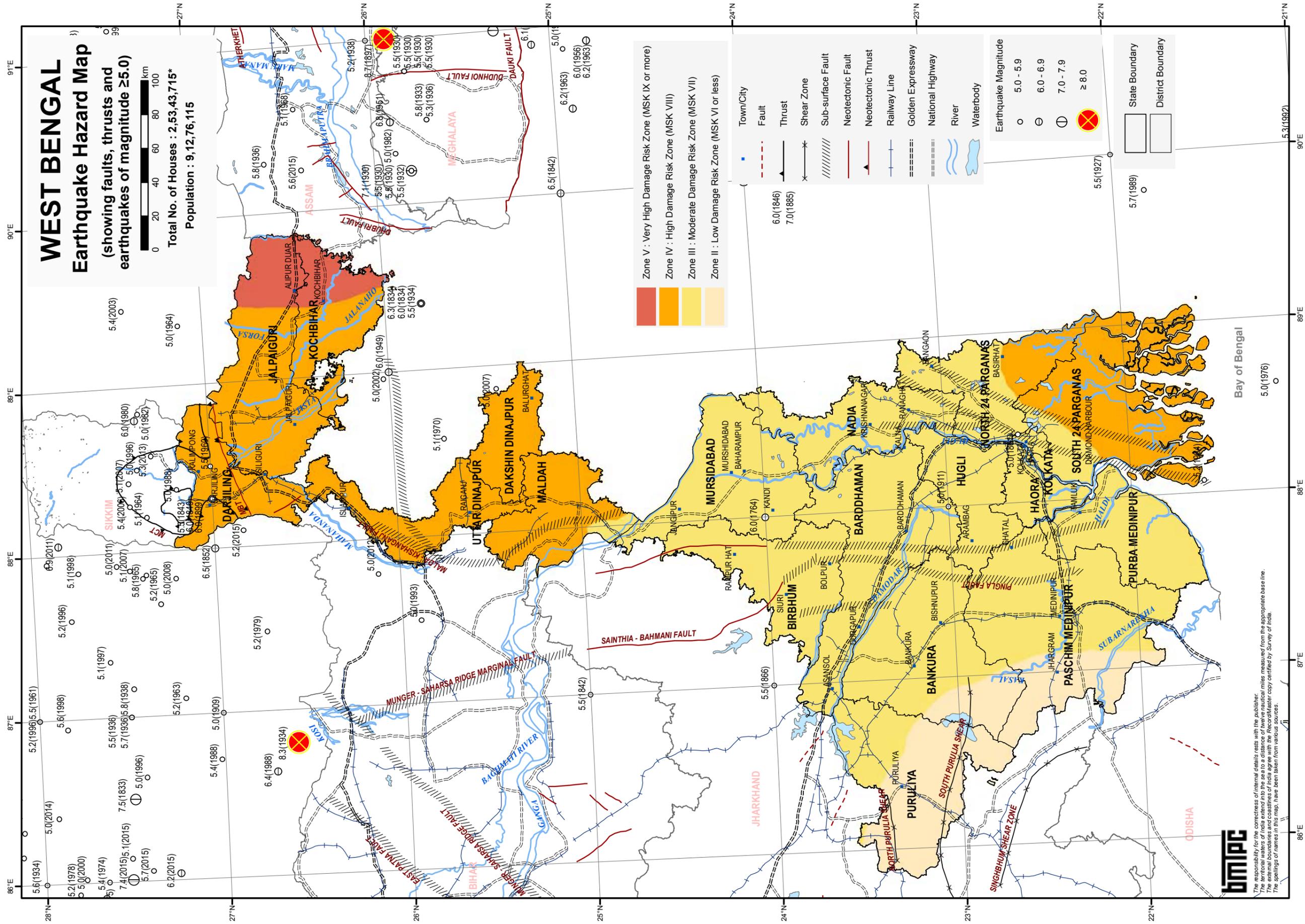
Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. **704 mm**

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C** : Reinforced building, well built wooden structures
- Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
3. Source of Housing Data : Census of Housing, GOI, 2011

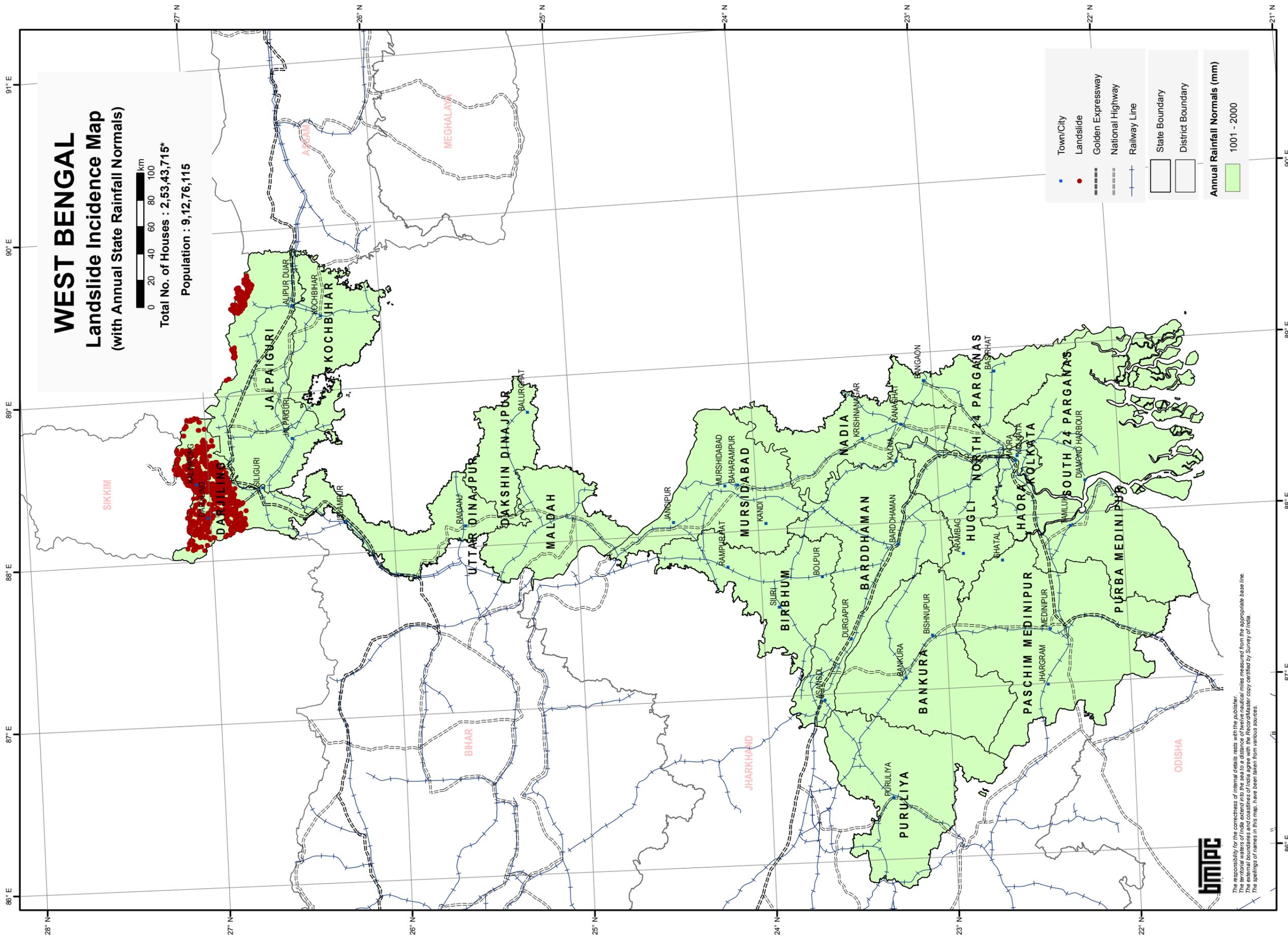
Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2** - Heavy Weight (Tiles, Stone/Slate)
- Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
- EQ Zone IV : High Damage Risk Zone (MSK VIII)
- EQ Zone III : Moderate Damage Risk Zone (MSK VII)
- EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
- M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses



The responsibility for the correctness of internal details rests with the publisher.
 The territorial waters of India extend into the sea to a distance of twelve nautical miles measured from the appropriate base line.
 The external boundaries and coastlines of India agree with the RecordMaster copy certified by Survey of India.
 The spellings of names in this map have been taken from various sources.

BMTPC : Vulnerability Atlas - 3rd Edition : Peer Group, MoHUA, GOI; Map is Based on digitised data of SOI; Seismic Zones of India Map IS: 1893 (Part I) - 2002; BIS; Earthquake Epicentre from IMD; Seismotectonic Atlas of India and its Environs, GSI; Houses/Population as per Census 2011; * Houses including vacant & locked houses. Disclaimer: The maps are solely for thematic presentation.



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DAMAGE RISK TABLES AND HAZARD MAPS

UNION TERRITORIES

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

ANDAMAN & NICOBAR ISLANDS

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
STATE - ANDAMAN & NICOBAR ISLANDS		100								100		
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	716	0.6									
	Urban	397	0.3									
	Total	1,113	0.9	VH						M		
A2 - Stone Wall not packed with mortar	Rural	419	0.3									
	Urban	304	0.3									
	Total	723	0.6	VH						L		
Total - Category - A		1,836	1.5									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	5,792	4.8									
	Urban	3,004	2.5									
	Total	8,796	7.3	H						L		
Total - Category - B		8,796	7.2									
C1 - Concrete Wall	Rural	17,601	14.5									
	Urban	29,694	24.4									
	Total	47,295	38.9	M						VL		
C2 - Wood wall	Rural	16,415	13.5									
	Urban	7,691	6.3									
	Total	24,106	19.8	M						M		
Total - Category - C		71,401	58.7									
X - Other Materials	Rural	35,181	28.9									
	Urban	4,326	3.6									
	Total	39,507	32.5	M						M		
Total - Category - X		39,507	32.5									
TOTAL HOUSES*		121,540										

ROOF											
R1 - Light Weight Sloping Roof	Rural	72,045	59.3								
	Urban	33,261	27.4								
	Total	105,306	86.7	M						H	
R2 - Heavy Weight Sloping Roof	Rural	331	0.3								
	Urban	454	0.4								
	Total	785	0.7	H						L	
R3 - Flat Roof	Rural	3,748	3.1								
	Urban	11,701	9.6								
	Total	15,449	12.7								<i>Damage Risk as per that for the Wall supporting it</i>
TOTAL HOUSES*		121,540									

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
 - Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
 - Category - C** : Reinforced building, well built wooden structures
 - Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
 - Category - R2** - Heavy Weight (Tiles, Stone/Slate)
 - Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
 Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
 * Total No. of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : AN 01 State : ANDAMAN & NICOBAR ISLANDS NICOBARS

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
STATE - ANDAMAN & NICOBAR ISLANDS		100								100		
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	7	0.1									
	Urban	-	-									
	Total	7	0.1	VH						M		
A2 - Stone Wall not packed with mortar	Rural	36	0.3									
	Urban	-	-									
	Total	36	0.3	VH						L		
Total - Category - A		43	0.4									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	223	1.9									
	Urban	-	-									
	Total	223	1.9	H						L		
Total - Category - B		223	1.9									
C1 - Concrete Wall	Rural	1,750	15.0									
	Urban	-	-									
	Total	1,750	15.0	M						VL		
C2 - Wood wall	Rural	6,582	56.5									
	Urban	-	-									
	Total	6,582	56.5	M						M		
Total - Category - C		8,332	71.5									
X - Other Materials	Rural	3,051	26.2									
	Urban	-	-									
	Total	3,051	26.2	M						M		
Total - Category - X		3,051	26.2									
TOTAL HOUSES*		11,649										

ROOF											
R1 - Light Weight Sloping Roof	Rural	11,403	97.9								
	Urban	-	-								
	Total	11,403	97.9	M						H	
R2 - Heavy Weight Sloping Roof	Rural	36	0.3								
	Urban	-	-								
	Total	36	0.3	H						L	
R3 - Flat Roof	Rural	210	1.8								
	Urban	-	-								
	Total	210	1.8								<i>Damage Risk as per that for the Wall supporting it</i>
TOTAL HOUSES*		11,649									

Probable Maximum Precipitation at a Station of the district in 24 hrs is N.A. mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
 - Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
 - Category - C** : Reinforced building, well built wooden structures
 - Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
 - Category - R2** - Heavy Weight (Tiles, Stone/Slate)
 - Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
 Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
 * Total No. of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : AN 02 State : ANDAMAN & NICOBAR ISLANDS NORTH & MIDDLE ANDAMAN

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
		100								100		
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	125	0.3									
	Urban	5	-									
	Total	130	0.3	VH						M		
A2 - Stone Wall not packed with mortar	Rural	54	0.2									
	Urban	1	-									
	Total	55	0.2	VH						L		
Total - Category - A		185	0.5									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	3,041	8.5									
	Urban	37	0.1									
	Total	3,078	8.6	H						L		
Total - Category - B		3,078	8.6									
C1 - Concrete Wall	Rural	4,850	13.6									
	Urban	166	0.5									
	Total	5,016	14.1	M						VL		
C2 - Wood wall	Rural	3,743	10.5									
	Urban	300	0.8									
	Total	4,043	11.3	M						M		
Total - Category - C		9,059	25.3									
X - Other Materials	Rural	23,003	64.3									
	Urban	439	1.2									
	Total	23,442	65.5	M						M		
Total - Category - X		23,442	65.5									
TOTAL HOUSES*		35,764										
ROOF												
R1 - Light Weight Sloping Roof	Rural	33,611	94.0									
	Urban	933	2.6									
	Total	34,544	96.6	M						H		
R2 - Heavy Weight Sloping Roof	Rural	94	0.3									
	Urban	2	-									
	Total	96	0.3	H						L		
R3 - Flat Roof	Rural	1,111	3.1									
	Urban	13	-									
	Total	1,124	3.1									
TOTAL HOUSES*		35,764										

Probable Maximum Precipitation at a Station of the district in 24 hrs is N.A. mm

Housing Category : Wall Types

- Category - A :** Buildings in field-stone, rural structures, unburnt brick houses, clay houses
 - Category - B :** Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
 - Category - C :** Reinforced building, well built wooden structures
 - Category - X :** Other materials not covered in A,B,C. These are generally light.
- Notes :**
1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1 - Light Weight** (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
 - Category - R2 - Heavy Weight** (Tiles, Stone/Slate)
 - Category - R3 - Flat Roof** (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : AN 03 State : ANDAMAN & NICOBAR ISLANDS SOUTH ANDAMAN

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
		100								100		
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	584	0.8									
	Urban	392	0.5									
	Total	976	1.3	VH						M		
A2 - Stone Wall not packed with mortar	Rural	329	0.4									
	Urban	303	0.4									
	Total	632	0.8	VH						L		
Total - Category - A		1,608	2.2									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	2,528	3.4									
	Urban	2,967	4.0									
	Total	5,495	7.4	H						L		
Total - Category - B		5,495	7.4									
C1 - Concrete Wall	Rural	11,001	14.8									
	Urban	29,528	39.8									
	Total	40,529	54.6	M						VL		
C2 - Wood wall	Rural	6,090	8.2									
	Urban	7,391	10.0									
	Total	13,481	18.2	M						M		
Total - Category - C		54,010	72.9									
X - Other Materials	Rural	9,127	12.3									
	Urban	3,887	5.2									
	Total	13,014	17.5	M						M		
Total - Category - X		13,014	17.6									
TOTAL HOUSES*		74,127										
ROOF												
R1 - Light Weight Sloping Roof	Rural	27,031	36.5									
	Urban	32,328	43.6									
	Total	59,359	80.1	M						H		
R2 - Heavy Weight Sloping Roof	Rural	201	0.3									
	Urban	452	0.6									
	Total	653	0.9	H						L		
R3 - Flat Roof	Rural	2,427	3.3									
	Urban	11,688	15.8									
	Total	14,115	19.1									
TOTAL HOUSES*		74,127										

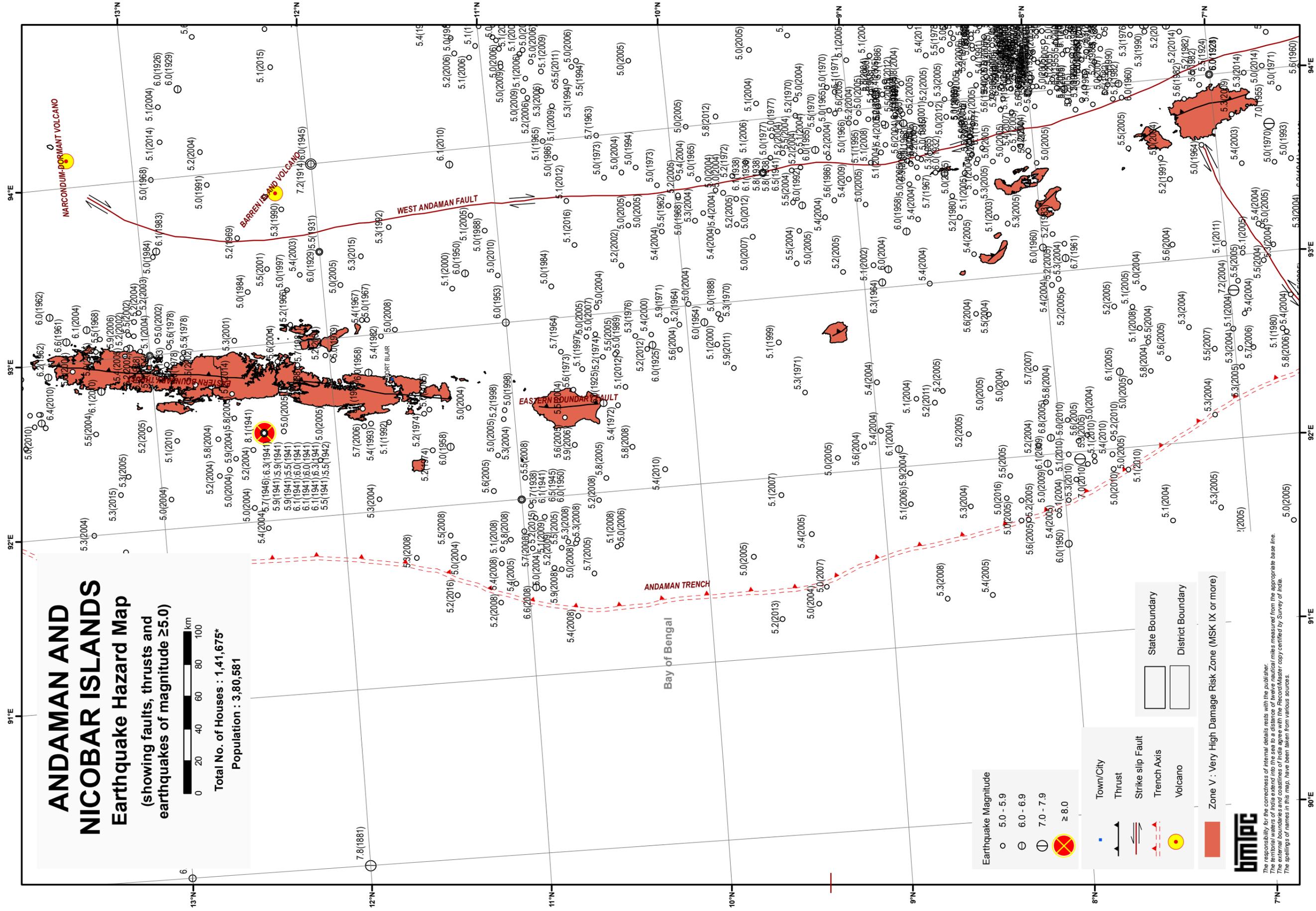
Probable Maximum Precipitation at a Station of the district in 24 hrs is N.A. mm

Housing Category : Wall Types

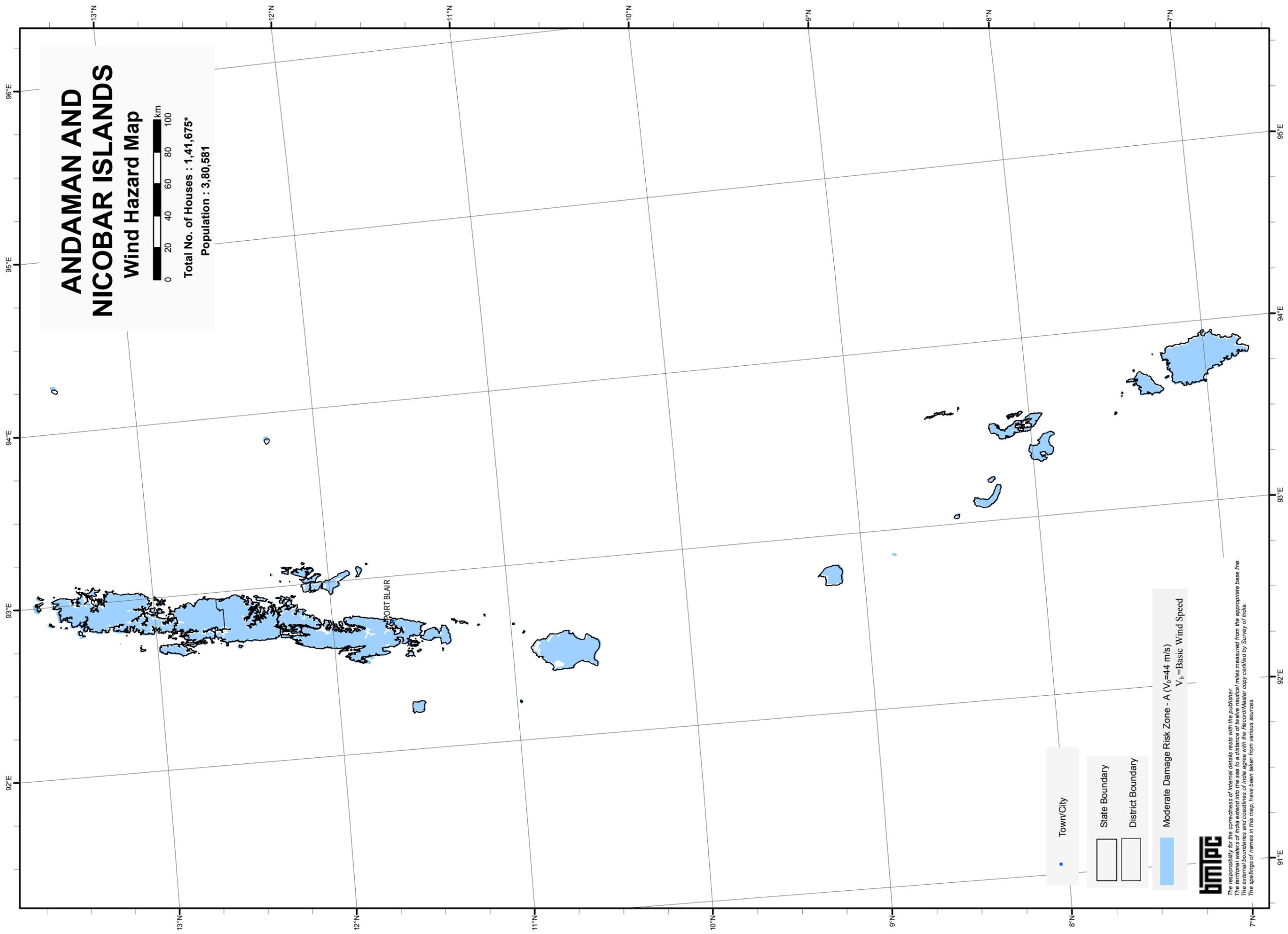
- Category - A :** Buildings in field-stone, rural structures, unburnt brick houses, clay houses
 - Category - B :** Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
 - Category - C :** Reinforced building, well built wooden structures
 - Category - X :** Other materials not covered in A,B,C. These are generally light.
- Notes :**
1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1 - Light Weight** (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
 - Category - R2 - Heavy Weight** (Tiles, Stone/Slate)
 - Category - R3 - Flat Roof** (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses



BMTPC : Vulnerability Atlas - 3rd Edition : Peer Group, MoHUA, GOI; Map is Based on digitised data of SOI; Seismic Zones of India Map IS: 1893 (Part I) - 2002, BIS; Earthquake Epicentre from IMD; Seismotectonic Atlas of India and its Environs, GSI; Houses/Population as per Census 2011; *Houses including vacant & locked houses. Disclaimer: The maps are solely for thematic presentation.



BMTPC : Vulnerability Atlas - 3rd Edition; Peer Group, MoHUA. Map is Based on digitised data of SOI, GOI; Basic Wind Speed Map National Building Code 2016. Houses/Population as per Census 2011; *Houses including vacant & locked houses. Disclaimer: The maps are solely for thematic presentation.

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

CHANDIGARH

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
		Area in %				Area in %						
STATE - CHANDIGARH												
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	24	-									
	Urban	7,468	2.7									
	Total	7,492	2.7		H					VH		
A2 - Stone Wall not packed with mortar	Rural	25	-									
	Urban	1,353	0.5									
	Total	1,378	0.5		H					H		
Total - Category - A		8,870	3.2									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	7,154	2.6									
	Urban	240,811	86.9									
	Total	247,965	89.5		M					H		
Total - Category - B		247,965	89.5									
C1 - Concrete Wall	Rural	869	0.3									
	Urban	13,440	4.9									
	Total	14,309	5.2		L					L		
C2 - Wood wall	Rural	20	-									
	Urban	494	0.2									
	Total	514	0.2		L					VH		
Total - Category - C		14,823	5.4									
X - Other Materials	Rural	208	0.1									
	Urban	5,192	1.9									
	Total	5,400	2.0		VL					VH		
Total - Category - X		5,400	1.9									
TOTAL HOUSES*		277,058										
ROOF												
R1 - Light Weight Sloping Roof	Rural	1,101	0.4									
	Urban	36,458	13.2									
	Total	37,559	13.6		M					VH		
R2 - Heavy Weight Sloping Roof	Rural	203	0.1									
	Urban	3,829	1.4									
	Total	4,032	1.5		M					H		
R3 - Flat Roof	Rural	6,996	2.5									
	Urban	228,471	82.5									
	Total	235,467	85.0									
TOTAL HOUSES*		277,058										

Probable Maximum Precipitation at a Station of the district in 24 hrs is 600 mm

Housing Category : Wall Types

Category - A : Buildings in field-stone, rural structures, unburnt brick houses, clay houses

Category - B : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone

Category - C : Reinforced building, well built wooden structures

Category - X : Other materials not covered in A,B,C. These are generally light.

Notes: 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.

2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building

3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

Category - R1 - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)

Category - R2 - Heavy Weight (Tiles, Stone/Slate)

Category - R3 - Flat Roof (Brick, Concrete)

EQ Zone V : Very High Damage Risk Zone (MSK > IX)

EQ Zone IV : High Damage Risk Zone (MSK VIII)

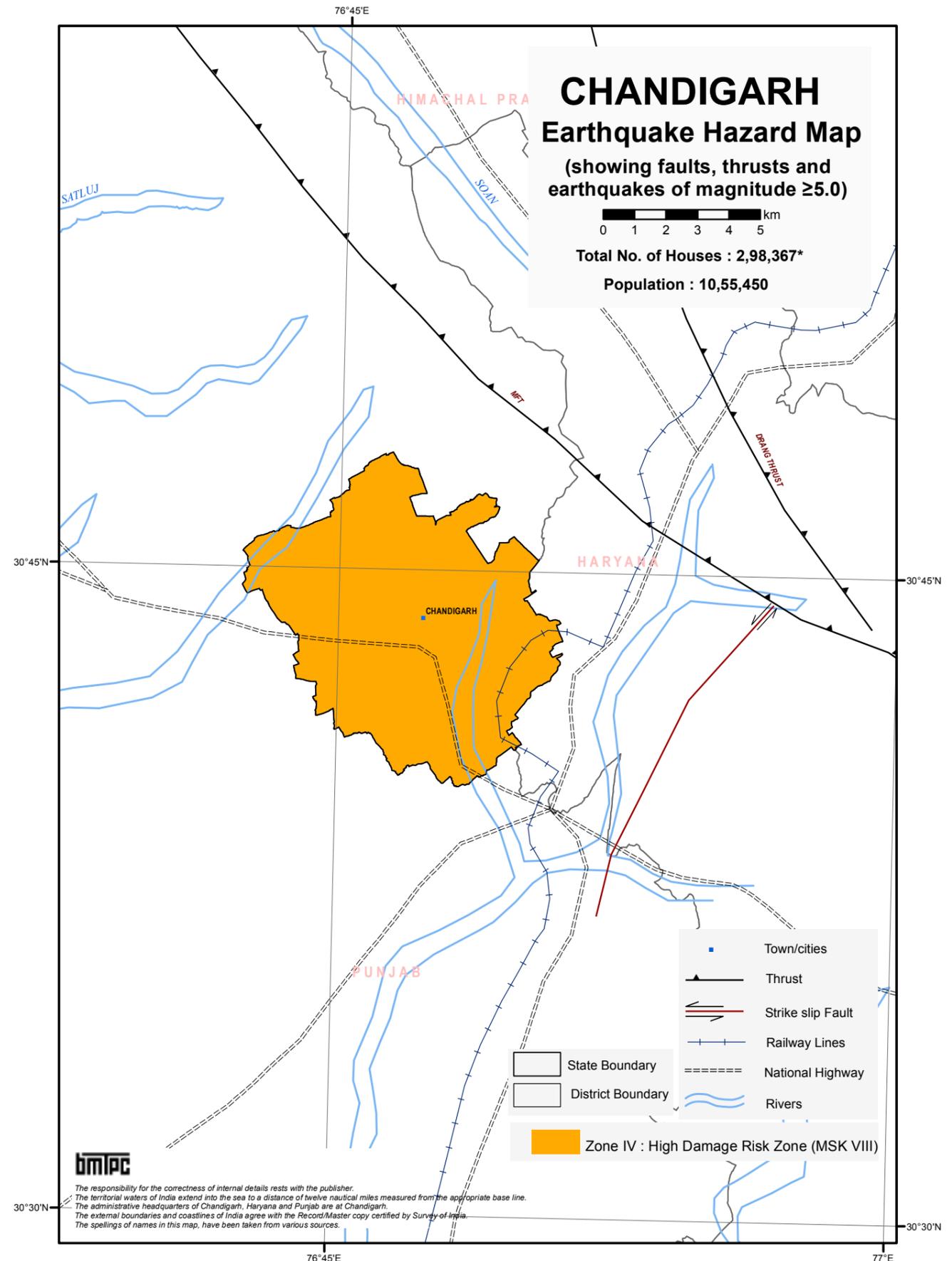
EQ Zone III : Moderate Damage Risk Zone (MSK VII)

EQ Zone II : Low Damage Risk Zone (MSK < VI)

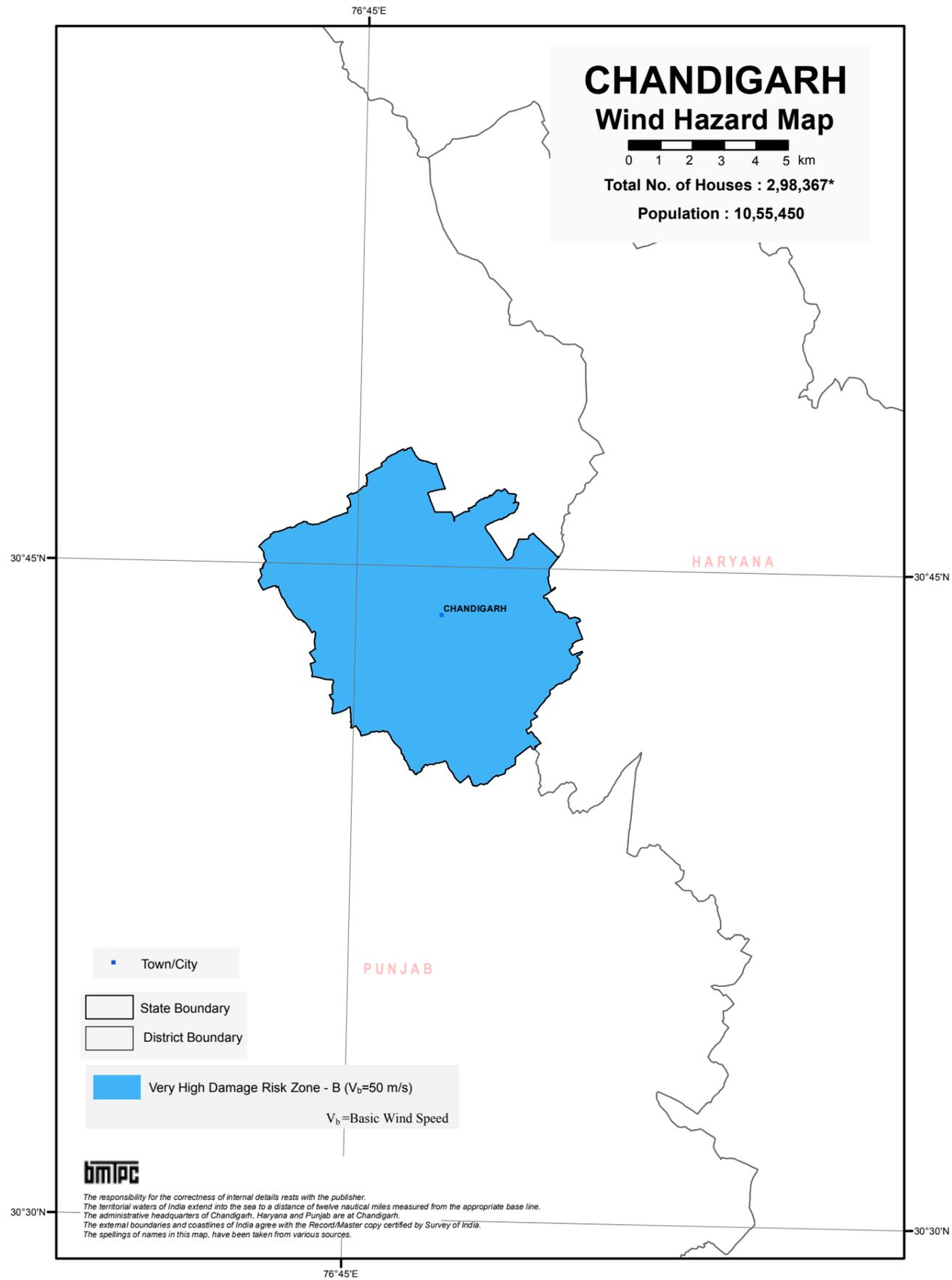
Level of Risk : VH = Very High; H = High;

M = Moderate; L = Low; VL = Very Low

* Total No. of Houses excluding Vacant/Locked Houses



BMTPC : Vulnerability Atlas - 3rd Edition : Peer Group, MoHUA, GOI; Map is Based on digitised data of SOI; Seismic Zones of India Map IS:1893 (Part I); 2002, BIS; Earthquake Epicentre from IMD; Seismotectonic Atlas of India and its Environs, GSI; Houses/Population as per Census 2011; *Houses including vacant & locked houses. Disclaimer: The maps are solely for thematic presentation.



BMTPC: Vulnerability Atlas - 3rd Edition; Peer Group, MoHUA; Map is Based on digitised data of SOI, GOI; Basic Wind Speed Map National Building Code 2016. Houses/Population as per Census 2011; *Houses including vacant & locked houses. Disclaimer: The maps are solely for thematic presentation.

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

DADRA & NAGAR HAVELI

Wall / Roof		Census Houses		Level of Risk under						Flood Prone Area in %	
		No. of Houses	%	EQ Zone			Wind Velocity m/s				
				V	IV	III	II	55 & 50	47		44 & 39
		Area in %			Area in %						
STATE - DADRA & NAGAR HAVELI											
WALL											
A1 - Mud & Unburnt Brick Wall	Rural	5,434	6.1								
	Urban	1,852	2.1								
	Total	7,286	8.2								
A2 - Stone Wall not packed with mortar	Rural	133	0.1								
	Urban	153	0.2								
	Total	286	0.3								
Total - Category - A		7,572	8.4								
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	15,892	17.7								
	Urban	41,362	46.1								
	Total	57,254	63.8								
Total - Category - B		57,254	63.9								
C1 - Concrete Wall	Rural	1,331	1.5								
	Urban	1,956	2.2								
	Total	3,287	3.7								
C2 - Wood wall	Rural	198	0.2								
	Urban	240	0.3								
	Total	438	0.5								
Total - Category - C		3,725	4.2								
X - Other Materials	Rural	18,050	20.1								
	Urban	3,051	3.4								
	Total	21,101	23.5								
Total - Category - X		21,101	23.5								
TOTAL HOUSES*		89,652									
ROOF											
R1 - Light Weight Sloping Roof	Rural	12,509	14.0								
	Urban	22,810	25.4								
	Total	35,319	39.4								
R2 - Heavy Weight Sloping Roof	Rural	24,146	26.9								
	Urban	4,119	4.6								
	Total	28,265	31.5								
R3 - Flat Roof	Rural	4,383	4.9								
	Urban	21,685	24.2								
	Total	26,068	29.1								
TOTAL HOUSES*		89,652									

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 1082 mm

Housing Category : Wall Types

Category - A : Buildings in field-stone, rural structures, unburnt brick houses, clay houses

Category - B : Ordinary brick building; buildings of the large block and prefabricated type, half-timbered structures, building in natural hewn stone

Category - C : Reinforced building, well built wooden structures

Category - X : Other materials not covered in A,B,C. These are generally light.

Notes : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.

2. Source of Housing Data : Census of Housing, GOI, 2011

Level of Risk : VH = Very High; H = High; M = Moderate; L = Low; VL = Very Low

Housing Category : Roof Type

Category - R1 - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)

Category - R2 - Heavy Weight (Tiles, Stone/Slate)

Category - R3 - Flat Roof (Brick, Concrete)

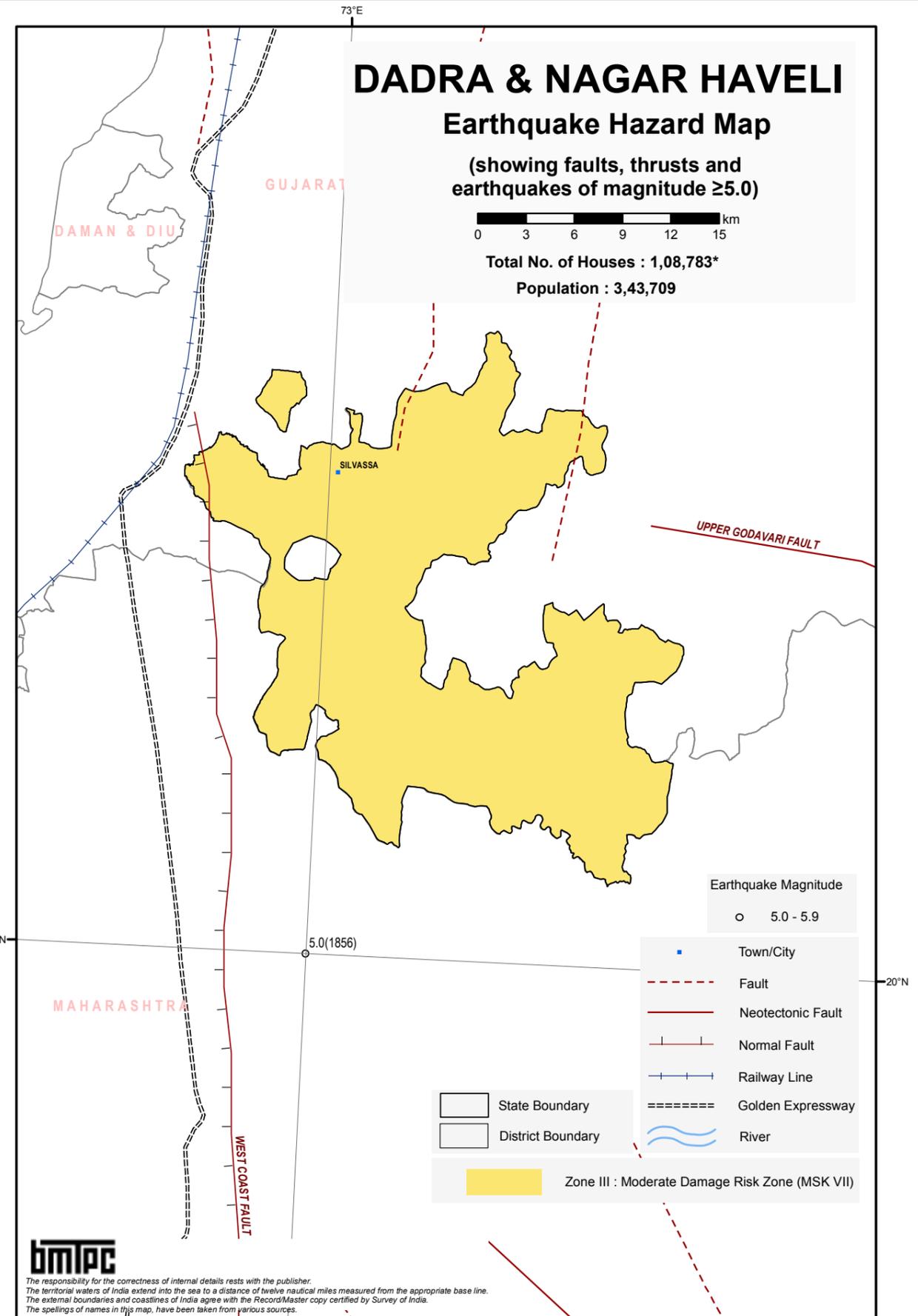
EQ Zone V : Very High Damage Risk Zone (MSK > IX)

EQ Zone IV : High Damage Risk Zone (MSK VIII)

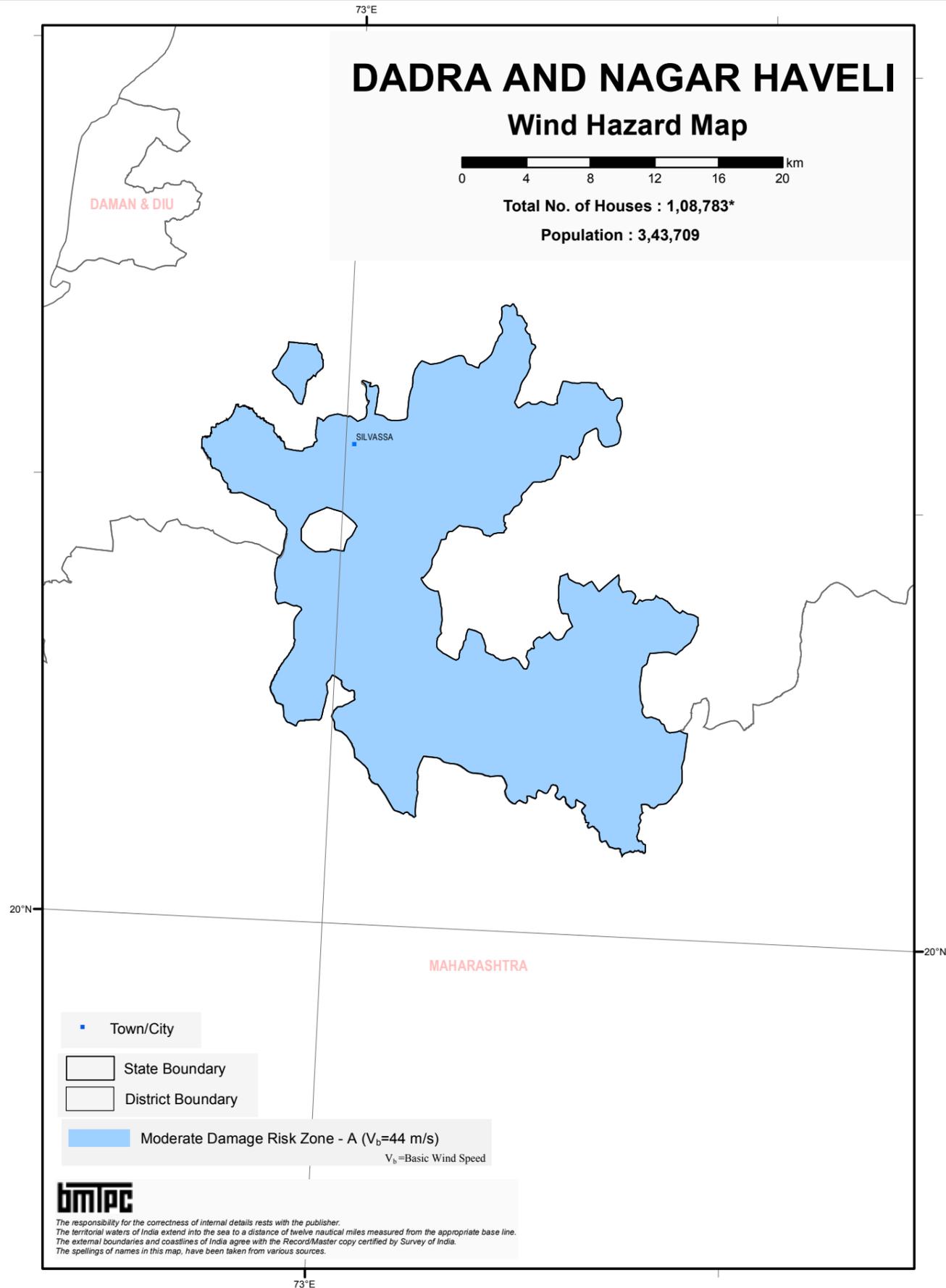
EQ Zone III : Moderate Damage Risk Zone (MSK VII)

EQ Zone II : Low Damage Risk Zone (MSK < VI)

* Total No.of Houses excluding Vacant/Locked Houses



BMPCC : Vulnerability Atlas - 3rd Edition : Peer Group, MoHUA, GOI; Map is Based on digitised data of SOI; Seismic Zones of India Map IS:1893 (Part I): 2002, BIS; Earthquake Epicentre from IMD; Seismotectonic Atlas of India and its Environs, GSI; Houses/Population as per Census 2011; *Houses including vacant & locked houses. Disclaimer: The maps are solely for thematic presentation.



BMTPC : Vulnerability Atlas - 3rd Edition; Peer Group, MoHUA; Map is Based on digitised data of SOI, GOI; Basic Wind Speed Map National Building Code 2016. Houses/Population as per Census 2011; *Houses including vacant & locked houses. Disclaimer: The maps are solely for thematic presentation.

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

DAMAN & DIU

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
				Area in %				Area in %					
STATE - DAMAN & DIU						100				31.4		68.6	
WALL													
A1 - Mud & Unburnt Brick Wall	Rural	379	0.5										
	Urban	462	0.6										
	Total	841	1.1			M				VH		M	
A2 - Stone Wall not packed with mortar	Rural	661	0.9										
	Urban	305	0.4										
	Total	966	1.3			M				H		L	
Total - Category - A		1,807	2.4										
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	15,454	20.6										
	Urban	53,502	71.2										
	Total	68,956	91.8			L				H		L	
Total - Category - B		68,956	91.8										
C1 - Concrete Wall	Rural	143	0.2										
	Urban	2,469	3.3										
	Total	2,612	3.5			VL				L		VL	
C2 - Wood wall	Rural	46	0.1										
	Urban	238	0.3										
	Total	284	0.4			VL				VH		M	
Total - Category - C		2,896	3.9										
X - Other Materials	Rural	525	0.7										
	Urban	924	1.2										
	Total	1,449	1.9			VL				VH		M	
Total - Category - X		1,449	1.9										
TOTAL HOUSES*		75,108											

ROOF													
R1 - Light Weight Sloping Roof	Rural	5,592	7.4										
	Urban	28,841	38.4										
	Total	34,433	45.8			L				VH		H	
R2 - Heavy Weight Sloping Roof	Rural	4,174	5.6										
	Urban	5,162	6.9										
	Total	9,336	12.5			L				H		L	
R3 - Flat Roof	Rural	7,442	9.9										
	Urban	23,897	31.8										
	Total	31,339	41.7										
<i>Damage Risk as per that for the Wall supporting it</i>													
TOTAL HOUSES*		75,108											

Housing Category : Wall Types

Category - A : Buildings in field-stone, rural structures, unburnt brick houses, clay houses

Category - B : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone

Category - C : Reinforced building, well built wooden structures

Category - X : Other materials not covered in A,B,C. These are generally light.

Notes : 1. Flood prone area includes that protected area which may have more severe

damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.

2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building

3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

Category - R1 - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)

Category - R2 - Heavy Weight (Tiles, Stone/Slate)

Category - R3 - Flat Roof (Brick, Concrete)

EQ Zone V : Very High Damage Risk Zone (MSK > IX)

EQ Zone IV : High Damage Risk Zone (MSK VIII)

EQ Zone III : Moderate Damage Risk Zone (MSK VII)

EQ Zone II : Low Damage Risk Zone (MSK < VI)

Level of Risk : VH = Very High; H = High;

M = Moderate; L = Low; VL = Very Low

* Total No. of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : DD 01

State : DAMAN & DIU

DIU

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
				Area in %				Area in %					
STATE - DAMAN & DIU						100				100			
WALL													
A1 - Mud & Unburnt Brick Wall	Rural	104	0.7										
	Urban	9	0.1										
	Total	113	0.8			M				VH			
A2 - Stone Wall not packed with mortar	Rural	641	4.2										
	Urban	201	1.3										
	Total	842	5.5			M				H			
Total - Category - A		955	6.3										
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	7,590	50.0										
	Urban	6,368	42.0										
	Total	13,958	92.0			L				H			
Total - Category - B		13,958	92.0										
C1 - Concrete Wall	Rural	7	-										
	Urban	150	1.0										
	Total	157	1.0			VL				L			
C2 - Wood wall	Rural	7	-										
	Urban	17	0.1										
	Total	24	0.1			VL				VH			
Total - Category - C		181	1.2										
X - Other Materials	Rural	41	0.3										
	Urban	41	0.3										
	Total	82	0.6			VL				VH			
Total - Category - X		82	0.5										
TOTAL HOUSES*		15,176											

ROOF													
R1 - Light Weight Sloping Roof	Rural	568	3.7										
	Urban	292	1.9										
	Total	860	5.6			L				VH			
R2 - Heavy Weight Sloping Roof	Rural	2,555	16.8										
	Urban	1,264	8.3										
	Total	3,819	25.1			L				H			
R3 - Flat Roof	Rural	5,267	34.7										
	Urban	5,230	34.5										
	Total	10,497	69.2										
<i>Damage Risk as per that for the Wall supporting it</i>													
TOTAL HOUSES*		15,176											

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 1082 mm

Housing Category : Wall Types

Category - A : Buildings in field-stone, rural structures, unburnt brick houses, clay houses

Category - B : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone

Category - C : Reinforced building, well built wooden structures

Category - X : Other materials not covered in A,B,C. These are generally light.

Notes : 1. Flood prone area includes that protected area which may have more severe

damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.

2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building

3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

Category - R1 - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)

Category - R2 - Heavy Weight (Tiles, Stone/Slate)

Category - R3 - Flat Roof (Brick, Concrete)

EQ Zone V : Very High Damage Risk Zone (MSK > IX)

EQ Zone IV : High Damage Risk Zone (MSK VIII)

EQ Zone III : Moderate Damage Risk Zone (MSK VII)

EQ Zone II : Low Damage Risk Zone (MSK < VI)

Level of Risk : VH = Very High; H = High;

M = Moderate; L = Low; VL = Very Low

* Total No. of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : DD 02 State : DAMAN & DIU DAMAN

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	275	0.5									
	Urban	453	0.8									
	Total	728	1.3			M				M		
A2 - Stone Wall not packed with mortar	Rural	20	-									
	Urban	104	0.2									
	Total	124	0.2			M				L		
Total - Category - A		852	1.4									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	7,864	13.1									
	Urban	47,134	78.6									
	Total	54,998	91.7			L				L		
Total - Category - B		54,998	91.8									
C1 - Concrete Wall	Rural	136	0.2									
	Urban	2,319	3.9									
	Total	2,455	4.1			VL				VL		
C2 - Wood wall	Rural	39	0.1									
	Urban	221	0.4									
	Total	260	0.5			VL				M		
Total - Category - C		2,715	4.5									
X - Other Materials	Rural	484	0.8									
	Urban	883	1.5									
	Total	1,367	2.3			VL				M		
Total - Category - X		1,367	2.3									
TOTAL HOUSES*		59,932										
ROOF												
R1 - Light Weight Sloping Roof	Rural	5,024	8.4									
	Urban	28,549	47.6									
	Total	33,573	56.0			L				H		
R2 - Heavy Weight Sloping Roof	Rural	1,619	2.7									
	Urban	3,898	6.5									
	Total	5,517	9.2			L				L		
R3 - Flat Roof	Rural	2,175	3.6									
	Urban	18,667	31.1									
	Total	20,842	34.7									
TOTAL HOUSES*		59,932										

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. **1082 mm**

Housing Category : Wall Types

- Category - A :** Buildings in field-stone, rural structures, unburnt brick houses, clay houses
 - Category - B :** Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
 - Category - C :** Reinforced building, well built wooden structures
 - Category - X :** Other materials not covered in A,B,C. These are generally light.
- Notes :**
1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

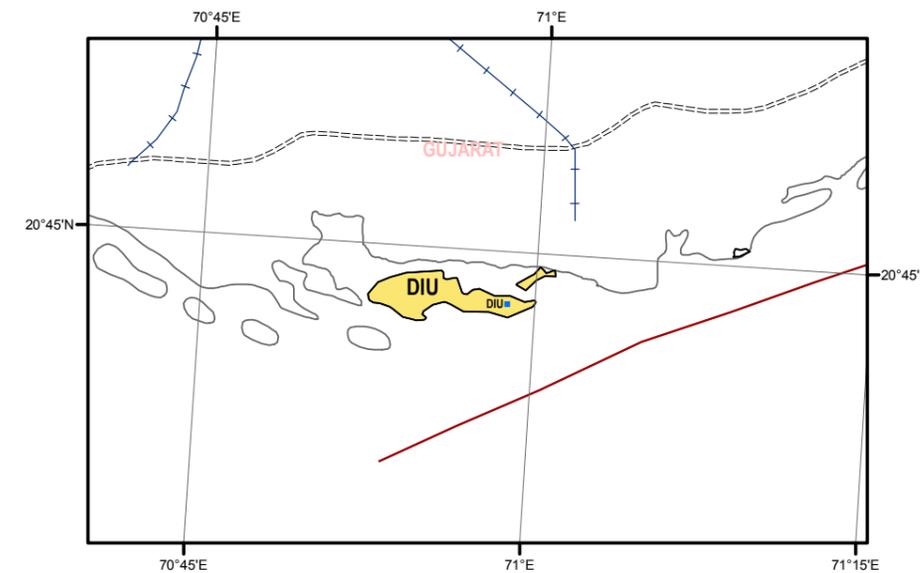
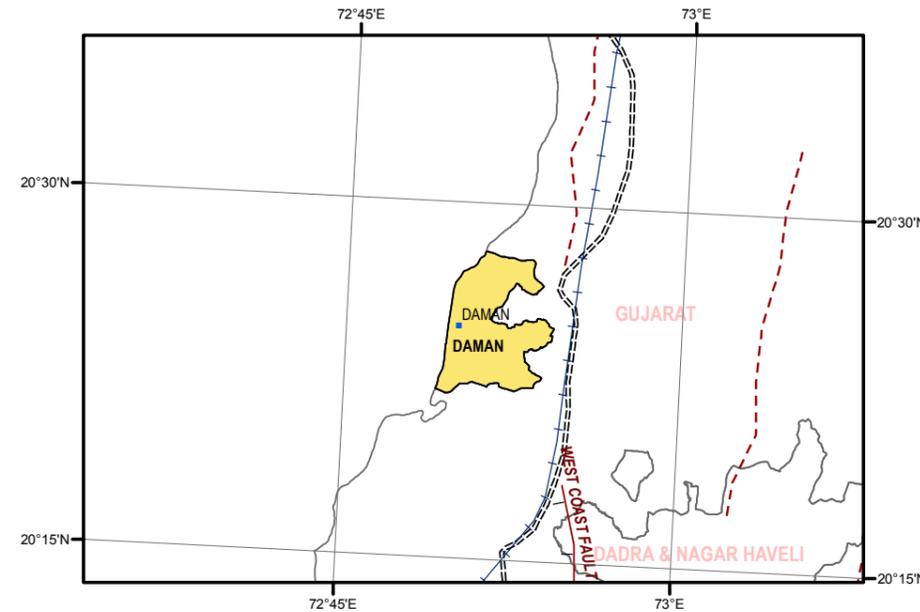
- Category - R1 - Light Weight** (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
 - Category - R2 - Heavy Weight** (Tiles, Stone/Slate)
 - Category - R3 - Flat Roof** (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

DAMAN & DIU Earthquake Hazard Map

(showing faults, thrusts and earthquakes of magnitude ≥5.0)



Total No. of Houses : 89,929*
 Population : 2,43,247



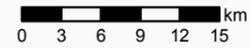
- Town/City
- Fault
- Normal Fault
- Neotectonic Fault
- Railway line
- Golden Expressway
- State Boundary
- District Boundary

Zone III : Moderate Damage Risk Zone (MSK VII)

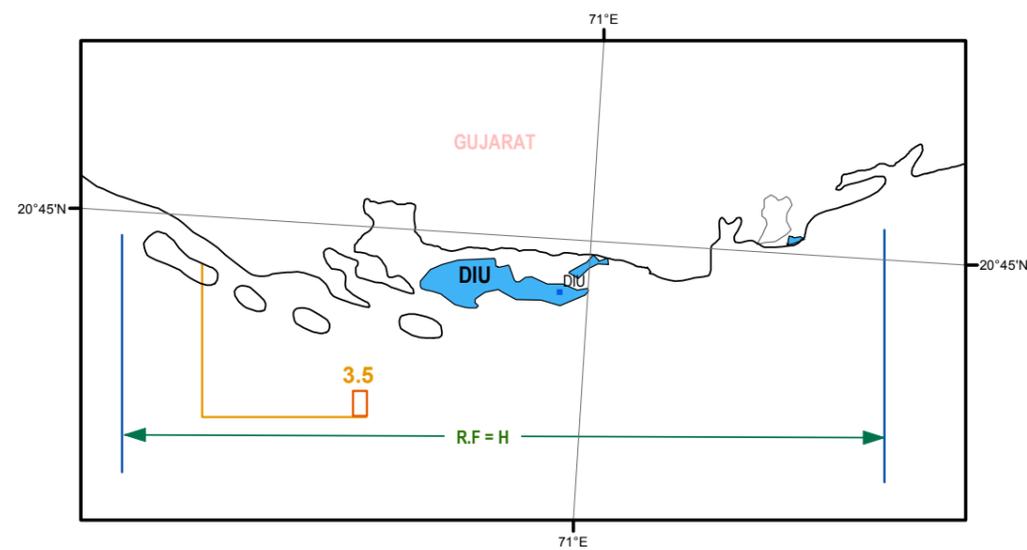
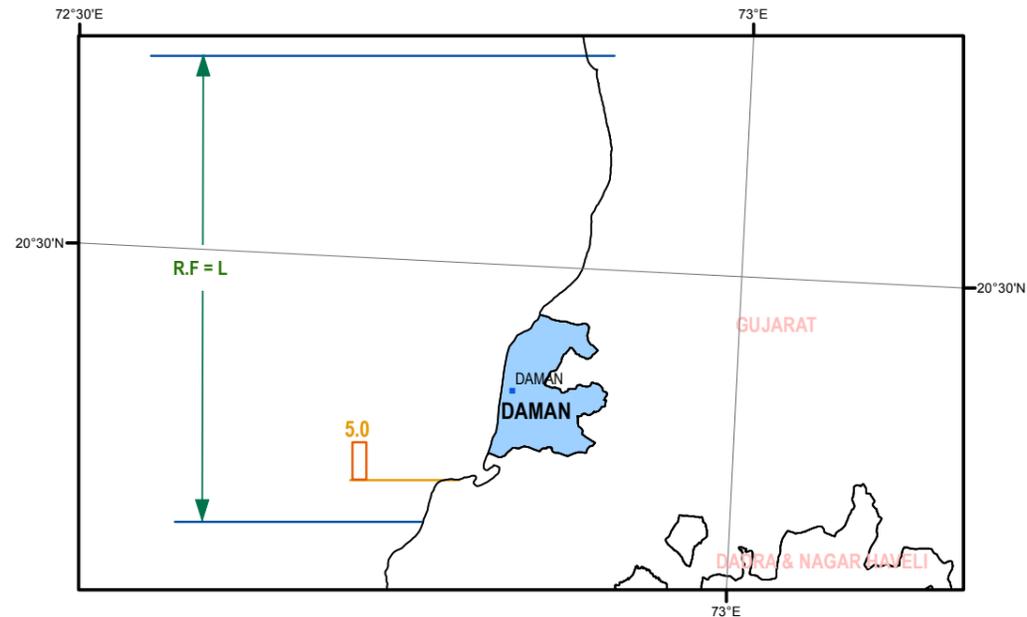
The responsibility for the correctness of internal details rests with the publisher. The territorial waters of India extend into the sea to a distance of twelve nautical miles measured from the appropriate base line. The external boundaries and coastlines of India agree with the Record/Master copy certified by Survey of India. The spellings of names in this map, have been taken from various sources.

DAMAN AND DIU

Wind Hazard Map



Total No. of Houses : 89,929*
Population : 2,43,247



	State Boundary		Town/City
	District Boundary		= Probable Maximum Surge Height (m)
	Very High Damage Risk Zone - B ($V_b=50$ m/s)	R.F.= H = Risk Factor High	
	Moderate Damage Risk Zone - A ($V_b=44$ m/s)	R.F.= L = Risk Factor Low	
	V_b = Basic Wind Speed	C.S.7 = Cyclonic Storm '7' between 20 - 21 deg N	
		(S.C.S.3) = Severe Cyclonic Storm Only '3' between 20 - 21 deg N	



The responsibility for the correctness of internal details rests with the publisher.
The territorial waters of India extend into the sea to a distance of twelve nautical miles measured from the appropriate base line.
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The spellings of names in this map, have been taken from various sources.

BMPIC : Vulnerability Atlas - 3rd Edition; Peer Group, MoHUA; Map is Based on digitised data of SOI, GOI; Basic Wind Speed Map National Building Code 2016. Houses/Population as per Census 2011; *Houses including vacant & locked houses. Disclaimer: The maps are solely for thematic presentation.

**Distribution of Houses by Predominant Materials of Roof and Wall
and Level of Damage Risk**

NCT OF DELHI

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
STATE - NCT OF DELHI				100				62.8	37.2			2.9
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	3,335	0.1									
	Urban	82,507	2.0									
	Total	85,842	2.1		H			VH	H			VH
A2 - Stone Wall not packed with mortar	Rural	1,758	-									
	Urban	43,455	1.1									
	Total	45,213	1.1		H			H	M			VH
Total - Category - A		131,055	3.2									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	90,056	2.2									
	Urban	3,559,017	87.8									
	Total	3,649,073	90.0		M			H	M			H/M
Total - Category - B		3,649,073	90.0									
C1 - Concrete Wall	Rural	3,881	0.1									
	Urban	219,613	5.4									
	Total	223,494	5.5		L			L	VL			L/VL
C2 - Wood wall	Rural	166	-									
	Urban	7,297	0.2									
	Total	7,463	0.2		L			VH	H			H
Total - Category - C		230,957	5.7									
X - Other Materials	Rural	1,866	-									
	Urban	40,425	1.0									
	Total	42,291	1.0		VL			VH	H			VH
Total - Category - X		42,291	1.0									
TOTAL HOUSES*		4,053,376										

ROOF												
R1 - Light Weight Sloping Roof	Rural	18,010	0.4									
	Urban	299,600	7.4									
	Total	317,610	7.8		M			VH	VH			VH
R2 - Heavy Weight Sloping Roof	Rural	46,919	1.2									
	Urban	933,292	23.0									
	Total	980,211	24.2		M			H	M			H
R3 - Flat Roof	Rural	36,133	0.9									
	Urban	2,719,422	67.1									
	Total	2,755,555	68.0									<i>Damage Risk as per that for the Wall supporting it</i>
TOTAL HOUSES*		4,053,376										

Housing Category : Wall Types

- Category - A :** Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B :** Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C :** Reinforced building, well built wooden structures
- Category - X :** Other materials not covered in A,B,C. These are generally light.
- Notes :** 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1 -** Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2 -** Heavy Weight (Tiles, Stone/Slate)
- Category - R3 -** Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
EQ Zone IV : High Damage Risk Zone (MSK VIII)
EQ Zone III : Moderate Damage Risk Zone (MSK VII)
EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

**Distribution of Houses by Predominant Materials of Roof and Wall
and Level of Damage Risk**

Table No. : DL 01

State : NCT OF DELHI

NORTH WEST

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
STATE - NCT OF DELHI				100				100				4.6
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	1,916	0.2									
	Urban	17,847	2.0									
	Total	19,763	2.2		H			VH				VH
A2 - Stone Wall not packed with mortar	Rural	1,037	0.1									
	Urban	10,399	1.2									
	Total	11,436	1.3		H			H				VH
Total - Category - A		31,199	3.6									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	47,148	5.4									
	Urban	735,734	84.1									
	Total	782,882	89.5		M			H				H/M
Total - Category - B		782,882	89.5									
C1 - Concrete Wall	Rural	1,698	0.2									
	Urban	45,805	5.2									
	Total	47,503	5.4		L			L				L/VL
C2 - Wood wall	Rural	119	-									
	Urban	976	0.1									
	Total	1,095	0.1		L			VH				H
Total - Category - C		48,598	5.6									
X - Other Materials	Rural	1,484	0.2									
	Urban	10,380	1.2									
	Total	11,864	1.4		VL			VH				VH
Total - Category - X		11,864	1.4									
TOTAL HOUSES*		874,543										

ROOF												
R1 - Light Weight Sloping Roof	Rural	11,691	1.3									
	Urban	66,365	7.6									
	Total	78,056	8.9		M			VH				VH
R2 - Heavy Weight Sloping Roof	Rural	23,022	2.6									
	Urban	214,127	24.5									
	Total	237,149	27.1		M			H				H
R3 - Flat Roof	Rural	18,689	2.1									
	Urban	540,649	61.8									
	Total	559,338	63.9									<i>Damage Risk as per that for the Wall supporting it</i>
TOTAL HOUSES*		874,543										

Probable Maximum Precipitation at a Station of the district in 24 hrs is N.A. mm

Housing Category : Wall Types

- Category - A :** Buildings in field-stone, rural structures, unburnt brick houses, clay houses
- Category - B :** Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
- Category - C :** Reinforced building, well built wooden structures
- Category - X :** Other materials not covered in A,B,C. These are generally light.
- Notes :** 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1 -** Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
- Category - R2 -** Heavy Weight (Tiles, Stone/Slate)
- Category - R3 -** Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
EQ Zone IV : High Damage Risk Zone (MSK VIII)
EQ Zone III : Moderate Damage Risk Zone (MSK VII)
EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : DL 02 State : NCT OF DELHI NORTH

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
				Area in %				Area in %					
					100					100			
WALL													
A1 - Mud & Unburnt Brick Wall	Rural	61	-										
	Urban	3,417	1.3										
	Total	3,478	1.3		H					VH			
A2 - Stone Wall not packed with mortar	Rural	7	-										
	Urban	3,813	1.4										
	Total	3,820	1.4		H					H			
Total - Category - A		7,298	2.7										
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	3,312	1.2										
	Urban	242,528	90.7										
	Total	245,840	91.9		M					H			
Total - Category - B		245,840	92.0										
C1 - Concrete Wall	Rural	216	0.1										
	Urban	10,348	3.9										
	Total	10,564	4.0		L					L			
C2 - Wood wall	Rural	-	-										
	Urban	784	0.3										
	Total	784	0.3		L					VH			
Total - Category - C		11,348	4.2										
X - Other Materials	Rural	65	-										
	Urban	2,764	1.0										
	Total	2,829	1.0		VL					VH			
Total - Category - X		2,829	1.1										
TOTAL HOUSES*		267,315											

ROOF													
R1 - Light Weight Sloping Roof	Rural	229	0.1										
	Urban	16,074	6.0										
	Total	16,303	6.1		M					VH			
R2 - Heavy Weight Sloping Roof	Rural	1,997	0.7										
	Urban	110,540	41.4										
	Total	112,537	42.1		M					H			
R3 - Flat Roof	Rural	1,435	0.5										
	Urban	137,040	51.3										
	Total	138,475	51.8										
<i>Damage Risk as per that for the Wall supporting it</i>													
TOTAL HOUSES*		267,315											

Probable Maximum Precipitation at a Station of the district in 24 hrs is N.A. mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
 - Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
 - Category - C** : Reinforced building, well built wooden structures
 - Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
 - Category - R2** - Heavy Weight (Tiles, Stone/Slate)
 - Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

Table No. : DL 03 State : NCT OF DELHI NORTH EAST

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
				Area in %				Area in %					
					100					100			
WALL													
A1 - Mud & Unburnt Brick Wall	Rural	57	-										
	Urban	4,058	0.9										
	Total	4,115	0.9		H					VH			
A2 - Stone Wall not packed with mortar	Rural	23	-										
	Urban	4,389	1.0										
	Total	4,412	1.0		H					H			
Total - Category - A		8,527	1.9										
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	4,234	0.9										
	Urban	417,127	93.4										
	Total	421,361	94.3		M					H			
Total - Category - B		421,361	94.3										
C1 - Concrete Wall	Rural	17	-										
	Urban	13,159	2.9										
	Total	13,176	2.9		L					L			
C2 - Wood wall	Rural	1	-										
	Urban	473	0.1										
	Total	474	0.1		L					VH			
Total - Category - C		13,650	3.1										
X - Other Materials	Rural	54	-										
	Urban	3,059	0.7										
	Total	3,113	0.7		VL					VH			
Total - Category - X		3,113	0.7										
TOTAL HOUSES*		446,651											

ROOF													
R1 - Light Weight Sloping Roof	Rural	312	0.1										
	Urban	13,245	3.0										
	Total	13,557	3.1		M					VH			
R2 - Heavy Weight Sloping Roof	Rural	1,965	0.4										
	Urban	170,886	38.3										
	Total	172,851	38.7		M					H			
R3 - Flat Roof	Rural	2,109	0.5										
	Urban	258,134	57.8										
	Total	260,243	58.3										
<i>Damage Risk as per that for the Wall supporting it</i>													
TOTAL HOUSES*		446,651											

Probable Maximum Precipitation at a Station of the district in 24 hrs is N.A. mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
 - Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
 - Category - C** : Reinforced building, well built wooden structures
 - Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes** : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
 - Category - R2** - Heavy Weight (Tiles, Stone/Slate)
 - Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
- * Total No. of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : DL 04 State : NCT OF DELHI EAST

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
				Area in %				Area in %					
					100					100			
WALL													
A1 - Mud & Unburnt Brick Wall	Rural	2	-										
	Urban	4,460	1.1										
	Total	4,462	1.1		H					VH			
A2 - Stone Wall not packed with mortar	Rural	3	-										
	Urban	3,386	0.8										
	Total	3,389	0.8		H					H			
Total - Category - A		7,851	1.9										
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	952	0.2										
	Urban	378,682	89.8										
	Total	379,634	90.0		M					H			
Total - Category - B		379,634	90.0										
C1 - Concrete Wall	Rural	1	-										
	Urban	28,522	6.8										
	Total	28,523	6.8		L					L			
C2 - Wood wall	Rural	-	-										
	Urban	562	0.1										
	Total	562	0.1		L					VH			
Total - Category - C		29,085	6.9										
X - Other Materials	Rural	3	-										
	Urban	5,148	1.2										
	Total	5,151	1.2		VL					VH			
Total - Category - X		5,151	1.2										
TOTAL HOUSES*		421,721											
ROOF													
R1 - Light Weight Sloping Roof	Rural	10	-										
	Urban	17,306	4.1										
	Total	17,316	4.1		M					VH			
R2 - Heavy Weight Sloping Roof	Rural	27	-										
	Urban	47,006	11.1										
	Total	47,033	11.1		M					H			
R3 - Flat Roof	Rural	924	0.2										
	Urban	356,448	84.5										
	Total	357,372	84.7										
TOTAL HOUSES*		421,721											

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. **537 mm**

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
 - Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
 - Category - C** : Reinforced building, well built wooden structures
 - Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes :**
1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
 - Category - R2** - Heavy Weight (Tiles, Stone/Slate)
 - Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : DL 05 State : NCT OF DELHI NEW DELHI

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
				Area in %				Area in %					
					100					100			
WALL													
A1 - Mud & Unburnt Brick Wall	Rural	-	-										
	Urban	2,542	5.4										
	Total	2,542	5.4		H					VH			
A2 - Stone Wall not packed with mortar	Rural	-	-										
	Urban	493	1.0										
	Total	493	1.0		H					H			
Total - Category - A		3,035	6.4										
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	-	-										
	Urban	40,741	86.3										
	Total	40,741	86.3		M					H			
Total - Category - B		40,741	86.3										
C1 - Concrete Wall	Rural	-	-										
	Urban	2,484	5.3										
	Total	2,484	5.3		L					L			
C2 - Wood wall	Rural	-	-										
	Urban	389	0.8										
	Total	389	0.8		L					VH			
Total - Category - C		2,873	6.1										
X - Other Materials	Rural	-	-										
	Urban	552	1.2										
	Total	552	1.2		VL					VH			
Total - Category - X		552	1.2										
TOTAL HOUSES*		47,201											
ROOF													
R1 - Light Weight Sloping Roof	Rural	-	-										
	Urban	6,747	14.3										
	Total	6,747	14.3		M					VH			
R2 - Heavy Weight Sloping Roof	Rural	-	-										
	Urban	2,668	5.7										
	Total	2,668	5.7		M					H			
R3 - Flat Roof	Rural	-	-										
	Urban	37,786	80.1										
	Total	37,786	80.1										
TOTAL HOUSES*		47,201											

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. **631 mm**

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
 - Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
 - Category - C** : Reinforced building, well built wooden structures
 - Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes :**
1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
 - Category - R2** - Heavy Weight (Tiles, Stone/Slate)
 - Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : DL 08 State : NCT OF DELHI SOUTH WEST

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
				Area in %				Area in %					
				100				12.7	87.3				
WALL													
A1 - Mud & Unburnt Brick Wall	Rural	1,138	0.2										
	Urban	13,692	2.5										
	Total	14,830	2.7		H			VH	H				
A2 - Stone Wall not packed with mortar	Rural	629	0.1										
	Urban	5,679	1.0										
	Total	6,308	1.1		H			H	M				
Total - Category - A		21,138	3.8										
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	30,987	5.6										
	Urban	454,721	82.6										
	Total	485,708	88.2		M			H	M				
Total - Category - B		485,708	88.3										
C1 - Concrete Wall	Rural	1,534	0.3										
	Urban	35,644	6.5										
	Total	37,178	6.8		L			L	VL				
C2 - Wood wall	Rural	42	-										
	Urban	1,022	0.2										
	Total	1,064	0.2		L			VH	H				
Total - Category - C		38,242	6.9										
X - Other Materials	Rural	229	-										
	Urban	4,957	0.9										
	Total	5,186	0.9		VL			VH	H				
Total - Category - X		5,186	0.9										
TOTAL HOUSES*		550,274											
ROOF													
R1 - Light Weight Sloping Roof	Rural	5,287	1.0										
	Urban	55,249	10.0										
	Total	60,536	11.0		M			VH	VH				
R2 - Heavy Weight Sloping Roof	Rural	17,972	3.3										
	Urban	86,533	15.7										
	Total	104,505	19.0		M			H	M				
R3 - Flat Roof	Rural	11,300	2.1										
	Urban	373,933	68.0										
	Total	385,233	70.1										
TOTAL HOUSES*		550,274											

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 631 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
 - Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
 - Category - C** : Reinforced building, well built wooden structures
 - Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes :**
1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
 - Category - R2** - Heavy Weight (Tiles, Stone/Slate)
 - Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : DL 09 State : NCT OF DELHI SOUTH

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %	
		No. of Houses	%	EQ Zone				Wind Velocity m/s					
				V	IV	III	II	55 & 50	47	44 & 39	33		
				Area in %				Area in %					
				100				48.5	51.5				10.2
WALL													
A1 - Mud & Unburnt Brick Wall	Rural	153	-										
	Urban	18,601	2.9										
	Total	18,754	2.9		H			VH	H				VH
A2 - Stone Wall not packed with mortar	Rural	53	-										
	Urban	5,695	0.9										
	Total	5,748	0.9		H			H	M				VH
Total - Category - A		24,502	3.8										
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	1,889	0.3										
	Urban	580,083	89.5										
	Total	581,972	89.8		M			H	M				H/M
Total - Category - B		581,972	89.8										
C1 - Concrete Wall	Rural	405	0.1										
	Urban	33,603	5.2										
	Total	34,008	5.3		L			L	VL				L/VL
C2 - Wood wall	Rural	4	-										
	Urban	1,009	0.2										
	Total	1,013	0.2		L			VH	H				H
Total - Category - C		35,021	5.4										
X - Other Materials	Rural	28	-										
	Urban	6,757	1.0										
	Total	6,785	1.0		VL			VH	H				VH
Total - Category - X		6,785	1.0										
TOTAL HOUSES*		648,280											
ROOF													
R1 - Light Weight Sloping Roof	Rural	422	0.1										
	Urban	66,856	10.3										
	Total	67,278	10.4		M			VH	VH				VH
R2 - Heavy Weight Sloping Roof	Rural	800	0.1										
	Urban	110,226	17.0										
	Total	111,026	17.1		M			H	M				H
R3 - Flat Roof	Rural	1,310	0.2										
	Urban	468,666	72.3										
	Total	469,976	72.5										
TOTAL HOUSES*		648,280											

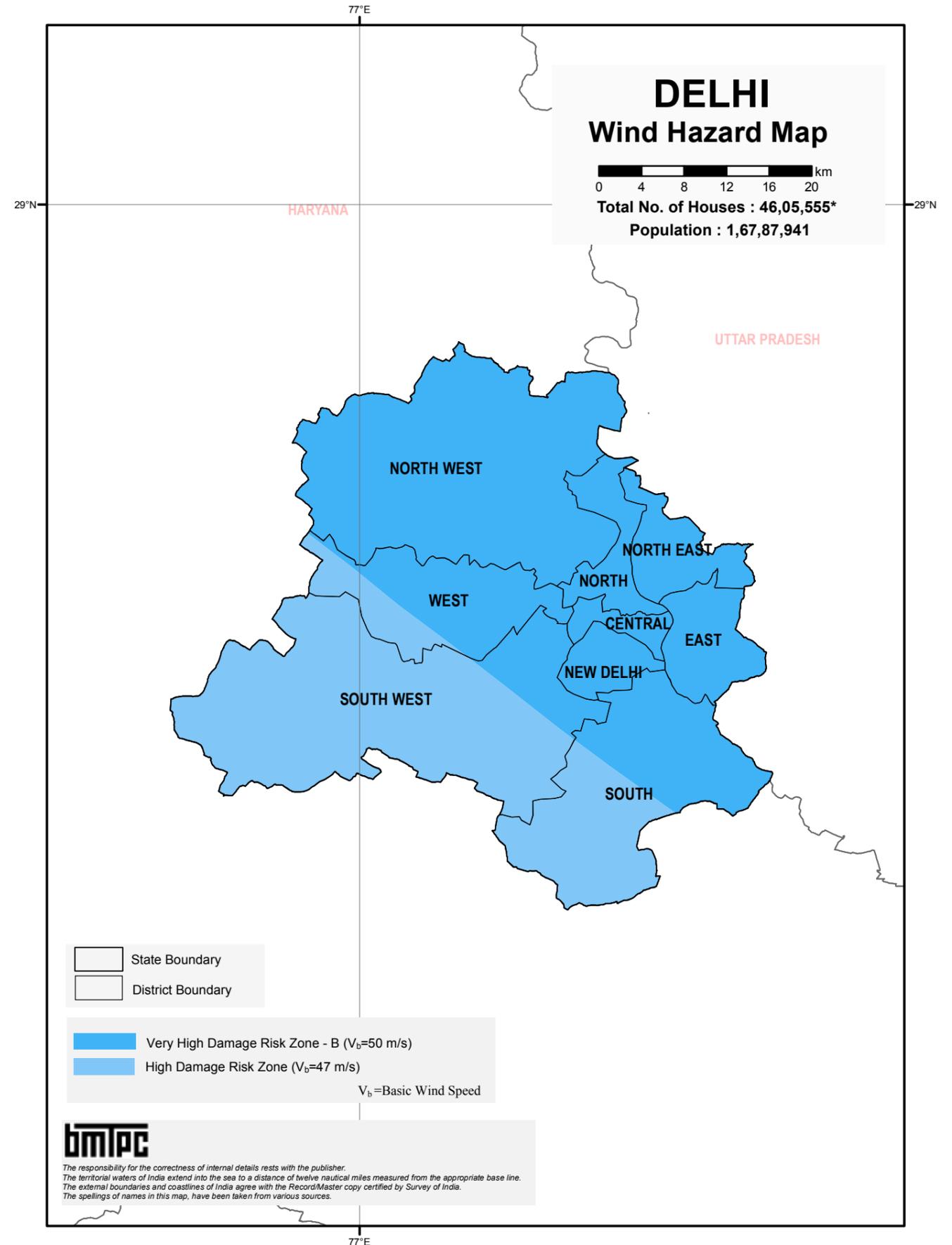
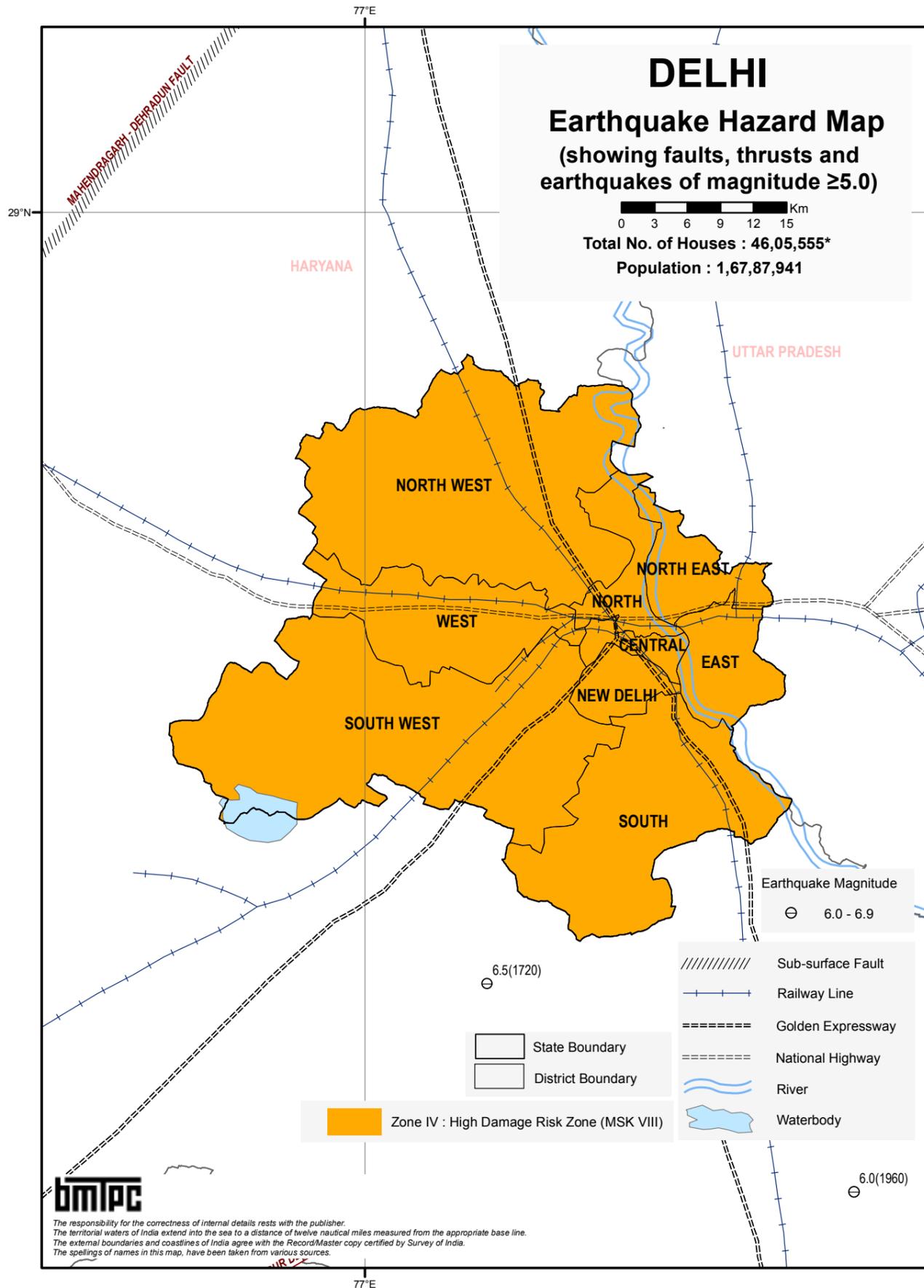
Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 631 mm

Housing Category : Wall Types

- Category - A** : Buildings in field-stone, rural structures, unburnt brick houses, clay houses
 - Category - B** : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone
 - Category - C** : Reinforced building, well built wooden structures
 - Category - X** : Other materials not covered in A,B,C. These are generally light.
- Notes :**
1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.
 2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building
 3. Source of Housing Data : Census of Housing, GOI, 2011

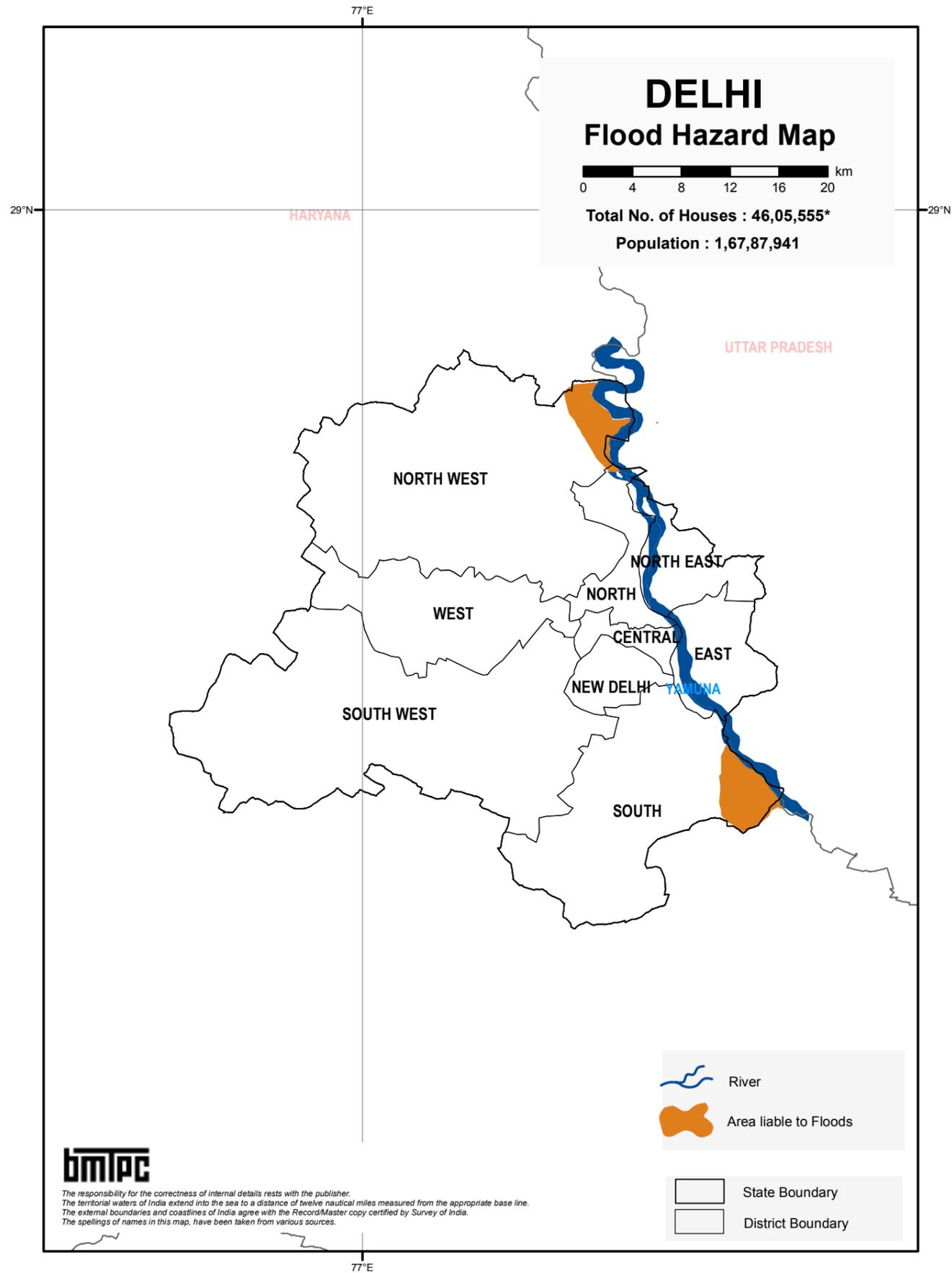
Housing Category : Roof Type

- Category - R1** - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)
 - Category - R2** - Heavy Weight (Tiles, Stone/Slate)
 - Category - R3** - Flat Roof (Brick, Concrete)
- EQ Zone V : Very High Damage Risk Zone (MSK > IX)
 EQ Zone IV : High Damage Risk Zone (MSK VIII)
 EQ Zone III : Moderate Damage Risk Zone (MSK VII)
 EQ Zone II : Low Damage Risk Zone (MSK < VI)
- Level of Risk : VH = Very High; H = High;
 M = Moderate; L = Low; VL = Very Low
- * Total No.of Houses excluding Vacant/Locked Houses



BMTPC : Vulnerability Atlas - 3rd Edition : Peer Group, MoHUA, GOI; Map is Based on digitised data of SOI; Seismic Zones of India Map IS:1893 (Part I): 2002, BIS; Earthquake Epicentre from IMD; Seismotectonic Atlas of India and its Environs, GSI; Houses/Population as per Census 2011; *Houses including vacant & locked houses. Disclaimer: The maps are solely for thematic presentation.

BMTPC : Vulnerability Atlas - 3rd Edition; Peer Group, MoHUA; Map is Based on digitised data of SOI, GOI; Basic Wind Speed Map National Building Code 2016. Houses/Population as per Census 2011; *Houses including vacant & locked houses. Disclaimer: The maps are solely for thematic presentation.



BMTPC : Vulnerability Atlas - 3rd Edition; Peer Group, MoHUA; Map is Based on digitised data of SOI, GOI; Census of India 2011; Flood Atlas(1987),Task Force Report(2004), C.W.C., G.O.I. Houses/Population as per Census 2011; * Houses including vacant & locked houses. Disclaimer: The maps are solely for thematic representation

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

LAKSHADWEEP

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
		Area in %				Area in %						
STATE - LAKSHADWEEP												
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	26	0.1									
	Urban	14	0.1									
	Total	40	0.2			M				H		
A2 - Stone Wall not packed with mortar	Rural	564	3.2									
	Urban	985	5.6									
	Total	1,549	8.8			M				M		
Total - Category - A		1,589	9.0									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	3,122	17.7									
	Urban	10,696	60.7									
	Total	13,818	78.4			L				M		
Total - Category - B		13,818	78.4									
C1 - Concrete Wall	Rural	47	0.3									
	Urban	99	0.6									
	Total	146	0.9			VL				VL		
C2 - Wood wall	Rural	10	0.1									
	Urban	208	1.2									
	Total	218	1.3			VL				H		
Total - Category - C		364	2.1									
X - Other Materials	Rural	720	4.1									
	Urban	1,126	6.4									
	Total	1,846	10.5			VL				H		
Total - Category - X		1,846	10.5									
TOTAL HOUSES*		17,617										
ROOF												
R1 - Light Weight Sloping Roof	Rural	1,306	7.4									
	Urban	2,878	16.3									
	Total	4,184	23.7			L				VH		
R2 - Heavy Weight Sloping Roof	Rural	1,840	10.4									
	Urban	4,746	26.9									
	Total	6,586	37.3			L				M		
R3 - Flat Roof	Rural	1,343	7.6									
	Urban	5,504	31.2									
	Total	6,847	38.8									
TOTAL HOUSES*		17,617										

Probable Maximum Precipitation at a Station of the district in 24 hrs is N.A. mm

Housing Category : Wall Types

Category - A : Buildings in field-stone, rural structures, unburnt brick houses, clay houses

Category - B : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone

Category - C : Reinforced building, well built wooden structures

Category - X : Other materials not covered in A,B,C. These are generally light.

Notes : 1. Flood prone area includes that protected area which may have more severe

damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.

2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building

3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

Category - R1 - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)

Category - R2 - Heavy Weight (Tiles, Stone/Slate)

Category - R3 - Flat Roof (Brick, Concrete)

EQ Zone V : Very High Damage Risk Zone (MSK > IX)

EQ Zone IV : High Damage Risk Zone (MSK VIII)

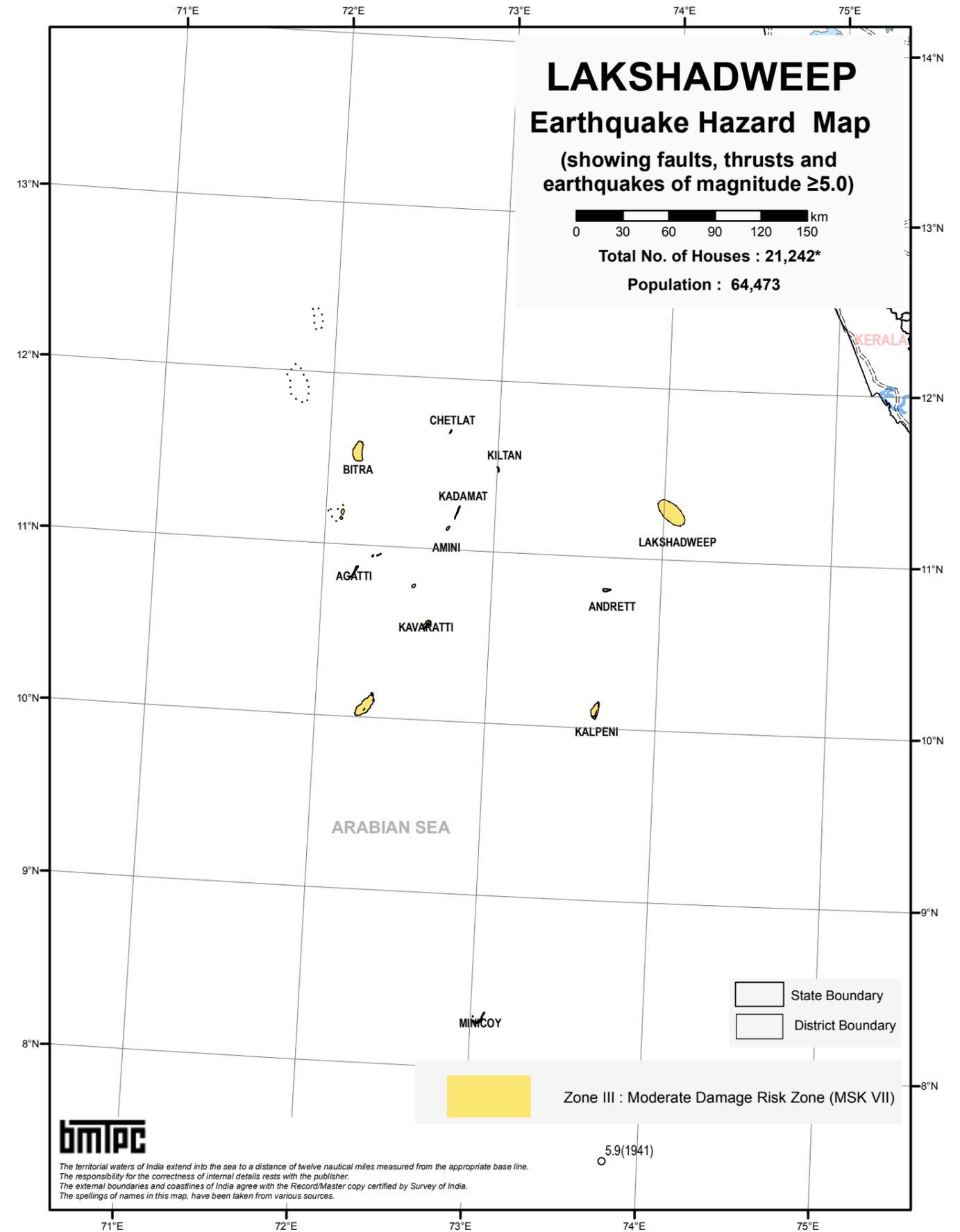
EQ Zone III : Moderate Damage Risk Zone (MSK VII)

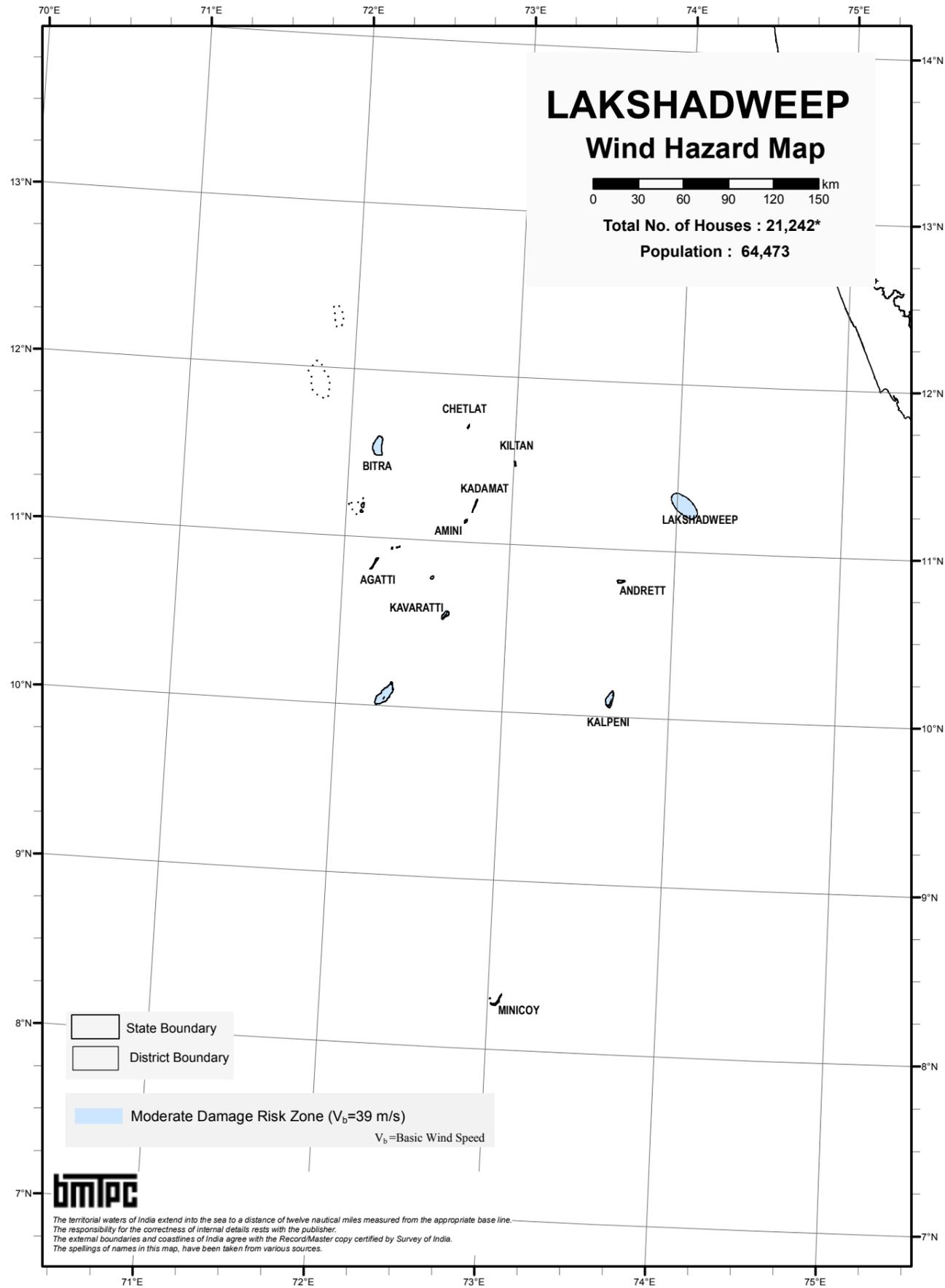
EQ Zone II : Low Damage Risk Zone (MSK < VI)

Level of Risk : VH = Very High; H = High;

M = Moderate; L = Low; VL = Very Low

* Total No. of Houses excluding Vacant/Locked Houses





BMTPC : Vulnerability Atlas - 3rd Edition; Peer Group, MoHUA; Map is Based on digitised data of SOI, GOI; Basic Wind Speed Map National Building Code 2016. Houses/Populationas per Census 2011; *Houses including vacant & locked houses. Disclaimer: The maps are solely for thematic presentation.

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

PUDUCHERRY

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
STATE - PUDUCHERRY											8.7	
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	15,385	4.4									
	Urban	7,671	2.2									
	Total	23,056	6.6		M	L	VH	H	M		VH	
A2 - Stone Wall not packed with mortar	Rural	3,141	0.9									
	Urban	2,295	0.7									
	Total	5,436	1.6		M	L	H	M	L		VH	
Total - Category - A		28,492	8.2									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	74,189	21.3									
	Urban	211,946	60.8									
	Total	286,135	82.1		L	VL	H	M	L		H/M	
Total - Category - B		286,135	82.0									
C1 - Concrete Wall	Rural	3,090	0.9									
	Urban	4,590	1.3									
	Total	7,680	2.2		VL	VL	L	VL	VL		L/VL	
C2 - Wood wall	Rural	525	0.2									
	Urban	432	0.1									
	Total	957	0.3		VL	VL	VH	H	M		H	
Total - Category - C		8,637	2.5									
X - Other Materials	Rural	14,050	4.0									
	Urban	11,534	3.3									
	Total	25,584	7.3		VL	VL	VH	H	M		VH	
Total - Category - X		25,584	7.3									
TOTAL HOUSES*		348,848										

ROOF												
R1 - Light Weight Sloping Roof	Rural	47,585	13.6									
	Urban	43,929	12.6									
	Total	91,514	26.2		L	VL	VH	VH	H		VH	
R2 - Heavy Weight Sloping Roof	Rural	12,453	3.6									
	Urban	20,215	5.8									
	Total	32,668	9.4		L	VL	H	M	L		H	
R3 - Flat Roof	Rural	50,342	14.4									
	Urban	174,324	50.0									
	Total	224,666	64.4	<i>Damage Risk as per that for the Wall supporting it</i>								
TOTAL HOUSES*		348,848										

Housing Category : Wall Types

Category - A : Buildings in field-stone, rural structures, unburnt brick houses, clay houses

Category - B : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone

Category - C : Reinforced building, well built wooden structures

Category - X : Other materials not covered in A,B,C. These are generally light.

Notes : 1. Flood prone area includes that protected area which may have more severe

damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.

2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building

3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

Category - R1 - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)

Category - R2 - Heavy Weight (Tiles, Stone/Slate)

Category - R3 - Flat Roof (Brick, Concrete)

EQ Zone V : Very High Damage Risk Zone (MSK > IX)

EQ Zone IV : High Damage Risk Zone (MSK VIII)

EQ Zone III : Moderate Damage Risk Zone (MSK VII)

EQ Zone II : Low Damage Risk Zone (MSK < VI)

Level of Risk : VH = Very High; H = High;

M = Moderate; L = Low; VL = Very Low

* Total No. of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : PY 01

State : PUDUCHERRY

YANAM

Wall / Roof		Census Houses		Level of Risk under								Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s				
				V	IV	III	II	55 & 50	47	44 & 39	33	
				Area in %				Area in %				
STATE - PUDUCHERRY											64.9	
WALL												
A1 - Mud & Unburnt Brick Wall	Rural	-	-									
	Urban	462	3.2									
	Total	462	3.2							L	VH	VH
A2 - Stone Wall not packed with mortar	Rural	-	-									
	Urban	16	0.1									
	Total	16	0.1							L	H	VH
Total - Category - A		478	3.3									
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	-	-									
	Urban	12,940	89.0									
	Total	12,940	89.0							VL	H	H/M
Total - Category - B		12,940	89.0									
C1 - Concrete Wall	Rural	-	-									
	Urban	31	0.2									
	Total	31	0.2							VL	L	L/VL
C2 - Wood wall	Rural	-	-									
	Urban	220	1.5									
	Total	220	1.5							VL	VH	H
Total - Category - C		251	1.7									
X - Other Materials	Rural	-	-									
	Urban	875	6.0									
	Total	875	6.0							VL	VH	VH
Total - Category - X		875	6.0									
TOTAL HOUSES*		14,544										

ROOF												
R1 - Light Weight Sloping Roof	Rural	-	-									
	Urban	2,242	15.4									
	Total	2,242	15.4							VL	VH	VH
R2 - Heavy Weight Sloping Roof	Rural	-	-									
	Urban	851	5.9									
	Total	851	5.9							VL	H	H
R3 - Flat Roof	Rural	-	-									
	Urban	11,451	78.7									
	Total	11,451	78.7	<i>Damage Risk as per that for the Wall supporting it</i>								
TOTAL HOUSES*		14,544										

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. **808 mm**

Housing Category : Wall Types

Category - A : Buildings in field-stone, rural structures, unburnt brick houses, clay houses

Category - B : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone

Category - C : Reinforced building, well built wooden structures

Category - X : Other materials not covered in A,B,C. These are generally light.

Notes : 1. Flood prone area includes that protected area which may have more severe

damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.

2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building

3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

Category - R1 - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)

Category - R2 - Heavy Weight (Tiles, Stone/Slate)

Category - R3 - Flat Roof (Brick, Concrete)

EQ Zone V : Very High Damage Risk Zone (MSK > IX)

EQ Zone IV : High Damage Risk Zone (MSK VIII)

EQ Zone III : Moderate Damage Risk Zone (MSK VII)

EQ Zone II : Low Damage Risk Zone (MSK < VI)

Level of Risk : VH = Very High; H = High;

M = Moderate; L = Low; VL = Very Low

* Total No. of Houses excluding Vacant/Locked Houses

Distribution of Houses by Predominant Materials of Roof and Wall and Level of Damage Risk

Table No. : PY 04 State : PUDUCHERRY KARAİKAL

Wall / Roof		Census Houses		Level of Risk under							Flood Prone Area in %
		No. of Houses	%	EQ Zone				Wind Velocity m/s			
				V	IV	III	II	55 & 50	47	44 & 39	
				Area in %				Area in %			
WALL											
A1 - Mud & Unburnt Brick Wall	Rural	4,188	6.9								
	Urban	1,068	1.8								
	Total	5,256	8.7				L		H		
A2 - Stone Wall not packed with mortar	Rural	1,442	2.4								
	Urban	768	1.3								
	Total	2,210	3.7				L		M		
Total - Category - A		7,466	12.4								
B - Burnt Bricks Wall & Stone wall packed with mortar	Rural	20,819	34.5								
	Urban	24,557	40.7								
	Total	45,376	75.2				VL		M		
Total - Category - B		45,376	75.2								
C1 - Concrete Wall	Rural	419	0.7								
	Urban	834	1.4								
	Total	1,253	2.1				VL		VL		
C2 - Wood wall	Rural	92	0.2								
	Urban	32	0.1								
	Total	124	0.3				VL		H		
Total - Category - C		1,377	2.3								
X - Other Materials	Rural	4,405	7.3								
	Urban	1,734	2.9								
	Total	6,139	10.2				VL		H		
Total - Category - X		6,139	10.2								
TOTAL HOUSES*		60,358									
ROOF											
R1 - Light Weight Sloping Roof	Rural	15,103	25.0								
	Urban	7,214	12.0								
	Total	22,317	37.0				VL		VH		
R2 - Heavy Weight Sloping Roof	Rural	3,795	6.3								
	Urban	3,381	5.6								
	Total	7,176	11.9				VL		M		
R3 - Flat Roof	Rural	12,467	20.7								
	Urban	18,398	30.5								
	Total	30,865	51.2								
TOTAL HOUSES*		60,358									

Probable Maximum Precipitation at a Station of the district in one day for arial extent of 1000 sqm. 616 mm

Housing Category : Wall Types

Category - A : Buildings in field-stone, rural structures, unburnt brick houses, clay houses

Category - B : Ordinary brick building; buildings of the large block & prefabricated type, half-timbered structures, building in natural hewn stone

Category - C : Reinforced building, well built wooden structures

Category - X : Other materials not covered in A,B,C. These are generally light.

Notes : 1. Flood prone area includes that protected area which may have more severe damage under failure of protection works. In some other areas the local damage may be severe under heavy rains and choked drainage.

2. Damage Risk for wall types is indicated assuming heavy flat roof in categories A, B and C (Reinforced Concrete) building

3. Source of Housing Data : Census of Housing, GOI, 2011

Housing Category : Roof Type

Category - R1 - Light Weight (Grass, Thatch, Bamboo, Wood, Mud, Plastic, Polythene, GI Metal, Asbestos Sheets, Other Materials)

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EQ Zone III : Moderate Damage Risk Zone (MSK VII)

EQ Zone II : Low Damage Risk Zone (MSK < VI)

Level of Risk : VH = Very High; H = High;

M = Moderate; L = Low; VL = Very Low

* Total No. of Houses excluding Vacant/Locked Houses

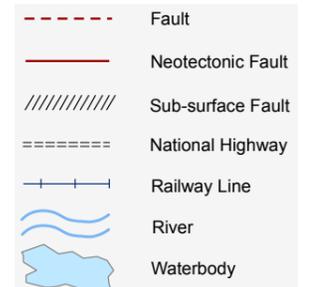
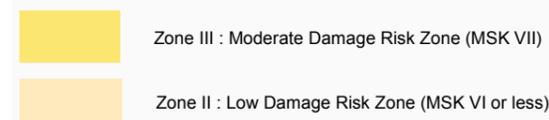
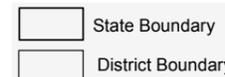
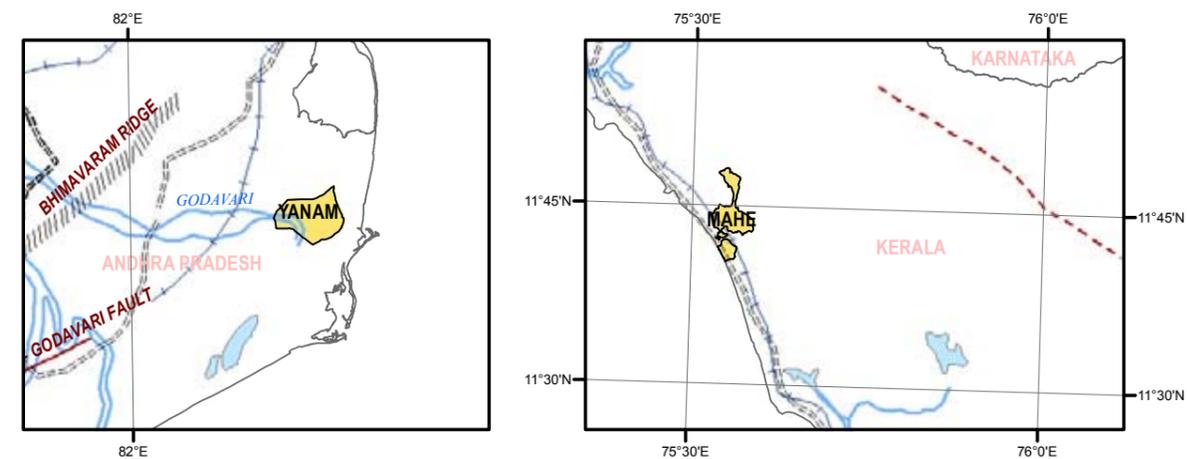
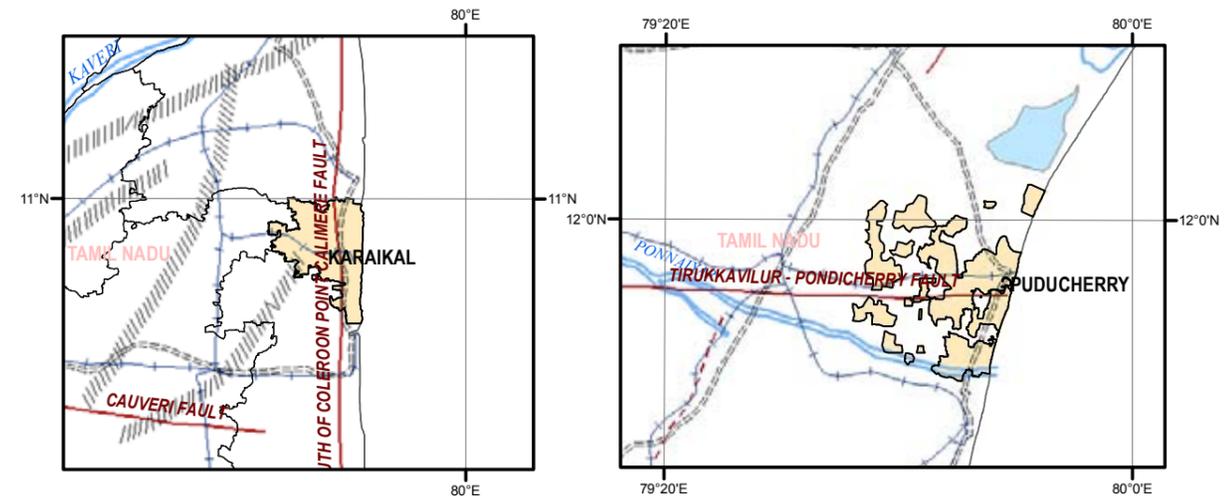
PUDUCHERRY Earthquake Hazard Map

(showing faults, thrusts and earthquakes of magnitude ≥5.0)



Total No. of Houses : 3,87,999*

Population : 12,47,953



The responsibility for the correctness of internal details rests with the publisher. The territorial waters of India extend into the sea to a distance of twelve nautical miles measured from the appropriate base line. The external boundaries and coastlines of India agree with the Record/Master copy certified by Survey of India. The spellings of names in this map, have been taken from various sources.

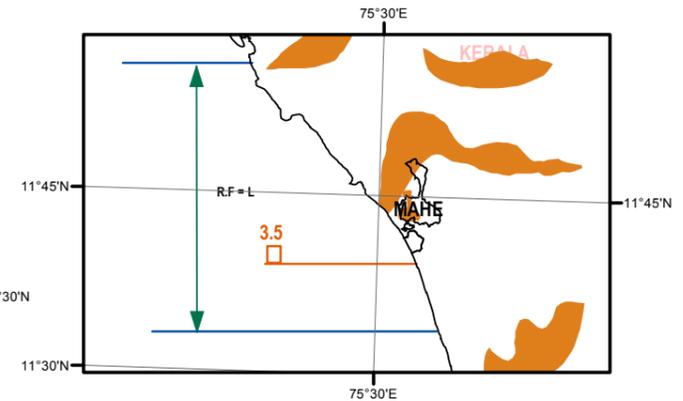
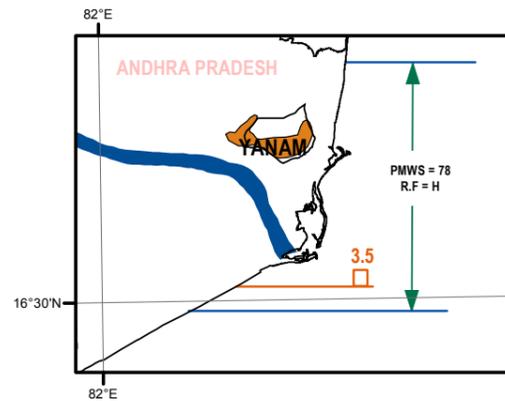
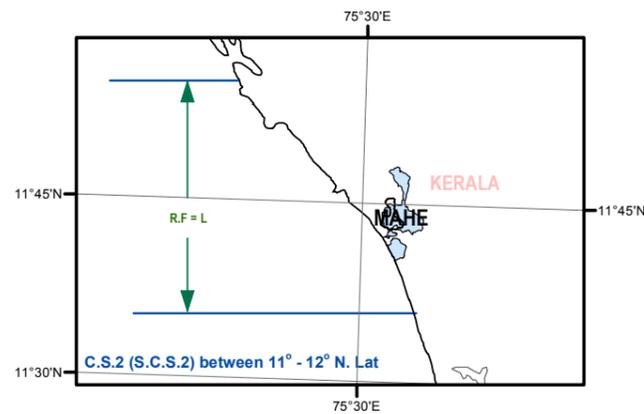
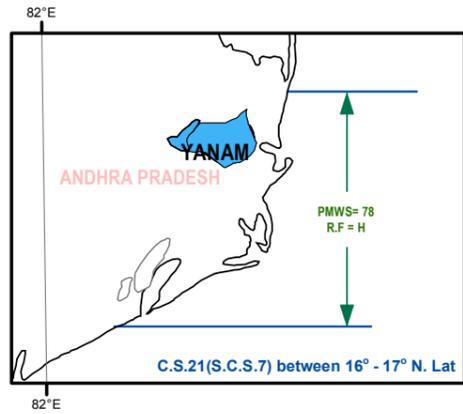
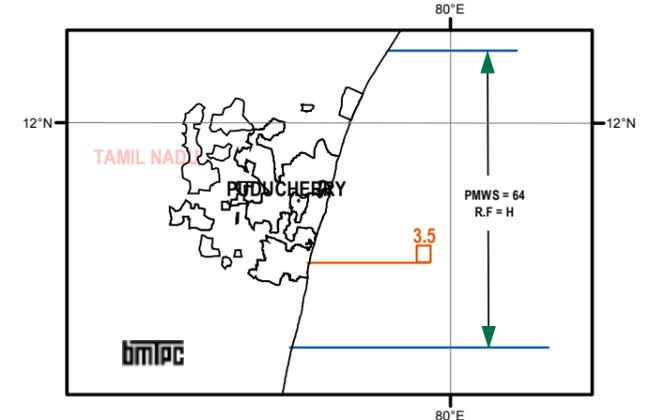
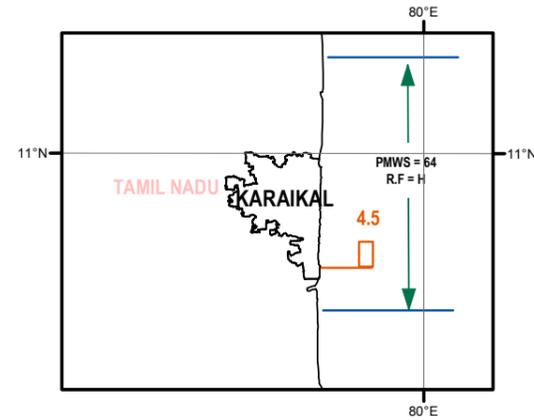
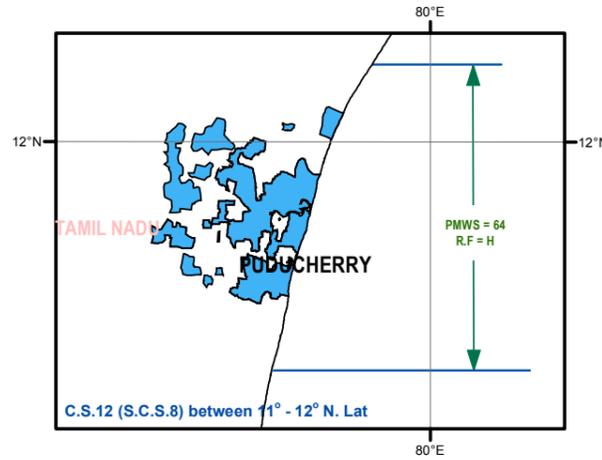
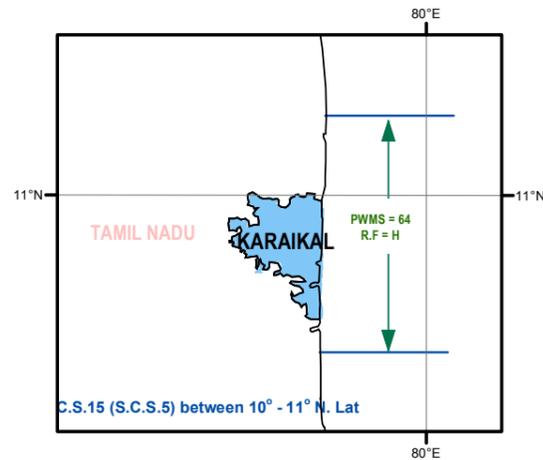
BMTPC : Vulnerability Atlas - 3rd Edition: Peer Group, MoHUA, GOI; Map is Based on digitised data of SOI; Seismic Zones of India Map IS: 1893 (Part I) - 2002, BIS; Earthquake Epicentre from IMD; Seismotectonic Atlas of India and its Environs, GSI; Houses/Population as per Census 2011; *Houses including vacant & locked houses. Disclaimer: The maps are solely for thematic presentation.

PUDUCHERRY Wind Hazard Map

0 10 20 30 40 50 km
 Total No. of Houses : 3,87,999*
 Population : 12,47,953

PUDUCHERRY Flood Hazard Map

0 10 20 30 40 50 Km
 Total No. of Houses : 3,87,999*
 Population : 12,47,953



State Boundary
 District Boundary

Very High Damage Risk Zone - B ($V_b=50$ m/s)
 High Damage Risk Zone ($V_b=47$ m/s)
 Moderate Damage Risk Zone - B ($V_b=39$ m/s)

V_b = Basic Wind Speed

C.S = Cyclonic Storm Crossing one degree Latitude
 (S.C.S) = Severe Cyclonic Storm Crossing one degree Latitude
 P.M.W.S = Probable Maximum Wind Speed (m/s)
 R.F.= H = Risk Factor High
 R.F.= L = Risk Factor Low



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BMTPC : Vulnerability Atlas - 3rd Edition; Peer Group, MoHUA; Map is Based on digitised data of SOI, GOI; Basic Wind Speed Map National Building Code 2016; Cyclone Data, 1891-2015, IMD, GOI. Houses/Population as per Census 2011; *Houses including vacant & locked houses. Disclaimer: The maps are solely for thematic presentation.



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River
 Area liable to Floods
 Probable Maximum Surge Height (m)
 State Boundary
 District Boundary

For further details, please contact:



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