GOI-UNDP DISASTER RISK MANAGEMENT PROGRAMME

URBAN EARTHQUAKE VULNERABILITY REDUCTION PROJECT

(38 CITIES IN SEISMIC ZONE 3,4,5 WITH MORE THAN ½ MILLION POPULATION)

Introduction to the Disaster Risk Management Programme:

The GoI-UNDP Disaster Risk Management Programme is a national initiative to reduce vulnerabilities of communities in some of the most hazard prone districts of India (169 districts and 17 states). The Programme (2002-2007) aims to contribute to the social and economic development goals of the National and State Governments, enable them to minimise losses to development gains and to reduce their vulnerability to natural disasters. The programme relies upon a community based approach to disaster management, and seeks to build capacities of communities, government functionaries at all levels, and other stake-holders in disaster management, at all levels, in an organised manner. Please refer to the programme document or www.undp.org.in for details on the objectives, spread, activities, etc.

The Ministry of Home Affairs is the executing agency with UNDP Country Office support for implementation.

The chief components of the programme are:

- Development of State and District Disaster Management Plans.
- Development of disaster risk management and response plans at Village/Ward, Gram Panchayat, Block/Urban Local Body levels.
- Constitution and training of Disaster Management Teams (DMTs) and Disaster Management Committees (DMCs) at all levels with adequate representation of women in all committees and team. (Village/Ward, Gram Panchayat, Block/Urban local body, District and State.) At the village level, the DMT is a number of Village Task Forces on various aspects of disaster management.
- Capacity building of DMTs at all levels.
- Special training for women in first aid, shelter management, water and sanitation, rescue and evacuation, etc.
- Capacity building in cyclone and earthquake resistant features for houses in disaster-prone districts, training in retrofitting, and construction of technology demonstration units.
- Integration of disaster management plans with development plans of local self-governments.
- Mainstreaming of disaster management in training, capacity building and education curricula at all levels, across the country.

I. Background to the subcomponent on Urban Earthquake Vulnerability Reduction

The Indian sub continent is highly prone to natural disasters. Floods, droughts, cyclones and earthquakes are a recurrent phenomenon. As per the latest seismic zoning map brought out by the Bureau of Indian Standards (BIS)*, over 65% of the country is prone to earthquakes of intensity MSK VII or more. Some of the most intense earthquakes of the world have occurred in India, but fortunately, none of these have occurred in any of the major cities. India has highly populous cities including the national capital of New Delhi, located in zones of high seismic risk. Typically, the majority of the constructions in these cities are not earthquake resistant. Thus any earthquake striking in one of these cities would turn into a major disaster.

It is most important in the medium and long term to formulate strategies to reduce the vulnerability to and losses arising from a possible earthquake striking one of these cities. Six major earthquakes have struck different parts of India over a span of the last 15 years. The damages caused by these earthquakes reiterate the scale of vulnerability. However, if any of these earthquakes had struck populous urban centres, the damages in terms of human lives and property would have been colossal.

Frequent disasters lead to erosion of development gains and restricted options for the disaster victims. Physical safety—especially that of the vulnerable groups—is routinely threatened by hazards. Disasters such as the Gujarat Earthquake have very clearly illustrated that we need mitigation, preparedness and response plans so that the threat to human life and property is minimized.

II. The Project

This project essentially aims at strengthening capacities of communities, urban local bodies and the administration in mitigation, preparedness and response in 38 cities in India. These cities have been chosen on the criteria of being located in Seismic Zones 3, 4 or 5, with more than half a million population. The project would demonstrate a suitable model for mainstreaming of earthquake risk management initiatives at all levels and help to reduce earthquake risk in the most earthquake-prone urban areas in India.

Urban Planning Institutions and Agencies in the selected cities would be directly involved in the planning process to ensure sustainability of these initiatives. A wide representation of women is envisaged in this project during the planning process and also in the capacity building component, not just to be prepared in the event of a disaster, but also to act as disaster managers and to focus on the special needs of women in disasters. This project will work closely with relevant Government departments and institutions at the National and State levels. Learnings from this initiative will feed into the national capacity building programmes of the Government of India, and help to mainstream training in disaster

* IS 1893 -Part 1: 2002, Map of Seismic Zones of India

management in all regular training programmes of the Government.

This project envisages the following broad components

1. **Awareness Generation,**
2. **Development of Preparedness and Response Plans at the community and administrative levels,**
3. **Development of a Techno-legal Regime for the States,**
4. **Capacity Building at all levels and**
5. **Knowledge Networking on International and National Best-practices among all the cities and urban centers in the programme.**

II.a. Goals and Objectives

Goal: Sustainable Reduction in Earthquake Risk in the most earthquake-prone urban areas across the country.

Indicators: The indicators of achievement of this goal would be:

- Risk reduction factor in rapid disaster recovery
- Disasters mitigated and development gains protected.
- Disaster risk considerations mainstreamed into development.
- Community-led enforcement of preparedness activities
- Gender equity in disaster preparedness.

Objective 1: Create awareness among government functionaries, technical institutions, NGOs, CBOs and communities about earthquake vulnerability and possible preventive actions.

Objective 2: Development and Institutionalising of Earthquake Preparedness and Response Plans and practise these through mock drills

Objective 3: Development of regulatory framework (techno-legal regime) to promote safe construction and systems to ensure compliance

Objective 4: Capacity building for certification by Government functionaries and professionals (engineers and architects)

Objective 5: Networking knowledge on best practices and tools for effective earthquake risk management, including creation of information systems containing inventory of resources for emergency operations.

The activities envisaged are as follows:

Activities under Objective - I : Awareness Generation

1. Consultations with national and state governments, City development authorities,

ULBs, NGOs, training institutions, practicing engineers, architects, real-estate firms, builders, contractors, etc. for city-specific earthquake risk management and mitigation strategies.

2. Formulation of city specific awareness campaign strategies.
3. Awareness generation programmes for
   - Voluntary organizations and students on earthquake management and mitigation
   - The community through workshops/seminars/training, use of media (radio/TV/ articles in common magazines, posters/leaflets in local language and observation of earthquake risk management day/week)
   - School children on safety measures through audio-visual programmes, competitions, mock drills, etc
   - Institutions of Engineers/Architects, stakeholders in the real estate market, builders associations, contractors associations, etc. through workshops and orientation programmes.
4. Development of 'Ready reckoners' and user-friendly manuals on
   - Design and construction of earthquake-resistant houses/retrofitting
   - Earthquake risk management and response plans.
   - Dissemination of accurate warning, search and rescue operations, first aid, Restoration of services- water & sanitation, shelter management, counselling and damage assessments for early recovery and response, proper utilization and better coordination of relief materials during crisis.
   - Documentation of appropriate retrofitting techniques and sharing of best practices, conference proceedings and articles in popular magazines.
   - Newspaper advertisements in National and local newspapers

Activities under Objective - II : Earthquake Preparedness plan

- Identification and networking of nodal agencies and partners at different levels for implementation of the programme.
- Formation of City and Ward level Disaster Management Teams [DMT] including the concerned Government Depts. Senior citizens, National Cadet Corps (NCC)/National Social Service (NSS), Rotary and Lions Clubs, Bhagidaris (Delhi)/City Nagarik Committees/resident welfare associations, elected members, NGOs and other civil society response groups.
- Development of city and ward level earthquake preparedness and response plans.
- Development of an inventory of resources at all levels for speedy response during emergencies and establishing linkages with the India Disaster Resources Network (IDRN) portal being commissioned by MHA.

- Development of response structure from ward to city level.
- Specialized training of Disaster Management Teams [DMTs'] at ward and city levels.
- Preparedness drills at all levels- national, city and ward levels.

Activities under Objective - III : Developing a Techno-Legal Framework

- Orientation for policy makers to enforce legislation for registration and regulation of builders, promoters, and real estate developers for creation of safe habitat.
- Orientation of govt. officials in Urban Local Bodies - Development Authorities/ Municipalities/Town Planning Departments/Housing Societies/Housing Boards, etc. towards the earthquake hazard, risk evaluation and possible mitigation measures.
- Developing systems for city specific Audit of safe building practices
- Constitution of empowered committees at the national and apex bodies at the state level to review the zoning regulations, building codes & byelaws and regulatory mechanisms at National, State and City levels (for newly developed areas, old 'core' areas of the city and slums) for earthquake vulnerability reduction.
- Creating a framework for compulsory certification system for engineers and architects- to set standard levels of competence among all practitioners.
- Developing course curriculum for compulsory certification of practicing engineers and architects through a national level committee to be constituted by MHA.
- Setting up of Institutional framework for a National/State Ombudsman to ensure compliance of safe building byelaws and construction practices
- Consultations and partnerships with Financial Institutions and Insurance Agencies to work out modalities for ensuring disaster resistant features in new as well as extension of existing constructions while giving loans and policies.
- Using vulnerability databases for risk and vulnerability analysis as decision support instruments to enhance national and state policy on earthquake risk management.

Activities under Objective - IV : Capacity Building

- Building capacities of students of Engineering & Architecture for awareness generation, mitigation measures and in the development of the preparedness plans.
- Strengthening of local academic institutions as Key Resource Institutions for earthquake risk management.
- Trainings and orientation programmes for National and State Government functionaries, functionaries of development authorities, ULBs, NGOs, training institutions, private sectors (real-estate firms, builders, contractors, etc.) in the process of development of community based earthquake risk management and response plans;

- Training of selected engineers from prominent government engineering departments (such as PWD, MES, the Urban Development Authorities) on seismic resistant constructions, codal provisions, safety and evaluation techniques, retrofitting etc. in collaboration with the National Programme on Earthquake Engineering Education (NPEEE) – a programme of the Ministry of Human Resource Development.
- Providing technical support, trainings and periodic assessments on earthquake vulnerability through the research/knowledge hub at national level.
- Constitution and capacity building of Quick Response Teams (QRTs) in disaster preparedness and response by international experts in the field.
- Partnerships with research/resource institutions at National and City levels for review of existing earthquake preparedness and response plans.
- Support for formation/development of a Resource Center in each city for capacity building and technology transfer.
- Training programmes for resident welfare associations in hazard, social and resource mapping and development of earthquake preparedness and response plans.
- Sensitisation and training of policy makers and local self-governments in the development of the Incident Command System for dealing with emergencies.

Activities under Objective - V : Networking

- Developing a web-based portal on knowledge sharing, inter-city co-operation on earthquake vulnerability reduction initiatives, a forum for city representatives, project coordinators, and national advisors to share experiences and learning on urban earthquake risk and risk management for linking the practitioners involved in the programme.
- Research and documentation on earthquake risk management index for each city, and sharing of the same.
- National database on earthquake risk management and earthquake preparedness and response plans at various levels.
- Capability assessment and national training plan for earthquake risk management.
- Development of Risk and Vulnerability Indices and annual reports.
- Documentation and sharing of best practices of India for earthquake risk management for wider circulation as part of training curriculum.
- Inter-city exposure visits for city managers for mutual learning.

III. Project Implementation Strategy

With a focus on the 38 urban centers at risk, GoI-UNDP envisages a comprehensive programme for seismic risk management. In this project, a multi-pronged strategy would be adopted:

- ❖ *Support National Government [MHA] efforts in strengthening its role in community and urban local bodies' preparedness and response, including support to key National and State level resource institutions.*
- ❖ *Facilitate State and Local self Governments in ensuring administrative, institutional, financial and techno-legal mechanisms for seismic risk management.*
- ❖ *Empower communities at risk to engage in comprehensive earthquake risk management in the most vulnerable urban centers.*

Seismic Risk Management can be addressed through structural measures and non-structural measures. Structural measures would reduce the impact of disasters and non-structural measures would enhance the management skills and improve capacities of the community, local self-governments, urban bodies and the State authorities to prepare, prevent & respond effectively to disasters. Non-structural measures are of utmost importance, and include vulnerability mapping, risk assessment analysis, hazard zoning, inventory of resources to meet the emergency, Knowledge networking of best practices etc.

The Urban Earthquake Vulnerability Reduction Project is targeted over a time period of 4 years and is aimed in particular to raise the awareness of decision makers and the public to seismic risk in their region and contribute to minimizing losses to developmental gains by helping communities at risk to be better prepared.

IV. Outcomes of the Programme

The Ministry of Home Affairs (MHA) is the nodal Ministry for disaster management at the national level. This project will provide capacity building support to MHA, State Governments, Urban Local Bodies (ULBs) & Key Resource Institutions.

The following are the direct outcomes of the programme:

- ❖ Enhanced capacities in Ministry of Home Affairs for disaster risk management
- ❖ Administrative and institutional framework for earthquake risk management in the most vulnerable urban centres of the country
- ❖ Capacity building in earthquake risk management at National, State, District, City, Ward/Community level, including strengthening of resource institutions and establishing of linkages.
- ❖ Development of an Earthquake Scenario document for each city so as to know the consequences of an earthquake (estimation of damage probabilities, etc.) and preparation of an Action Plan for the purpose of emergency planning and preparedness for the 38 cities.
- ❖ A comprehensive earthquake risk management framework and recovery plans for each of the 38 cities.
- ❖ Awareness on earthquake risk among functionaries of Urban Local Bodies

- Disaster resource inventory prepared for the cities covered under the programme.
- Sectoral Preparedness plans for all nodal agencies in the ULBs and for the residents welfare associations of the city
- An aware and informed community, students and teachers, key government functionaries, masons and engineering institutions, policy makers etc.
- Compulsory certification course for practicing engineers and architects, including detailed course curriculum.
- Training and capacity building for engineers/architects and builders in safe-building practices and retrofitting techniques.
- Awareness on safe building practices among practicing architects/engineers/builders.
- Support to generate awareness among School students and schedule to drills in disaster prevention and response for schools and promote programme such as School Earthquake Safety Programme.
- Institutionalisation of regular preparedness drills at various levels including all stakeholders
- Capacity building activities for all stakeholders including civil society organizations in the search and rescue, first aid, relief and restoration in post earthquake recovery situations.
- Risk analysis of key public utilities, prioritization of the same in terms of need for retrofitting and resource (finance, manpower, etc) need plan.
- Review & amendment of the existing zoning regulations, building codes and byelaws and sensitization of building experts about the same.
- Review of enforcement mechanisms for the byelaws etc.
- Adoption of preventive maintenance policies and action towards earthquake safety in hospitals and key public institutions.
- Dissemination of cost effective retrofitting technologies for hazard resistant housing
- Enhanced capacity of women as Disaster managers in First aid, Shelter management, search and Rescue, trauma counselling etc.
- Manuals, training modules, SOPs and awareness strategies to be made available for replication in other areas.
- Enhanced capacity of the training institutions for training in seismic hazard mitigation and risk management.
- Knowledge network for better involvement of stakeholders
- National and State database on natural disaster risk management developed.
- Integration of vulnerability reduction into development programmes to allocate resources more effectively based on needs.

- A web-based portal on knowledge sharing and inter-city cooperation on earthquake vulnerability reduction initiatives

The following are indirect outcomes of the programme:

- Reduction of expenditure on disaster relief and reconstruction with an increased investment in preparedness measures.
- Sharing of disaster relief cost by the community.
- Self-reliant Urban Local bodies for preparedness.
- Linkages of Earthquake preparedness plan to urban development plans.
- People's awareness and participation increased.
- Access to information by the people.
- Development of highly trained construction personnel.
- Strengthening of Academic/Key resources institutions.

The above direct and indirect outcomes would essentially contribute also to the reduction in poverty levels by enabling communities to be better prepared for facing the seismic risk in their city.

V. Implementation arrangements

The MHA will advise the state governments to select the State Nodal agencies for implementation of the project, after which the MHA will host a preliminary national consultation meeting for all the nodal departments, selected resource institutions and the ULBs for finalization of strategies. A national Seismic Advisor will be identified for providing technical support for developing methodologies towards the creation of a Techno-legal regime in the programme areas. Also at the national level a web-based database on the 38 major cities will be initiated.

Initiation at the State and City level: Seismic engineer specialists for the cities under the project will be posted and attached to the nodal departments identified by the Chief Secretary. Sensitisation meetings will be organized in all the states to generate awareness among the key functionaries of the Nodal department and the urban local bodies. These meetings will also identify local academic institutions to be developed as **Key Resource institutions (KRIs)** to be included in the programme. The resource institutions will be enabled to develop manuals and training modules, information, education and communication materials and risk assessment procedures. They will also develop training modules for conducting training programmes for the senior ULB staffs on use of risk management tools. The selected resource institutions will work in partnership and provide technical support to these ULBs in the development of ward based earthquake risk management and response plans for public utilities, generate risk awareness along with use of earthquake-resistant construction, safety and evaluation techniques and retrofitting and earthquake mitigation strategies.

Awareness generation: For **awareness generation** strategies, a geographical focus for initiation will be decided in consultation with the nodal department. A training of Trainers programme will be conducted for the students of the KRIs/local engineering colleges and the IEC materials developed by the KRIs will be utilized in the sensitisation of the residents' welfare association members and the community at large. These meetings will be facilitated by the staff and students of the KRIs and will be followed by sensitisation programmes on the local seismic risks and possible mitigation measures including retrofitting for the practicing Architects, builders, contractors and engineers.

Other awareness programmes to be taken up include that on the community contingency plans for Earthquakes using media advertisements, mass meetings, School earthquake awareness programmes through rallies, competitions like essay, debate, drawing etc. among school students and using posters, leaflets etc. The programme also envisages the setting up of a Resource center for technology transfer, which will also function as a City Risk Management Information Center. The process will be replicated in other parts of the urban centers.

The Earthquake Preparedness and Response Plan would start from the community/ ward level and would be consolidated through similar planning at higher levels up to Urban Local Bodies and the city itself in the selected cities. A cadre of community volunteers would be created to carry out the ward based earthquake risk management programmes in the select programme urban centers. These Volunteers will be drawn from the community with the help of civil society organizations such as NCC, NSS, NYKS, Scouts and Guides and Civil Defence etc.

The plans would focus on the earthquake risk prevention and early recovery through community-based preparedness and response plans, assessment of vulnerabilities and resources. Disaster Management Teams (DMT) would be formed at different levels to carry out the activities during emergency for sustainable recovery from disaster such as the Municipality level, the ward level, the resident welfare association level etc. DMT at ward level would comprise of a group of 10-12 members in task-based groups such as Early Warning (EW), Search and Rescue Operation (SRO), First Aid, Water & Sanitation (FAWA), Shelter Management (SM), Trauma Counseling (TC) and Damage Assessment (DA) groups. Similarly, DMT at Municipal level may be formed with the involvement of people' representatives, members from local administrative system like local police, Medical Officers, Junior Engineers, Revenue Inspectors, etc. The ULB commissioner/chairman would be the convener of the team at the municipal level.

The seismic engineer specialist will facilitate compilation of the various ward plans to form the city/urban center response plan. The data collected under the resource mapping exercises during the preparation of the plans will be fed into a City Disaster Resource Network, which will eventually be linked, to State Disaster Resources Network (SDRN) and the India Disaster Resources Network (IDRN). Information Technology Specialists would be responsible for development of disaster database at state and district levels for emergency response.

Techno-legal regime: The National Seismic Advisor will support the MHA and the state

Governments to develop a **techno-legal regime** for each state. At the national level, sensitisation workshops will be organized for policy makers at the national level, which will be followed by the facilitation of the formation of an Apex body for coordinating the development of the Techno-legal regime in all the states.

The Apex-body thus constituted will be responsible for reviewing of existing byelaws, the enforcement mechanisms in conjunction with the Urban development department of the state. The apex body will also carry out a review of the procedures for registration and regulation of builders, real estate developers etc. The key resource institutions will be responsible for developing a course curriculum for the **compulsory certification** of practicing engineers and architects, which will be carried out by the Apex body. Institutional framework will also be developed for the constitution of a state level 'Ombudsman/ institution' for reviewing performance of the enforcement authorities' vis-à-vis building byelaws and seismic codes.

The project also envisages the development of systems for a city specific audit of construction practices as well as legislation for retrofitting and certification of existing buildings within a timeframe for all the urban centers covered under the programme.

Capacity development: The State nodal agency, UNDP and the Key resource Institutions will prepare a training schedule for the various **Capacity building** programmes for the various target groups as has been envisaged in the Project. The Key Resource Institutions will prepare detailed training curriculum and a calendar for trainings at all levels. The staff of the KRIs will themselves undergo a Training of trainers (ToT) conducted with the help of national level resource Institutions and experts in the field. Training programmes under this Project will tap on the facilities being provided by the National Programme on Earthquake Engineering Education **(NPEEE)** being undertaken by the Ministry Of Human Resources Development. Engineering colleges in the cities will be encouraged to undertake medium-term courses on earthquake engineering being undertaken by the IITs (Indian Institute of Technologies). Key Government engineers in the Development Authorities of the Urban Centers covered by the programme will be supported to attend these courses to develop them into trainers for the compulsory certification courses for practicing engineers and architects envisaged under the programme and also to enhance capacities of the Development Authorities to ensure earthquake safe constructions with the ULB. The training and compulsory certification programme mentioned above will be initiated at the State levels through the Key resource institutions. at the State and city level. Students of select engineering colleges in the programme area will be trained for developing their capacities for preparing IEC materials and for carrying out awareness campaigns for the Residents' welfare associations and the community at large. The state and city functionaries will be trained to facilitate setting up of a well-defined **Incident Command System (ICS)** to respond in any crisis. The city ICS and the state ICS will be linked to the and be part of the ICS set up by the MHA, the nodal ministry for Disaster management in the country.

International experts in disaster management will provide training programmes to national and state Quick Response Teams in specialized areas such as 'Search and Rescue' and other key elements of Earthquake response. Key members of the Resident welfare

associations will also be given training for awareness campaigns, preparation of earthquake preparedness and response plans for their associations to develop them as potential trainers for the preparation of preparedness and response plans through social, vulnerability and resource mapping etc. Task forces will be provided specialized training focusing on their assigned tasks through specialists in the particular field to effectively carry out their responsibilities such as warning dissemination (awareness generation), damage assessment, search and rescue operation, shelter management, fist aid, trauma counseling etc.

Since the Project promotes and facilitates sharing and learning between cities, inter-city exposure visits for city managers key functionaries, government officials, resident welfare association members, task force members etc to best practice areas is also mooted. Regular studies, research and workshops will be conducted at state and national levels on the vulnerability analysis, existing coping mechanism, revision and modification of the existing administrative, legal, techno-legal and institutional systems, as per the suitability of different localities and need of the Urban Centers. Training manuals, Standard Operating Procedures and documentation of the best practices are important components of disaster preparedness programmes and will be developed for different levels for easy adoption, replication and sharing. Adequate training will be provided to the women DMTs to carry out activities during emergency situation to look after the special needs of women in any disaster.

Based on the experiences of previous disaster preparedness programmes, the state nodal agencies and resource institutions will develop **training manuals** for ward, city and State disaster management team, manuals for development of contingency plans for different areas and **Standard Operating Procedures [SOPs]** for all levels. The manuals would be printed in vernacular languages after field-testing. Training will be provided to the stakeholders to use the manuals and widely circulated for replication of the programme. In all manuals special mention shall be made for coping mechanism of women in disaster situations and also the role of **women as Disaster Managers**.

Knowledge networking: One of the preliminary activities under the Project will be to set up a web based database for individual cities and developing a framework for regular updating of these databases and to encourage **networking knowledge among the programme cities**. The City Disaster Resources Network, a web-based resources database to be developed for each city will link to the State Disaster Resource Network and also India Disaster resources network (IDRN) being set up at the National level.

VII. Institutional arrangements

- **Coordination at the National level:** The Ministry of Home Affairs, Government of India will be the nodal agency at central level for smooth execution of the programme supported out of Country Cooperation Framework resources. There would be a Programme Management Board (PMB) headed by the Secretary, MHA to provide overall guidance to the programme with participation of MHA, DEA, UNDP, European Commission and other donors representatives involved in the programme. Programme Steering Committee (PSC) headed by the Joint Secretary [DM] in MHA would be constituted, which will meet in every quarter to review the progress of the programme.

- **Monitoring at the State level:** In each DRM and Non-DRM state, a State Steering Committee (SSC) headed by Chief Secretary will review the programme at periodic intervals. The committee may consist of executing agencies, implementing agency and UNDP.
- Impact assessment studies will be carried out by both international and national experts. GOI-UNDP will also carry out internal assessments periodically.

IX. Duration

The project will be implemented over a period of four years [June 2003 to May 2007]

LIST OF 38 CITES WITH OVER HALF A MILLION POPULATION IN SEISMIC ZONES III, IV AND V

Sl. NO.	State	Name of City	District	Zone
1	Uttaranchal	Dehradun	Dehradun	IV
2	Delhi	Delhi	New Delhi	IV
3	Gujarat	Jamnagar	Jamnagar	IV
4	Gujarat	Rajkot	Rajkot	III
5	Gujarat	Bhavnagar	Bhavnagar	III
6	Gujarat	Surat	Surat	III
7	Maharashtra	Greater Mumbai	Mumbai	III
8	Maharashtra	Bhiwandi	Thane	III
9	Maharashtra	Nashik	Nashik	III
10	Maharashtra	Pune	Pune	III
11	Orissa	Bhubaneswar	Khurda	III
12	Orissa	Cuttack	Cuttack	III
13	Tamil Nadu	Chennai	Chennai	III
14	Bihar	Patna	Patna	IV
15	West Bengal	Asansol	Bardhaman	III
16	Assam	Guwahati	Kamrup	V
17	Gujarat	Vadodara	Vadodara	III
18	Gujarat	Ahmedabad	Ahmedabad	III
19	Tamil Nadu	Coimbatore	Coimbatore	III
20	Uttar Pradesh	Agra	Agra	III
21	Uttar Pradesh	Varanasi	Varanasi	III
22	Uttar Pradesh	Bareilly	Bareilly	III

(Continued)

LIST OF 38 CITES WITH OVER HALF A MILLION POPULATION IN SEISMIC ZONES III, IV AND V

Sl. NO.	State	Name of City	District	Zone
23	Uttar Pradesh	Meerut	Meerut	IV
24	Uttar Pradesh	Lucknow	Lucknow	III
25	Uttar Pradesh	Kanpur	Kanpur Nagar	III
26	West Bengal	Kolkata	Kolkata	III
27	Jammu & Kashmir	Srinagar	Srinagar	V
28	Jammu & Kashmir	Jammu	Jammu	IV
29	Madhya Pradesh	Indore	Indore	III
30	Madhya Pradesh	Jabalpur	Jabalpur	III
31	Punjab	Amritsar	Amritsar	IV
32	Punjab	Jalandhar	Jalandhar	IV
33	Andhra Pradesh	Vijayawada	Krishna	III
34	Jharkhand	Dhanbad	Dhanbad	III
35	Karnataka	Mangalore	South Canara	III
36	Kerala	Kochi	Ernakulam	III
37	Kerala	Kozhikode	Kozhikode	III
38	Kerala	Trivandrum	Trivandrum	III

♣ As per the Vulnerability Atlas prepared by Building Materials Promotion and Technology Council (BMTPC), Government of India, UNDP and MHA, IS 1893 (Part 1) : 2002 Map of Seismic Zones of India and other factors