

A step towards Urban Earthquake Vulnerability Reduction

The DRM 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 (169 districts in 17 states) of India. The Programme (2002-2007) aims to contribute to the social and economic development goals of the National and State Governments, enable them to minimize losses to development gains and to reduce their vulnerability to natural disasters. The programme relies upon a community based approach to disaster preparedness and management and seeks to build capacities of communities, government functionaries at all levels and other stake-holders in disaster management in an organized manner.

The Ministry of Home Affairs (the nodal ministry for disaster management in the country) is the executing agency with UNDP Country Office support for implementation.

UEVR Programme - Background

Earthquake is a destructive natural event and accounts to tremendous loss of life and property damage. The greatest challenge facing our country is to reduce the vulnerability of this uncontrollable and unpredictable hazard by having a greater understanding about its causes and effects.

As per the latest seismic zoning map brought out by the Bureau of Indian Standards, 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.

The Programme

The programme envisages strengthening capacities of communities, urban local bodies and the administration in mitigation, preparedness and response across 38 cities in the country having population above half a million and falling under seismic zone III, IV and V. The programme would demonstrate a suitable model for mainstreaming of earthquake risk management initiatives at all levels and help reduce seismic risk in the most earthquake-prone urban areas in India. Learning from this initiative will feed into the national capacity building programme of the GOI and help mainstream training in disaster management in all regular training programmes of the Government.

Goal

Sustainable reduction in Earthquake Risk in the most earthquake-prone urban areas across the country.

Objectives of the Programme

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

- Development and Institutionalising of Earthquake Preparedness and Response Plans and practise these through mock drills.
- Development of regulatory framework (techno-legal regime) to promote safe construction and systems to ensure compliance.
- Capacity building for certification by Government functionaries and professionals (engineers and architects).
- Networking knowledge on best practices and tools for effective earthquake risk management, including creation of information systems containing inventory of resources for emergency operations.

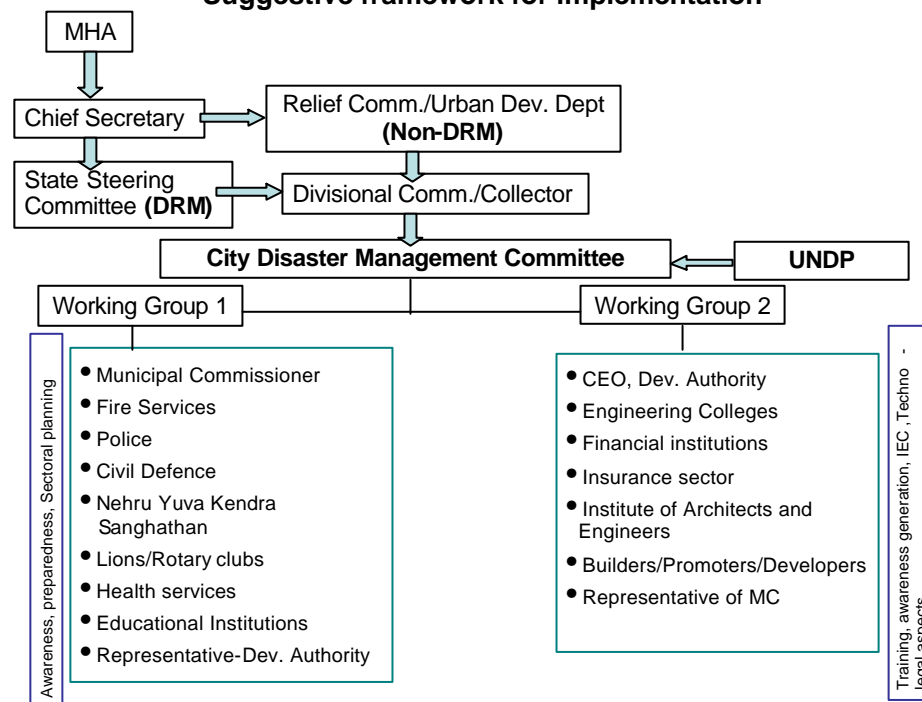
(Ward/Community) level, including strengthening of key resource institutions and establishing of linkages.

- Disaster Management Team formed at the city level along with sectoral preparedness plan for all nodal agencies in the Urban Local Body of each city.
- Earthquake preparedness and response plan for all the 38 cities across the country
- An aware and informed community
- Integration of seismic risk management into development programmes
- Enhanced capacity of the practicing engineers/architects & the training/academic/resource institutions.
- Review of enforcement mechanisms for the byelaws etc.
- Knowledge networking and inter-city cooperation on earthquake vulnerability reduction initiatives.
- Replication of the programme to other urban centres.

Outcomes

- Capacity building in earthquake risk management at National, State and City

Suggestive framework for implementation



Do's and Don'ts

What to do before an Earthquake?	What to do during an Earthquake?
<ul style="list-style-type: none"> Insist upon earthquake-resistant features while constructing/buying a house/flat. Ensure they comply with building bye-laws and BIS codes. Consult an Engineer/Architect for retrofitting your house to make it earthquake-resistant. Identify a safe place like wall corners or a sturdy table/cot for cover during an earthquake. List important telephone numbers and keep a torch, water, transistor, first-aid kit and non-perishable food at a designated place. Keep family emergency kit ready. Train yourself in basic first aid. Form teams for first-aid; search and rescue etc. in your area and conduct preparedness drills with family and neighbours. 	<ul style="list-style-type: none"> Stay calm and do not panic. If you are at home or inside of a building: <ul style="list-style-type: none"> do not rush to the doors, stairs, balcony and keep away from windows and heavy furniture. protect yourself by staying under the lintel of an inner door-frame, under a table/bed etc. for cover. turn-off electricity and gas. If you are on the road in a built up area: <ul style="list-style-type: none"> move away from buildings, slopes, streetlights, power lines, hoardings, fly-overs etc. into open spaces. If you are driving: <ul style="list-style-type: none"> pull to a side away from fly-overs, streetlights, power lines and stay inside the vehicle.
What to do after an Earthquake?	
<ul style="list-style-type: none"> Check if you or anyone else is hurt. Use first-aid and wait for medical help. Keep calm and expect aftershocks. Do not turn-on electrical appliances and gas. Keep the streets clear for emergency services. 	<ul style="list-style-type: none"> Check your house/building for damages Do not waste water and do not block telephone lines. Do not move seriously injured people. Do not spread rumours and don't panic. Volunteer to help

Earthquake Resistant Provisions in Masonry Buildings with Strip Foundation

Zone	Maximum Height	Mortar Mix	Bands	Vertical Reinforcement	Diameter of Vertical Requirement	Mortar Mix for Band/Vertical Reinforcement	Bracing of Pitched Roof
II	Four Storey (less than 15m)	1:6 Cement Sand or 1:3 Lime-Cinder/Lime-Surkhi	1.Lintel Band 2.Roof Band/Gable Band	Not Required	Not Required	1:3 Cement Sand or M 20 Concrete	Not Required
III	Four Storey (less than 15m)	1:6 Cement Sand or 1:2:9 Cement-Lime-Sand	1.Lintel Band 2.Roof Band/Gable Band 3.Plinth Band	for Rock/Hard/Medium Soil - Not Req'd for Soft Soil - At Joints and Corners	for Rock/Hard/Medium Soil - Not Required for Soft Soil - Single Bar 12mm(TOR) or 16mm(MS)	1:3 Cement Sand or M 20 Concrete	Bracing at Tie Level
IV	Four Storey (less than 15m)	1:6 Cement Sand or 1:2:9 Cement-Lime-Sand	1.Lintel Band 2.Roof Band/Gable Band 3.Plinth Band	At joints and Corners for Rock/Hard/Medium/Soft Soil At Jamb's and Openings for Soft Soil	Single Bar 12mm(TOR) or 16mm(MS)	1:3 Cement Sand or M 20 Concrete	Bracing at Tie Level
V	Four Storey (less than 15m)	1:4 Cement-sand or 1:1:6 Cement-Lime-Sand	1.Lintel Band 2.Roof Band/Gable Band 3.Plinth Band	1. At Joints and Corners 2.At Jamb's of Openings	Single Bar 20mm(TOR) or 25mm(MS)	1:3 Cement Sand or M 20 Concrete	Bracing at Tie Level

Note; the buildings should be made of well-burnt bricks, solid concrete blocks, squared stones, stone blocks or hollow concrete blocks of adequate strength.
(Source: Guidelines for Earthquake Resistant Buildings, IIT Roorkee)

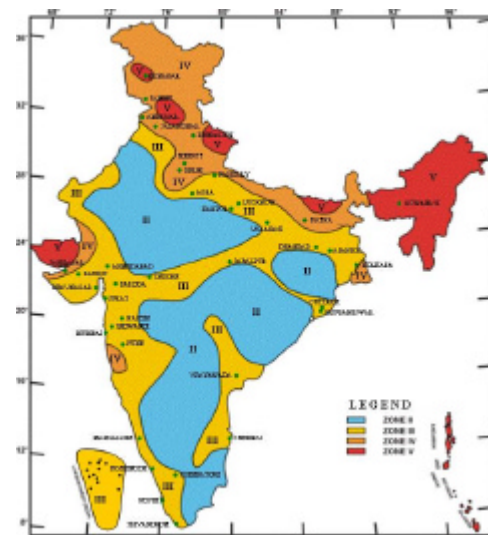


Figure showing location of 38 cities with population exceeding half a million in earthquake zones III, IV and V.

Zone III – Ahmedabad, Vadodara, Rajkot, Bhavnagar, Surat, Mumbai, Bhiwandi, Nashik, Pune, Bhubaneswar, Cuttack, Asansol, Kolkata, Agra, Varanasi, Bareilly, Lucknow, Kanpur, Indore, Jabalpur, Vijayawada, Dhanbad, Chennai, Coimbatore, Mangalore, Kochi, Kozhikode, and Trivandrum.

Zone IV – Dehradun, New Delhi, Jamnagar, Patna, Meerut, Jammu, Amritsar and Jalandhar.

Zone V – Guwahati and Srinagar.

Urban Earthquake Vulnerability Reduction Programme



a national initiative under the **GOI-UNDP Disaster Risk Management (DRM) Programme**

U E V R P

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