



# **Regional Cooperation on Earthquake Risk Management in South Asia**

## **Road Map**

*SAARC Workshop on*  
**Earthquake Risk Management in South Asia**

Islamabad, Pakistan  
8-9 October 2009

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### **Introduction**

1.1 South Asia is one of the most earthquake prone regions in the world. Six out of the eight countries of South Asia - Afghanistan, Pakistan, India, Nepal, Bhutan and Bangladesh - are located within most seismically active Himalayan - Hindukush belt which has seen some of the worst earthquakes recorded in history. Sri Lanka, Maldives and large parts of the coastal areas of Bangladesh, India and Pakistan are vulnerable to tsunamigenic earthquake in the Indian Ocean.

1.2 Earthquakes have caused heavy damages in terms of deaths, injuries, destruction of habitat and disruption of economic activity. Realising the potentially catastrophic consequences of largely unpredictable earthquakes, particularly in growing urban areas in different seismic zones of South Asia, it has become imperative that countries of the region pool their resources, expertise and strengths and share their experiences with each other in assessing the risk of earthquakes at regional and local levels, mitigate the risks through a combination of structural and non-structural measures, respond to the earthquake events by rapid response and relief to the victims and reconstruct the damaged houses, infrastructure and livelihood to restore normal life and economy in the affected areas. Such regional cooperation is envisaged under the SAARC Comprehensive Framework of Disaster Management adopted by the Member States. In order to discuss various issues of earthquake risk management in the region, a SAARC Workshop on Earthquake Risk Management was organized in Islamabad on 8-9 October 2009 by the SAARC Disaster Management Centre, New Delhi in collaboration with the National Disaster Management Authority of Pakistan.

1.3 The Workshop reviewed the strength, weakness and gaps of current status of earthquake risk assessment, mitigation, response, recovery and reconstruction practices in the region and recommended that certain coordinated regional programmes should be taken up under the auspices of the SAARC Disaster Management Centre to supplement the efforts of the national, provincial and local governments in the respective countries.

The Workshop recommended the following Roadmap for Regional Cooperation for earthquake risk management in the region.

## **A. Earthquake Risk Assessment**

2.1 The following regional programmes for assessing the hazards, vulnerabilities and risks of earthquake were recommended:

- a) **Seismic Hazard Assessment:** An Expert / Working Group may be constituted under the auspices of the SAARC Disaster Management Centre to:
  - I. Identify and prioritize the regional seismicity and fault zones in Himalaya-Hindukush region for further detailed studies and recommend the methodology and procedure to be followed.
  - II. Review the existing Seismic Hazard Maps of the countries and recommend the measures to be taken to develop a South Asia Regional Seismic Hazard, Risk and Vulnerability Map.
  - III. Explore possibilities of facilitating upgradation of seismic networks for better monitoring of earthquake parameters at the regional level.
- b) **Training and Capacity Building on Seismic Hazard and Risks:** SAARC Disaster Management Centre may plan and organize regional training programmes on seismology in collaboration with leading seismological research centres in South Asia. For this purpose a region specific training module may be developed in consultation with experts.
- c) **Development of a Regional Attenuation Models:** Realistic attenuation models are essential for accurate estimation of seismic hazards. These are lacking in most of the South Asian Countries. A research programme may be taken up in collaboration with concerned agencies of the member States to develop such a model using available strong motion data from the countries.
- d) **First-cut Microzonation study for Select Cities:** Based on available data a first order microzonation map may be developed for select cities in the Member States as a prelude to full scale microzonation. For this purpose an appropriate methodology may be developed under the

auspices of SAARC Disaster Management Centre, which shall be passed on the concerned States for necessary follow up action.

## **B. Earthquake Risk Mitigation**

3.1 Risks of earthquakes can be mitigated through a combination of structural and non-structural measures, as under:

- a) **Building Codes, Regulation and Enforcement:** The SAARC Disaster Management Centre may constitute an Expert Group to study the existing earthquake resistant building codes of the countries and recommend model building code and guidelines. The Centre may further compile the seismic provisions of the building codes for dissemination to all the concerned stakeholders.
- b) **Retrofitting of Life Line Structure:** The requirement to improve the ability of an existing building to withstand the ground shaking due to earthquake requires retrofitting of the structure. For the countries that do not have any experience in retrofitting, the SAARC Disaster Management Centre may provide technical support for retrofitting one life line structure provided the basic costs of retrofitting are met by the country from its own resources. The experiences gained from such model retrofitting may be utilized for retrofitting of other life line structures in a phased manner.
- c) **Compendium of Building Typologies:** South Asia has enormous variety of building typologies which need to be documented and assessed from earthquake safety point of view. The SAARC Disaster Management Centre may prepare a compendium of building types of non engineering construction in South Asian countries.
- d) **Documentation of Indigenous Technology:** South Asia has rich reservoir of indigenous knowledge of building materials and construction technology that has withstood the test of time. Such buildings practices are not only cost effective and thermally efficient these also conform to the culture and way of life of the local communities. Many of these technologies have the danger of becoming extinct due to their neglect and promotion of concrete buildings by the engineers and architects. Many such indigenous earthquake-resistant housing technology and practices like the *bhongas* in the Kutch Region of Gujarat, *dhajjidiwari* buildings in Jammu & Kashmir, *brick-nogged* wood frame constructions in Himachal Pradesh and *ekra* constructions made of bamboo in Assam and similar construction methods in Nepal and other

countries needs to be documented and further promoted if the local conditions permit.

- e) **Capacity Building of Engineers, Planners, Architects and Masons:** Capacity building measures need to be implemented through training and education at various levels by making use of the expertise and infrastructure available in the region. SAARC Disaster Management Centre had organised such training programmes which were found to be very useful. Such training programmes should be organized more frequently.
- f) **School and Hospital Safety:** Keeping in view the devastating impact of earthquakes on schools and hospitals and the importance of the safety of these institutions, a Regional Plan for School and Hospital Safety may be developed by the SAARC Disaster Management Centre in consultation with the Member States for implementation by the Member States.
- g) **Development of Guidelines for Environment Friendly Debris Management:** None of the countries of the region has developed guidelines for debris management that would conform to the standards of environment protection. The SAARC Disaster Management Centre may take up development of such guidelines which is specific to the diverse conditions of the region.

### **C. Earthquake Response, Recovery and Reconstruction**

4.1 Recent mega earthquakes in South Asia had exposed the limitations of existing capacity to effectively respond to earthquake disasters and provided opportunities to develop the capacities. Initiatives taken by India and Pakistan following the earthquakes in Gujarat and Kashmir have significantly augmented the regional capacity for earthquake response, recovery and reconstruction, which should be utilized for the benefit of the region. In this context following specific programmes may be taken up by the SAARC Disaster Management Centre.

- a) **Documentation and Sharing of Good Practices:** The experiences gained in respect of Gujarat and Kashmir earthquakes should be documented in a comprehensive manner covering various local, provincial, national and international level initiatives for earthquake response, relief, rehabilitation and reconstruction.
- b) **Regional Framework for Earthquake Response, Recovery and Reconstruction:** Based on these experiences a Regional Framework for

Earthquake Response, Recovery and Reconstruction may be developed by the SAARC Disaster Management Centre. Based on this framework each country may develop its own pre-disaster recovery planning which may be relevant for other disasters.

- c) **Sharing of Response under NDRRM:** SAARC Disaster Management Centre has been mandated to develop a Natural Disaster Rapid Response Mechanism. As a part of this mechanism the SAARC Disaster Management Centre may develop a regional response plan for mega earthquakes in consultation with the concerned agencies of the Member States.

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