



Regional Cooperation on Landslide Risk Management in South Asia

Road Map

SAARC Workshop on Landslide Risk Management in South Asia

Thimphu, Bhutan
11-12 May 2010

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1. Introduction

1.1 Almost every country of South Asia is affected by the hazards of landslides of varying types and intensities. Landslides occurred due to chain of causative factors both natural and man-made. Many coastal and island areas of South Asia have been facing the risks of underwater landslide and coastal instability. Climate change and associated risks of glacial melts, glacial lake outburst floods and sea level rise have added new dimensions to the risks of landslides. Much of the dynamics of these risks are yet to be assessed and mapped scientifically in most parts of South Asia.

1.2 Landslides have been causing substantial number of deaths, injuries and damages to human settlements and infrastructure, besides disrupting road and rail communications and rupturing oil, gas, water and sewage pipelines in almost every country of South Asia, but none of the countries of the region maintain a comprehensive database on landslide events, historical as well as real time, and the associated damages and losses due to such events. The global database on landslides also does not capture the variety and intensity of landslides of South Asia. As the landslides are mostly sporadic, localized and dispersed in nature these do not always create the big news that other natural disasters like earthquake, flood or cyclone and most of the events are not even reported.

1.3 The current science and practice of landslides risk management in South Asia is far removed from the state-of-art tools and techniques of landslide mitigation and management. Although such tools have been applied in few areas to protect vital slope and infrastructure, application of such tools in engineering practices are not generally contemplated due to capacity and cost constraints. No much success has been achieved in developing region and location specific cost effective solutions. While technical and operational guidelines have been developed for landslide risk mitigation in a few countries and some innovative and solutions have been implemented in some places, sharing and exchange of learning and good practices among the countries of the region are almost non-existent. Scientists, engineers and environmentalists from South Asia have been making significant contributions on landslide research in many institutions in the region and outside, but a South Asian forum of landslide experts is not in place to learn from each other's experience and collaborate with regional and global institutions.

In short, there are many shared interests and large gaps in landslide risk management in South Asia which offer huge scope for regional cooperation among the countries of South Asia.

1.4 In order to review the current strength and capacity of the South Asian countries for landslide risk management, assess the critical gaps, identify the possible areas of regional cooperation and develop a Road Map for such cooperation in short, medium and long time frame, the SAARC Disaster Management Centre organized a Workshop on Landslide Risk Management in South Asia on 11-12 in Thimphu, Bhutan in collaboration with the Ministry of Home and Cultural Affairs of the Royal Government of Bhutan.

1.5 The Workshop recommended the following Roadmap for Regional Cooperation for Landslide Risk Management in the region.

A. Landslide Risk Assessment

2.1 Most of the countries of the region have not been able to assess the hazards, vulnerabilities and risks of landslides in a holistic and comprehensive manner. It was noted that the countries of South Asia, and sometimes different agencies within the same country, have been following different classification system, terminologies, methodologies and scales for landslide hazard zonation mapping. The workshop recommended that an Expert Group may be constituted under the auspices of the SAARC Disaster Management Centre to critically review the current practices of landslide hazard zonation mapping in the countries of South Asia and develop commonly acceptable guidelines on landslide hazard zonation mapping, landslide terminology and classification system in the light of the global state-of-the-art practices. The draft guidelines so prepared shall be circulated to the Member States and peers in South Asia for comments and validation. Based on the comments received the Expert Group shall finalize the guidelines for adoption by the Member States.

B. Landslide Inventories

3.1 None of the countries of South Asia has been able to develop a comprehensive database and inventory of landslides. The global database on landslides does not adequately capture the frequency and intensity of landslides of South Asia. The workshop recommended that a comprehensive database of landslide disasters in each country of the region since 1990, to the extent it is

feasible, shall be developed and the same shall be updated on an annual basis under the auspices of the SAARC Disaster Management Centre. The Centre shall develop a template for documentation of historical and current landslides through consultation among experts of the region and further prepare guidance notes for documentation. The information thus collected shall be compiled, analyzed and further validated through consultation among experts before its dissemination.

3.2 The workshop further recommended that the SAARC Disaster Management Centre should bring out a publication on the Major Landslides in South Asia. Every Member State may be requested to document case studies on catastrophic landslides in their own country, to be compiled, and published by the SAARC Disaster Management Centre.

C. Early Warning of Landslides

4.1 The workshop recognized that unlike earthquakes, most recurrent landslides could be predicted through a timely systematic programme of detailed engineering geological, geotechnical and hydro-geological and hydro-metereological investigation, instrumentation, modeling and real time monitoring. It was noted that some of the countries of South Asia have developed early warning system of landslides in specific local areas through a combination of instrumentation and community based interventions. It was recommended that the SAARC Disaster Management Centre shall take the initiative to document such initiatives, and examine the strength and constraints of such of such initiatives.

4.2 Based on this study the SAARC Disaster Management Centre shall develop a few pilot projects on landslide early warning system on cost sharing basis in selected countries, as may be willing, in collaboration with reputed scientific and technical organizations within or outside the region. The Centre shall develop guidelines to encourage Member States in the formulation of such projects.

D. Landslide Risk Mitigation

5.1 The risks of landslides can be reduced significantly through a combination of structural and non-structural measures. The package of measures to be adopted for landslide risk mitigation would depend on the unique site conditions of specific landslides. The workshop recommended that the SAARC Disaster Management Centre may take the initiative of preparing a Compendium on the Best Practices of Landslide Risk Mitigation in South Asia region for the benefit of researchers and

practitioners in the field. The compendium would include engineering and non-engineering solutions and community based interventions for landslide mitigation.

5.2 The workshop felt that the current retrofitting programmes for seismic safety in the region stops at retrofitting of the superstructure of buildings. This practice is grossly unsafe inasmuch as even the retrofitted buildings will fail, if the slopes on which they are supported fail by sliding. The workshop recommended that the SAARC Disaster Management Centre may develop guidelines on evaluation of slope stability and strengthening of slopes based on the global best practices.

E. Training and Capacity Building

6.1 For national landslide hazard and risk assessment programmes to be successful it is imperative that highly trained professionals man the mapping teams. The workshop recommended that the following steps may be taken in this regard:

- a) SAARC Disaster Management Centre should design highly focused thematic training programmes and implement them in association with leading landslide experts and well established institutions. Some of the topics which need to be covered in such programmes are (a) Field oriented engineering geological, geomorphological, hydro-geological, hydro-metereological and seismo-tectonic mapping at large scale (b) GIS based integration and analysis of thematic maps (c) Geotechnical Characterization of Slopes and Stability Analysis in terms of total and effective stress (d) Strengthening of problematic slopes, (e) safety of human settlements in landslide prone areas
- b) The experts and institutions to be engaged to deliver the training programmes should be charged with the responsibility to develop high quality training manuals in each area selected for training

F. Landslide Response, Recovery and Reconstruction

7.1 Every year many lives are lost and many persons get severe injuries due to landslide disasters. Search, rescue and evacuation of landslide victims require specialized skills and practices. While many countries of South Asia are developing specialized response forces, in most of the countries search and rescue operations are still carried on in not a very professional manner. The workshop noted that the SAARC Disaster Management Centre is on the process of setting up

a Natural Disaster Rapid Response Mechanism and recommended that the SAARC Disaster Management Centre may develop guidelines for landslide response and organize special programmes for response agencies to expose them to the best practices, including the technological options available for search and rescue operations.

G. South Asian Landslide Forum

8.1 The workshop recommended that the SAARC Disaster Management Centre should take the initiative of setting up a South Asia Landslide Forum which will comprise of landslide experts and practitioners and scientific, technical and research, and professional organizations working for landslide risk management in the region. The Forum will work for the networking and integration of knowledge and practice on landslide risk management within the framework on South Asia Disaster Knowledge Network. The Forum shall organize a Regional Conference on Landslide Risk Management once in two to three years.