

MITIGATION AND PREPAREDNESS FOR GEOLOGY-RELATED DISASTERS IN ASIA AND THE PACIFIC

Geology-related disasters, such as earthquakes, tsunamis, landslides and volcanic eruptions, are among the most destructive. They affect a large number of countries in the region frequently, causing great loss of life and extensive damage to property and infrastructure.



According to a global survey prepared by the Swiss Reinsurance Company, between 1970 and 1997 there were 40 events that caused over one million deaths, almost half inflicted by earthquakes. Of the forty, 30 happened in Asia and the Pacific, accounting for 87% of the casualties. That is how critical these geology-related hazards are for the countries in this region. Here is a look at issues in question in the region.

Quality and timeliness of forecasts and warnings

It is hard to predict seismic events (e.g. earthquakes, tsunamis) and when such prediction can be made there is usually little time to warn people. There needs to be a complementary public information effort alongside scientific efforts to improve forecasts. These two efforts together can improve the lead time of warning to allow communities at risk to make advanced preparations. Special emphasis should be given to improving the communication links for the transmission of basic data and early warning information on hazards.

For the Sake of Future Generations...

Despite widespread efforts by governments in the region to adopt policies that incorporate disaster reduction, such as prediction of seismic events and early warning systems, we are still confronted with tragedy after disaster strikes. In July 1998 relief agencies mustered up resources and personnel to aid in the rescue and recovery after the Aitape tsunami disaster in Papua New Guinea. But the efforts came too late. The giant waves destroyed whole villages, swept hundreds of inhabitants to their deaths almost instantly, and buried others alive and left many thousands homeless. When asked by a reporter when schools would re-open, a local government authority told the Australian Broadcasting Corporation "the schools will be closed because we do not have the children; they are all dead." Obviously, for the sake of future generations, much still needs to be done

Monitoring equipment and networks

Monitoring needs to be established or upgraded for volcanic eruptions and tsunamis, to ensure proper and prompt warnings are disseminated through alert systems. Reliable feedback on warning performance, public response and damage caused by such disasters necessitates building consensus with multiple sectors.

Hazard mapping and risk assessment

Assessments have still not been completed for much of the region. There is a need for comprehensive vulnerability analysis for disaster-prone areas incorporating: past disasters, the socio-economic conditions of the population living in the area and inventories of major structures of public concern. Risk assessment and hazard mapping would delineate areas vulnerable to geology-related natural hazards and the frequency, intensity, impact, and return period of each hazard. Assessments are only as good as the plans and policies they inspire, which can be significant if risk assessors share the results with decision makers to incorporate risk reduction into development planning.

Hazard Mapping for Risk Reduction in Sri Lanka

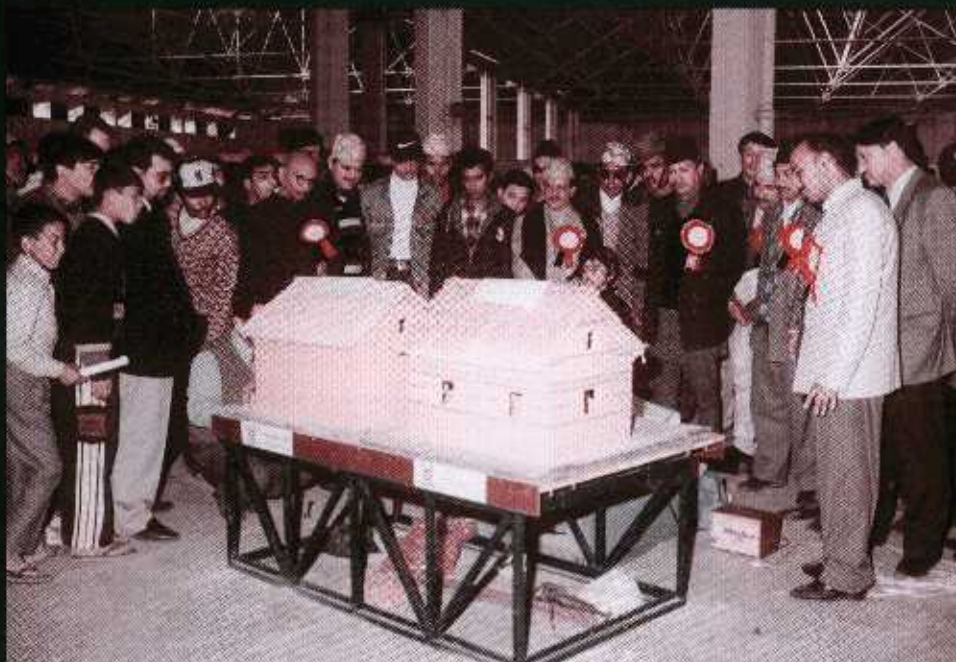
Landslides have been on the rise in Sri Lanka over the past two decades, resulting in high losses of life and property. In January 1986, landslides left 100,000 families homeless. In May-June 1989, the most extensive spate of landslides ever recorded in the country killed 300 people and destroyed infrastructure worth 2800 million Sri Lanka Rupees. The National Building Research Organization (NBRO), with the support of regional programs sponsored by UNDP, HABITAT and AUDMP, has responded by focusing its work on disaster reduction to increase hazard mapping coverage of Sri Lanka and promote awareness raising campaigns. NBRO, in conjunction with other government agencies, such as the Urban Development Authority (UDA) and the Centre for Housing Planning and Building (CHPB), are making a difference through lobbying for the incorporation of hazard assessments into land-use planning. Through policy workshops and high-level meetings, Sri Lanka is embracing a new strategy to incorporate disaster reduction into development planning.

*Raising Awareness in Kathmandu
A local organization's success in building consensus*

On January 16, 1999, Nepal celebrated its first Earthquake Safety Day ever, thanks to the success of a local organization in compelling the government to change its attitude toward disaster management. The event fell on the anniversary of the Great Bihar-Nepal Earthquake, a quake measuring 8.4 on the Richter scale that devastated Nepal in 1934. It remains the country's most destructive earthquake this century and an appropriate reminder of the need to ensure seismic awareness among the population today.

The Earthquake Safety Day initiative is a brainchild of the National Society for Earthquake Technology (NSET-Nepal), a professional association of disaster managers including, among others, seismologists, urban planners and journalists. The association has assumed a leading role in overseeing the implementation of actions by the private and public sectors for urban seismic safety. The association provides technical assistance on school retrofitting and urban environmental planning to local communities and NGOs interested in training and projects in disaster management. In this sense, NSET-Nepal heralds a new organizational model for dealing with disaster management in Asia and the Pacific. NSET-Nepal overcame the Nepalese government's traditional aversion to NGO involvement in this sector by proving that its technical and consensus-building skills could benefit government operations.

The annual Earthquake Safety Day, established under the chair of the Ministry of Science and Technology, marks a rekindling of interest in disaster reduction by the government. Even the Prime Minister endorsed the Day, with a radio address and by releasing the Kathmandu Valley Earthquake Scenario and Risk Management Action Plan. The plan comprises public and private sector actions to reduce the valley's vulnerability. The scenario on which it is based grew out of close consultation with the valley's key service providers to obtain information on critical facilities. The scenario includes maps of the potential damage to water, power and telephone systems, roads, bridges and hospitals given an event with the intensity of the 1934 earthquake. On Earthquake Safety Day, NSET-Nepal organized a public exhibition using a shake table to simulate how different buildings, with and without seismic reinforcement, would react to a high intensity earthquake. After Kathmanduites saw what can occur, the association was overwhelmed with information requests on how to build buildings that will not fall down the next time the earth shakes.



Building codes

In parts of the region there is still a need for preparation or review of earthquake-resistant design codes for buildings and other engineering structures. Code enforcement is also an issue. Low cost housing programs should incorporate disaster resistant techniques.

Traditional building techniques with disaster-resistant components should be encouraged. Public health facilities, potable water supplies, communication and other critical facilities should be established on sites that are the least vulnerable to natural hazards.

Building Codes Alone Don't Save Lives

After the 1988 Udayapur earthquake in Nepal, the UNDP assisted the Ministry of Housing and Physical Planning (MHPP) to implement a National Building Code Development Project. The project covered the modern and rural buildings in all regions of Nepal. A positive contribution made under this project was the inclusion of a significant component for seismic hazard mapping and risk assessment for the entire country. This assessment enabled Nepal to quantify seismic hazards and risk, and for those involved with the assessment, it was shocking to find that risk was indeed very high. But mitigating the risk proved easier said than done. The central government and the local municipalities instantly perceived that they alone could not cope with such an enormous task as applying a building code to actual house construction. Enforcement required a change in attitude of both the people and the private sector.



Health and education facilities

When community members have been trained in simple first aid they can reduce the numbers of serious casualties and deaths before outside help arrives. In much the same way, it is essential that health facilities and services continue to function after a disaster strikes. Therefore it is important that health facilities are constructed to withstand natural disasters, and are equipped to provide basic assistance. In terms of geology-related hazards, this means retrofitting of existing structures or incorporating seismic technology into new construction.

Schools and other community facilities can serve as shelters during relief efforts, if, and only if, they are accessible to the community. It is important that local authorities realize the versatility of such facilities and appropriate them for such uses. Integrating the construction and improvement of such facilities into long-term plans for disaster reduction at the local level continues to be a key issue of work in the region.

Deaths and losses that were not

Timely prediction of volcanic eruption in the countries of the region, have enabled authorities to evacuate the people from danger zones before any harm was sustained. Mount Pinatubo, which erupted in 1991 and indirectly caused 800 deaths, could have resulted in tens of thousands of fatalities. Lives were saved because the volcano was under monitoring, and there was a warning and communication system in place that allowed 80,000 people at risk to be evacuated. Similarly, Japan is containing the effects of tsunamis successfully with better tracking and warning of events and by building more appropriate structures. Lava flow channels helped reduce the damage to property in Japan. In many countries reductions in the loss of life and property due to earthquakes have been made possible by the adoption of appropriate building design and construction. Losses due to landslides were successfully reduced in Hong Kong by monitoring hazard-prone areas and undertaking appropriate structural and non-structural measures.

Institutionalization and cooperation

In principle, almost all countries in the region have accepted the need to integrate disaster prevention and environmental protection strategies into their national development plans. One of the most important needs at the national level is to strengthen or develop capacity to undertake national disaster mitigation strategies. Countries frequently exposed to severe natural hazards should seriously consider investing an appropriate portion of their GDP in disaster reduction activities for sustainable development.

Why Focus on Regional Cooperation?

Hazards do not obey political boundaries
Asia and Pacific countries, especially sub-regions, face similar hazards and can share lessons learned
Sharing of real-time information can reduce the impacts and provide early warning
Sharing of resources and technical knowledge can reduce costs to individual countries

Most countries of the region have enacted legislation giving the necessary controls and responsibilities to cope with disaster situations. These laws permit the relevant authorities to govern the long-term requirements of disaster prevention and the short-term needs of disaster preparedness. There still is a general need to establish or strengthen the institutional frameworks for natural disaster preparedness and mitigation at national, regional, district and community levels. Institutional arrangements can be established for the exchange of information among neighboring countries on all phases of a disaster on a continuous basis.

Regional Cooperation to Mitigate Geology-related Disasters

Forum for Urban Geology in Asia and the Pacific (FUGAP)
World Seismic Safety Initiative (WSSI) Regional and High-Level Meetings in Asia and the Pacific
Working Group on Environment and Urban Geology of Fast-growing Cities
Training Courses in Bangkok on Thematic Maps in Geology for Urban Planning
GIS in Geology for Urban Planning, and Earthquake Vulnerability Reduction for Cities
Asian Center for Research on Remote Sensing (AcroRS)

Information: the future is already here

Just as technological advances have furthered cooperation for technology transfer, so has the information revolution provided the technical capacity for increased transfer of cutting edge ideas, lessons learned and general knowledge about disaster reduction. Information exchange has, in fact, proven to be a mechanism for regional cooperation. Programs during the decade have shown that despite the differences in language, culture and thinking among the many countries of Asia and the Pacific, lessons are transferable and information technology makes the transfer all the more easy. Inter-regional cooperation through information technology has already happened. ADPC's Asian Urban Disaster Mitigation Program has been sharing challenges along the way and lessons learned with the Organization of American States' (OAS) Caribbean Disaster Mitigation Program (CDMP) and RADIUS. Information technology will also allow individual municipalities across regions to share experiences and build a stronger culture of prevention.

Information Exchange Among Cities at Risk: RADIUS Activities in Asia

To reduce seismic risk in urban areas, especially in developing countries, the IDNDR Secretariat, UN, Geneva, launched the Risk Assessment Tools for Diagnosis of Urban Areas Against Seismic Disaster (RADIUS) project. Out of 27 Asian cities that expressed interest in participating in the project, 3 were chosen, namely Bandung (Indonesia), Tashkent (Uzbekistan), and Zigong (China). The International Center for Disaster Mitigation Engineering (INCEDE) and the OYO Group of Japan have provided technical assistance for the case studies.

As one of the major goals of the two-year RADIUS project is to create awareness among municipal decision makers and the public on earthquake risk and management, the project set up focal points in both local government offices and scientific institutes, with special liaisons in the disaster management units. Through international symposiums, the Internet, and a comparative study, RADIUS has supported information exchange among cities, on a regional and global level. In all three Asian cities, RADIUS worked with local institutions to develop earthquake scenarios and action plans, and strengthen particular sectors of the disaster management machinery.

- In Bandung, RADIUS organized an earthquake scenario workshop, at which 150 school children participated in an open seminar and exhibition on earthquake safety.
- In Tashkent, RADIUS facilitated the use of basic data on the technical, social and infrastructure aspects of emergency response.
- In Zigong, RADIUS assisted the city to: (i) set up a basic database for earthquake disaster prevention and mitigation; and (ii) identify vulnerable areas.

Full information on RADIUS is available on the web at: <http://www.geohaz.org/radius>



THIS SECTION LISTS A SAMPLE OF REGIONAL EVENTS RELATED TO DISASTER REDUCTION HELD IN ASIAN AND PACIFIC COUNTRIES; ALTHOUGH HUNDREDS OF OTHER REGIONAL AND NATIONAL EVENTS ALSO DESERVE MENTION.

Asian Development Bank (ADB), "Regional Seminar on Policy and Institutional Requirements for Disaster Mitigation in Asia and the Pacific," Asian Disaster Preparedness Center, Bangkok, 1994

Asian Disaster Preparedness Center (ADPC)

- Asian Regional Meeting on El-Nino Related Crises, Bangkok, 1998
- Improved Cyclone Warning Response and Mitigation Workshops, 3 Regional Workshops and 5 National Workshops, Bangkok, 1990-93
- Training Courses on Community Based Approaches to Disaster Management (3), Urban Disaster Mitigation (2), Basic and Advanced Disaster Management Course (18), JICA-funded Seismic and Cyclone Hazard Mitigation (5), Bangkok, 1990-1999
- 1st and 2nd Workshops of the Asian Disaster Mitigation Training Network (ADMIT), attended by 11 National and 2 Regional Training Institutions, Bangkok, 1999

Association of South East Asian Nations (ASEAN)

- Experts Group on Disaster Management (AEGDM) in 1990, 1992, 1994, 1996 and 1998
- Regional Forum Intersessional Meetings on Disaster Relief in New Zealand (1997), Bangkok (1998) and Moscow (1999)

DIPECHO Regional Consultation Meeting on Disaster Preparedness in South East Asia and Bangladesh, 1998

ESCAP, Workshop on Regional Cooperation in Flood Control and Management for Improvement of the Urban Environment in Asia and the Pacific, Bangkok, 1998

ESCAP and **UNDRO** Symposium for the International Decade for Natural Disaster Reduction in Asia and the Pacific, attended by representatives of 22 countries, 1991

Expert Group Meeting on Geological Aspects of Land Use Planning, Bangkok, 1994

Forum on Urban Geology in Asia and the Pacific (FUGAP), in Calcutta (1995), Bangkok (1996), Shanghai (1997), and Bangkok (1999)

HABITAT Regional Exchange of Experience in Disaster Management, Colombo, 1996

International Workshop on Natural Disaster Management, Beijing 1999

IDNDR

- World Conference on Natural Disaster Reduction, Yokohama, 1994
- Scientific and Technical Committee (STC) Meeting, India (1993) and Canberra (1999)
- Regional Meeting For Asia-Pacific: Risk Reduction and Society in the 21st Century, Bangkok, 1999
- South Pacific Regional Disaster Management Meeting, annually over the 1990s
- Australian Disaster Conference 1999: Disaster Prevention for the 21st Century, Canberra
- Disaster '99: Asian-Pacific Conference & Exhibition on Disaster Management, Manila

International Federation of Red Cross and Red Crescent Societies, Community-Based Disaster Preparedness East Asia Workshop, Beijing, 1996

Second US-Asia Conference on Engineering for Mitigating Natural Hazards Damage, Yogyakarta, 1992

South Asian Association for Regional Cooperation (SAARC) Workshop on Natural Disaster Reduction, New Delhi, 1994

United Nations Department of Humanitarian Assistance (DHA) and Asian Disaster Preparedness Center, International Disaster Response Coordination Workshop for Asia, Bangkok, 1997

United Nations Disaster Management Training Program Workshops, Regional Workshop, 1992 and 14 Country Workshops, 1994-1997

World Seismic Safety Initiative (WSSI) Regional and Sub-regional Events

- Workshops on Seismic Risk Management for Countries of Asia-Pacific, Bangkok, 1993, 1999
- "Opportunities for Disaster Reduction in the Pacific Island Countries " Suva, Fiji, 1994
- "International Workshop on Seismotectonics and Seismic Hazards in South East Asia." Hanoi, 1994
- International Training Course on "Earthquake Resistant Non-Engineered Buildings " Hyderabad, India, 1994
- "Central Asian Seismic Safety Workshop," Alma Ata, Kazakstan, 1996

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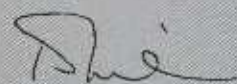
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Letter from the Director, IDNDR Secretariat

As the world is about to proceed into the next century, the international community at large, and all of the partners engaged in the IDNDR International Framework of Action attach a growing importance to the prevention of natural disasters and the reduction of vulnerability to natural phenomena. The Asian Disaster Preparedness Center, a valued IDNDR partner in the Region has been pursuing these objectives through training, consulting and promotion activities since its founding in 1986.

Asia and the Pacific contains more than one-half of the world's population, and with the Pacific covers almost half of the globe. The countries of the Region also experience a disproportionately large share of natural hazards, averaging about 215 major disastrous events during each of the past eight years. However, the people of Asia and the Pacific have demonstrated in recent years their tremendous capacity for social and economic accomplishment, with a dynamic energy propelling the region into the future. At the same time, we have also become painfully aware in today's global economy of the consequences of unanticipated developments, and unmitigated risks. We have before us, therefore, a clear example of conditions which I believe underline the importance, indeed the necessity, of making sustained commitments to disaster prevention in the 21st century. Resources are too scarce not to conserve them, and assets are too valuable not to protect them.

The views contained in this report, derived in part from the Regional Meeting for Asia: Risk and Society in the 21st Century, represent a selection of the accomplishments of national authorities, technical agencies and local communities working together for disaster reduction in Asia and the Pacific during the past nine years. More importantly though, they provide the benefits of collective experience in charting the direction and means for sustained disaster prevention into the future. Successful disaster prevention is an endeavor that involves people in all countries and a wide range of professional abilities — all bound in their common purpose by increased sharing of their information and experience. Therefore, as successor arrangements are considered to carry the vision of the IDNDR forward by international organizations, within national institutions and among local endeavors to maintain the momentum begun by the Decade, multi-disciplinary efforts and inter-sectoral relationships will be the key to making disaster prevention a public value.



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Prepared by the **Asian Disaster Preparedness Center** in collaboration with the **International Decade for Natural Disaster Reduction (IDNDR)** Secretariat. Produced through assistance from the **IDNDR**.

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