

Emerging Risks and Approaches for Reducing Vulnerability of the Urban Built Environment

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Dear Readers,

This issue of the Asian Disaster Management News highlights "emerging risks and approaches for reducing vulnerability of urban built environment".

Cities in Asia and in other parts of the world are in various stages of development. The trend towards urbanization accelerated in the last century is gaining all time high figures. It is expected that by the year 2030 more than 60% of people will be living in cities. The ongoing trends of population growth, environmental damage, increasing crime rate, exploitation of natural resources, globalization and more importantly ignorance will have a long lasting impact on the future of the society. The risks that grow hand in hand in the process of city expansion are also large. As the growth is too rapid and inorganic in nature, these problems pose a special challenge for administrators, planners, professionals and citizens.

Rapid expansion of the cities also mean high concentration of people, infrastructure and economic value in confined limits and therefore, the damage and loss potential is usually very high compared to the surrounding or rural areas. Many cities have been expanded over zones of severe hazard and with inadequate planning considerations to mitigate the impact of the hazard; cities are destined to be affected from major natural disasters. The engines of economic growth are also the harbour for major risks. A single loss event in one of the major cities can have far reaching negative consequences for various sectors.

Holistic solutions and risk prevention strategies should be developed in time and the development framework of the urban area should incorporate the risk management to ensure control of risks in the future. The newsletter aims to bring to our reader's attention to the underlying risks in the urban areas and the challenges and the opportunities for mitigation planning.

ADPC acknowledges and thanks all the invited contributors with special mention to the Urban Disaster Risk Management Team of ADPC in the production. I present the newsletter for your perusal.



Dr. Luis Jorge Perez-Calderon
Deputy Executive Director

ADPC's 8th Board of Trustees Meeting, 4 July 2007, Bangkok

ADPC held its 8th Board of Trustees (BOT) meeting in Bangkok, Thailand. The Board was briefed and consulted on several issues pertaining to the future ratification of the new ADPC Charter, the progress made and the future strategies for the Regional Consultative Committees meetings that have been held since 2000, ADPC's contributions toward the Hyogo Framework for Action, potential collaboration and partnership between ADPC and the WHO, progress made in the implementation of the ADPC facilitated regional tsunami and multi-hazard early-warning system for Southeast Asia and the Indian Ocean, and ADPC's activities.

The meeting was attended by H.E. Prof. Dr. Krasae Chanawongse, Chairman, Hon. Corazon Alma G. De Leon, Vice Chair and Dr. Bhichit Rattakul, Secretary to the Board, Mr Philippe Allen, Counsellor, Australian Embassy, H. E. Mr Shahed Akhtar, Ambassador of Bangladesh, H.E. Mr. David Fall, British Ambassador, Mr Zhang Wanhai, Minister Counsellor, Embassy of the People's Republic of China, Ms Malthida Burnouf, Asst. to the Regional Counsellor, French Embassy, H.E. Miss Vijaya Latha Reddy, Ambassador of India, H.E. Mr. Pieter Marres, Ambassador of the Netherlands, Mr Lasse Nymoen, Counsellor, Royal Norwegian Embassy, H. E. Lieutenant-General (Ret) Khateer Hasan Khan, Ambassador of Pakistan, H.E. Mr. Antonio Rodgriquez, Ambassador of the Philippines, Mr Simanhewage Piyadasa de Silva, Charged' Affaires, Embassy of Sri Lanka, Mr Kriangsak Kittichaisaree, Director-General, MoFA, H.E. Mr Nguyen Duy Hung, Ambassador of Vietnam, H.E. Mr. Ung Sean, Ambassador of Cambodia, Mr Arjun Mainalli, Deputy Chief of Mission, Embassy of Nepal, Ms Cecile Pichon, Technical Asst. DIPECHO, Professor Said Irandoust, President, AIT and ADPC Directors.



Emerging risks and approaches for reducing vulnerabilities of the urban built environment

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Photo credit: Arambepola, ADPC 2006



On 24 December 2004, as many as seven countries in Asia were devastated by a tsunami event recognized to be the biggest natural disaster event the world has ever known, reflected in the magnitude of lives lost (more than 200,000), families displaced (several millions), and damages to assets and economic losses (combined total of nearly US\$ 10 billion). Among many areas destroyed were urban coastal areas with important infrastructure and lifeline facilities. Subsequent major events, such as flash floods in Mumbai and Jakarta, losses due to Typhoon Xangsane in urban coastal areas of Vietnam, have shown that there is an urgent need to re-enforce hazard mitigation and preparedness practices in the development policy agenda.

Urban areas are recognized as economic engines of any country, but even these engines can fail if action is not taken to address the soaring reconstruction costs and to minimize significantly the losses to shelter, infrastructure, and commerce. Urban governments need to take serious note of the priorities for disaster management. Urban governments should adopt proactive approaches and practices for mainstreaming disaster risk mitigation within the efforts for sustainable development.

Issues and Concerns

Push factors drive the population to the urban and semi-urban regions, specifically, a lack of economic opportunities, frequent destruction of assets, crops, harvests as a result of natural disasters and limited rural livelihood alternatives. Pull factors that encourage rural to urban migration are the economic and welfare opportunities offered by urban areas.

Rural to urban migration comprises a major proportion of the urban workforce, but most of the migrants cannot afford to buy land in safer areas, find few or no alternate formal settlements, and no government programs to provide shelter to the poor segment of urban population. In cities such as Mumbai, India, 60% population live in slums occupying 7% of land. Hence, this migration concentrates what was once dispersed rural poverty into

unsafe land within the urban area in what can be described as the urbanization of poverty and disaster risk.

Asia is seen as one of the fastest urbanizing regions in the world. In 2000, 37% of its population lived in cities and the proportion is projected to reach more than 50% by 2025. By 2020, seven of the world's ten largest economies will be from Asia. The majority of Asian mega-cities and other urban municipalities are located in hazard prone areas. In the period 1994 to 2004, Asia accounted for one-third of 1,562 flood disasters, half of 120,000 people were killed in floods, and 98% were affected by floods (Few and Matthies, 2006).

A global-level analysis of the location of multiple hazards found that the eastern coastal regions of the major continents are exposed to a combination of hazards that are driven mainly by hydro-meteorological processes (Dilley, 2005). Unfortunately, coastal areas of low elevations are more densely populated than other areas. Asia accounts for eight of the top ten countries with populations in the coastal zone with elevation from 0 to 10 meters¹ (McGranahan, Balk and Anderson, 2007: p. 26). In addition, the largest coastal urban areas are located in the flood plains of major rivers of Asia (e.g. Ganges-Brahmaputra, Mekong, and Yangtze), and many other coastal urban areas are within cyclone-prone regions (e.g. Bay of Bengal, South China Sea, Japan and the Philippines).

The risks from these hazards require monitoring as they are affected by the continuing urbanization of coastal areas and slope destabilization due to migration from low-lying to upland areas. The rural people moving into coastal cities carry their traditional practices and are unaware & or have limited knowledge of the sensitivities of their new environment and adaptive practices for the coastal areas. There is also a potential increase in the intensity and frequency of hydro-meteorological hazards in the event of climate change or global warming.

¹In descending order: 1-China, 2-India, 3-Bangladesh, 4-Vietnam, 5-Indonesia, 6-Japan, 9-Thailand, 10-Philippines

²Lifeline services include transportation links (roads, rail, seaports, airports), government administration facilities (government offices, police, fire), emergency service facilities, health facilities, education facilities, community services, key commercial assets (banking, commerce and manufacturing), cultural assets (historic structures and museums).

These trends are summarized in the compelling article by Pelling (2006), "Cities are getting more and more vulnerable" on disaster risks in urban areas. For example, he points out how the complex lifeline services² that urban areas rely on for social and economic well-being are part of the natural attraction and comparative advantage of cities vis-à-vis rural areas. However, these services are easily overwhelmed by hazards. Failure in lifeline services can cause substantial insecurity in a community, leading to increases in illness, death, the breakdown of communication, and the disruption of economic activities that continues long after the hazard struck.

However, a change in location of vulnerable settlements and land use is not always the answer to reduce disaster risks. Vogel (2001) noted that while location is, in a sense, the main cause of urban vulnerability for a particular natural hazard, location might also be one of the main underlying factors for urban (economic) growth because it promotes economic and spatial linkages between producers of goods and their distributors and consumers. Simply relocating the city or its inhabitants cannot reduce vulnerability because hazards can occur outside any city and still disrupt the urban economy.

Secondary and tertiary cities in Asia are often planned to spread development evenly. This economic goal makes smaller cities the site of increasing urbanization and land use change, as they grow into the surrounding peri-urban space. However, these cities usually do not strictly enforce building regulations and monitor land use, nor do they have enough qualified technical staff to engage in planning, development control and construction regulation. Therefore, the secondary and tertiary cities are in the forefront of the urban disaster risk scenario in Asia.

City governments in general seem to fail to design action plans to address the problems associated with vulnerability and fail to engage the urban poor in their own disaster mitigation, although it is directly connected with the urban development process. Institutional vulnerability of city governments refer to the limitation in capacity of municipalities to assess risk trends. It is related to the lack of technical information and probable scenarios of hazard exposure, socio-economic and physical vulnerabilities, risk assessment tools, an early warning mechanism, and historical information on destructive events. It is also related to the ability to use technical information and probable scenarios within the urban planning and decision-making processes. The responsibility of urban authorities is to provide safer areas for living, but cities do not implement strict land use and construction regulations. The result is the death, damage and destruction that could have been avoided through zoning, adequate building codes implementation, emergency response planning, and disaster mitigation and preparedness that involve communities. The June 2007 landslides in Chittagong, Bangladesh, is an example of poor land use regulation that did not prevent cutting hillside sections to "make room for development".

In most countries in Asia, DRM is a subject handled by central authorities and little effort has been made to delegate the DRM responsibilities to the local government

³Proceedings of workshop on Financing Infrastructure, USAID, 2003

sector. Despite the increased recognition of the effectiveness of mitigation at local level, it has not generated the resources and attention necessary from city governments to make it a mainstream requirement of their development efforts to spread the benefits of mitigation to a greater portion of the population³. It is in this respect that mechanisms for participatory approaches for decision-making are recommended. Most decisions taken in the absence of representation from vulnerable communities are unfavorable to them, and consequently resisted by them.

Mainstreaming disaster risk reduction

Mainstreaming refers to relating development priorities to the environmental and social issues that contribute to disasters. Within its various functions, it identifies areas prone to hazard events, identifies communities and sectors at risk, implements protection measures, promotes its citizens' abilities to cope. This can be achieved by authorities by:

- Increasing the coping capacities of citizens by enabling them to reduce their own risks
- Reducing risks by strictly regulating specific, disaster risk-related private sector activities
- Include disaster risk considerations within urban planning, development planning and poverty reduction programs
- Promoting good governance to sustain disaster risk reduction.

Despite the growing risks, most of the rapidly developing countries in Asia adopt a reactive approach for management of the risks in urban areas. Spatial plans are often prepared without adequate considerations to seismic or hydrological aspects with city expansions directed towards the most prone areas or even creating new risks from rapid land use change. Countries need to understand the urban risks arising due to natural and manmade hazards and subsequently, should adopt a long-term proactive strategy for risk management. Some of the strategies that can be adopted are as follows:

Increase the coping capacities of citizens by enabling them to reduce their own risks

Through the city governance process, local governments are encouraged to engage in a constructive dialogue with stakeholders on development issues, and involving them in decision-making through a sustainable and proactive risk reduction approach. In many countries, the national legal mandates of cities do not include such processes and therefore, it is necessary to promote the establishment of Municipality Disaster Management committees with representation from city government, civil society groups and public sector. This can be an effective informal governance approach for risk reduction.

Participatory hazard and vulnerability mapping with the subsequent participatory risk assessments are considered starting points in the process. These assessments are carried out using participatory tools and trained volunteers to facilitate inputs from a wide range of community stakeholders. At the municipal level, the

Initiatives by Asian Disaster Preparedness Center (ADPC)

As a resource center dedicated to risk management capacity building in Asia, ADPC implements a number of urban mitigation programs¹ in Asia.

The Asian Urban Disaster Mitigation Program (1995 to 2005) was a key initiative that targeted urban risks and identified Urban Disaster Risk Management as one of the five core thematic areas of work. It was funded by the Official US Fund for Disaster Assistance (USAID/OFDA).

One major program is the Program for Hydro-Meteorological Disaster Mitigation in Secondary Cities in Asia (PROMISE), funded by USAID/OFDA and implemented from 2005 to 2008. The main thrust of the present intervention enhances preparedness for and mitigation of the destructive impacts of hydro-meteorological events on the vulnerable urban communities and the economic infrastructure. The program's strategies include:

- Adopting specific hydro-meteorological disaster preparedness and mitigation measures
- Increasing stakeholders' involvement and further enhancement of strategies, tools and methodologies related to community preparedness and mitigation through the promotion of good governance and community-based disaster risk management.
- Strengthening networks and regional links among relevant risk management institutions to improve potential and capacity for application and dissemination of lessons learned.

ADPC in collaboration with Norwegian Geo-technical Institute (NGI) has developed the program for Asian Program for Regional Capacity Enhancement for Landslide Impact Mitigation (RECLAIM) to promote a dialogue between decision makers and professionals about the theoretical and practical aspects and issues related to landslide hazard mitigation. The project aims to build the national capacity on landslide disaster mitigation by:

- Identifying cost effective methodologies and practices adopted by national partners
- Execution of Landslide Mitigation Demonstration Projects, (LMDPs) in 2 countries as a source of committing efforts and funds for applied mitigation, advocacy and awareness creation purposes.
- Sharing of experience of partner agencies in target countries in Asia.

ADPC has several programs that promote community based disaster risk management (CBDRM). These programs are PROMISE (mentioned above), Partnership for Disaster Reduction in South East Asia (PDR-SEA) funded by the Disaster Preparedness Program of the European Community Humanitarian Office (DIPECHO),

and the Enhancing Community Resilience to Natural Disasters in Southeast Asia funded by the Danish International Development Agency (DANIDA).

ADPC gives a regional-level course on CBDRM, Community-Based Basic Emergency Response Course, and the pioneering regional course on Governance and Disaster Risk Reduction. ADPC also provides several technical courses: the Earthquake Vulnerability Reduction Course, the Urban Flooding Mitigation course, the Technological Risk Mitigation for Cities course, and the Urban Disaster Management course.

Conclusions

Urban disaster risks are dynamic and severe due to the combination of exposure to several hazards, rapid urbanization and high population densities, unplanned land use change, and low institutional capacity to mainstream disaster risk management into urban planning and decision making processes. A concentration of effort must be made to increase the capacities and actions taken by all stakeholders (local authorities, communities, private sector, and civil society) to reduce risks within their control.

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⁴ For details about ADPC and its programs, please visit <http://www.adpc.net>

Reducing risks to cities from disasters and climate change

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Bangladesh and natural disasters

Bangladesh is one of the countries that have been significantly affected by natural disasters. A recent study shows that at least 174 natural disasters affected Bangladesh from 1974 to 2003, affecting major cities like Dhaka, Rajshahi, Chittagong, Khulna, Sylhet and Barishal of Bangladesh. Extreme events such as floods, drought, cyclone and storm surge, rainfall and temperature variations have affected life and property.

It is predicted that the temperature in Bangladesh may rise by 0.7°C in summer and 1.3°C during winter by 2030, whereas it would be 1.1°C in summer and 1.4°C in winter by 2050. It is also predicted that the sea level is likely to rise by 30 and 50 cm by 2030 and 2050, respectively. It has been revealed that by the year 2030, an additional 14.3% of the country would become extremely vulnerable to floods, while the existing flood prone areas will face higher levels of flooding. Analysis of past floods suggests that, about 26% of the country is subjected to annual flooding and an additional 42% is at risk of floods with varied intensity. The predictions will affect all major cities including the coastal cities e.g. Chittagong, Khulna.

The cities of Dhaka, Rajshahi, Khulna, Sylhet and Barisal are exposed to various types of disaster and climate change impacts. Chittagong city is highly exposed to cyclone and tidal surges as mentioned above whereas Rajshahi faces severe drought. Rainfall and temperature variation also affect these cities. For example, a record of 315 millimeters rainfall in Dhaka city in September 2004 caused damage to 250 schools and 681 garment factories amounting to very heavy losses. Road repair cost was estimated to about US\$ 200 million and damage to the telephone sector totaled about US\$ 2 million. The poor or the lower income groups of the cities lose more, recover less and are always most vulnerable to any of the extreme events.

The disaster management process in Bangladesh

There are number of ministries in the government of Bangladesh directly or indirectly involved with environment, climate change and disaster management through their respective agencies. There are city development authorities and or city corporations that look after the process of proper development planning and

development control and management. In addition, Water Supply and Sewerage Authority (WASA) located in Dhaka and Chittagong city is responsible for water supply, sewage and drainage management issues in respective cities. The Disaster Management Bureau (DMB) and Directorate of Relief and Rehabilitation (DRR) under the Ministry of Food and Disaster Management are responsible for embracing the processes of hazard identification and mitigation, community preparedness and integrated response efforts, relief and recovery activities to lowering the vulnerabilities to specific hazards etc. Department of Environment and Department of Forests under the Ministry of Environment and Forests look at the development, planning, promotion, co-ordination and overseeing the implementation of environmental and forestry programmes. The Bangladesh Water Development Board (BWDB) under the Ministry of Water Resources conducts water related infrastructure control and management issues.

Measures to reduce vulnerability to disasters

The above-mentioned government agencies, NGOs and Developing partners and relevant institutions (research and academic) are involved in facilitating/developing/ implementing many measures to address adverse impacts or reduce the vulnerability of disaster and climate change related catastrophic events especially floods. Some of the major measures that have been already taken are:

- The Ministry of Food and Disaster Management has developed Standing Orders on Disaster (SoD) that highlights roles and responsibilities of different administrative levels committees, Ministries and other organizations in disaster risk management. It also establishes the necessary actions required to enable the local community, authorities of the city corporations and local organizations to support the poor and vulnerable community for increasing their income and other abilities for risk reduction and for taking necessary security measures against any impending warnings and disaster. According to SoD, each of the city corporations (major cities) have Disaster Management Committee (DMC) involving representatives of relevant GOs, NGOs, CBOs research and academic institutions, elites, religious leaders etc.

- Bangladesh Water Development Board under the Ministry of Water Resources implemented "The Dhaka Integrated Flood Protection Project-embankment to protect western Dhaka". This has saved about 50% of the city from 1998 and 2004 flood inundation. The other cities e.g. Chittagong and Rajshahi are also protected by this type of structural measure.
- Relevant agencies of the government of Bangladesh (GoB) have recently started to recover 14 of 26 canals to increase capacity of the drainage system and to reduce risks of water logging in Dhaka city. Same measures are being taken by the GoB to protect other major cities from adverse impacts of disaster and climate change related extreme events.
- The GoB initiated community based solid waste management in many cities of the country. This initiative has helped disposing of substantial amount of solid wastes. Otherwise, over 50% of the total generated solid wastes would remain on the streets, ditches, drains and thereby, clog the drainage system of the cities. The situation gets worse during flood inundation. In addition, banning of polythene bags helped to reduce clogging
- In low-lying areas, buildings are being built either on pillars or by raising the basement to avoid flood risk. Although these initiatives are few, they have been initiated in almost all the cities
- Roads and Highways Department have elevated some roads while repairing and reconstruction
- Dhaka Electric Supply Authority (DESA) has raised their substations and transformers to avoid flood inundation
- Flood Forecasting and Warning Centre of the BWDB monitors water level of the rivers and disseminate it to people through electronic and print media. Mobile phones have a significant contribution in early warning and forecasting mechanism.

In addition, measures have been suggested to reduce disaster and climate risks. These include:

- Construction of flood reservoirs in surrounding river basins to reduce flood risk. For example, it was suggested that the discharge to the Dhaka Rivers (Briganga, Turag, Balu, and Shitalakhya) could be increased through controlled release from the reservoirs during the dry season. In addition, this may provide surface water for consumption in some areas of Dhaka
- Increase the rate of afforestation in and around the city
- Pumping stations to be set up to avoid water logging
- Gunny bags to prevent water from spilling inside the protected area
- Special force (army) may be deployed in restoring road, communication, etc
- Flood zoning was suggested at different times to facilitate the development in controlled manner so that expensive investments can be made in risk free zone. Zoning would also help to protect aquatic ecosystem, natural drainage system, etc.

Standing Orders for Disaster (SoD) suggested a number of adaptation measures to reduce flood risk. Some of them are:

- Prepare short, medium and long-term vulnerability reduction and capacity building action plan for high-risk people with active participation of the community at risk
- Build the capacity of the local institution, volunteers, and the community to adapt with flood resistant agriculture and other livelihood options
- Train students, youth, local club members and volunteers on community based water purification techniques so that during flood, they can supply safe drinking water in their own community during emergencies
- Keeps stock of emergency life saving drugs at City Corporation and Ward level for use during disaster
- Take emergency measures to prevent diarrhoea and other water borne diseases by preparing oral-saline and water purification tablets by trained students, youths, club members and volunteers using local resources or emergency assistance.

The Government of Bangladesh recently initiated Community Risk Reduction (CRR) programme in seven pilot districts under the Comprehensive Disaster Management Programme of the Ministry of Food and Disaster Management. This CRR aims to improve self reliance at the community level through capacity building to respond to any hazard or disaster. The CRR programme is formulating the action plans to address hazards like flood, cyclone, drought, etc. On the other hand, the government is determined to improve drainage in the cities. In fact, in the last few months many illegal structures were removed/destroyed in Dhaka city to improve drainage condition and to avoid water logging of the city. However, it still needs comprehensive risk reduction plan at the city level to address future threats and combined effects.

Asian-Pacific Regional Workshop on School Education and Disaster Risk Reduction 8-10 October 2007, Bangkok Thailand

The Regional Workshop on Education for Disaster Risk Reduction is an initiative developed as a first step to demonstrate the long-term integration of disaster risk reduction into the Education sector. The three-day Regional Workshop will be part of a regional strategy that aims at raising awareness on the need to integrate disaster risk reduction and school safety construction programmes as part of education curricula.

The overall goal is to contribute to the reduction of school children vulnerabilities and loss of lives as well as damage control to school environments caused by disasters through increased knowledge, awareness and formal education on disaster risk reduction at all levels.

*For more details, download brochure from
<http://www.adpc.net>*

Building partnerships to address urban vulnerability for establishing community resilience: The PROMISE Philippines experience

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Dagupan, the Milkfish capital of the world

The city of Dagupan, located at the northern part of the Philippine archipelago is a clear picture of an urban setting because of its vast human made structures, state of the art facilities, sprawling business, recreational establishments and center of academic excellence. A big portion of its revenue comes from the fishing industry. It has earned the title Milkfish Capital of the World and a Guinness World Record for its "Longest Grill" activity.

The trend of urbanization is not always complementary to development since it is also a source of serious physical, ecological, health and cultural risks. The city's susceptibility to hydro-meteorological hazards further contributes to possible danger that people might encounter. The occurrence of flooding is a main threat to Dagupan's outstanding fishing industry. Since there are seven river systems that pass through the city, most of which are silted, heavy flooding is a common scenario. This devastates fish ponds resulting in loss of income. In addition, this damages their infrastructure, destroys crops and interrupts the lives of citizens.

Towards a holistic approach to community resilience

The case of Dagupan testifies that a holistic approach must be regarded if disaster experts together with the local people and other stakeholders aspire for a unified vision of cultivating the culture of community resilience. The social aspect of vulnerability should also be tackled along with reducing environmental and economic vulnerabilities of the affected population. It should be a priority that social service providers become prepared and familiar with the needs of the community before, during and after disasters.

Responding to social vulnerabilities

One good practice that exemplified the significance of responding to social vulnerabilities as a key element in managing disaster risks is the experience of Dagupan City under the Program for Hydro-Meteorological Disaster Mitigation in Secondary Cities in Asia (PROMISE) Project, implemented by the Center for Disaster Preparedness, Philippines. Previously, the city had no systematic and attuned disaster management framework that could operate in pre, during and post disaster events. The project brought new hope for the City Government and its people, particularly those belonging in the eight identified high risk ¹barangays or city villages, to offset their vulnerable state through Community Based Disaster Risk Management (CBDRM) approach. It became successful in involving the community and the City Government. Leveling off was done through Training of Trainers (ToT) on CBDRM-Participatory Rural Appraisal (PRA) participated by city officials who became members of the Technical Working Group (TWG).

Bringing the social element in focus, remarkable changes were evident in people's attitude, both at the community and administrative levels. From the risk assessment performed in the eight pilot communities and in the city, one of the issues that surfaced was the lack of regular coordination between the local people and city officials, thus resulting in unorganized plans of action particularly during emergency situations. This also contributed to an unclear demarcation of roles. Existing Barangay Disaster Coordinating Councils (BDCCs) members became inactive because they were unaware of their responsibilities.

Figure 1. Empowerment of the community people and active participation of the city officials were highlighted during the conduct of capability building activities to promote disaster risk management



¹ Barangay or village refers to the smallest administrative unit in the Philippine society

Formulation of the risk reduction plan

Based on the perceived vulnerable condition as a result of the assessment, a Risk Reduction Plan was crafted with measures to be adopted in bringing forward an ideally prepared community. The differences were amicably bridged through opportunities given to the city officials to impart their learning from the trainings to the community. The re-echoed capability building activities highlighted the enhancement of the locality's Early Warning System and participatory drafting of Early Warning and Evacuation Plans. Having a clear understanding on the relevance of disaster management, the revival and strengthening of existing local organizations who act as front liners during emergencies were realized. The City Disaster Coordinating Council (CDCC) and BDCCs fostered a sincere partnership and were encouraged to practice "good governance" in pushing proactive disaster risk reduction measures. Furthermore, a network of various organizations from the civil society, media, religious institutions and business groups were formed called Bantay Dagupan (Guarding Dagupan). This in effect provided an opportunity for the Local Government Unit (LGU) and the private sector to enhance their commitment to promote preparedness and vigilance when disasters strike.

Apart from the capability building strategies, public information drive was also a key component. An extensive information, education and communication (IEC) campaign was pursued in coordination with various sectors seeking awareness in the schools and in the communities. These activities included slogan/ poster making competition among high school students, distribution of information materials such as calendar, sourcebooks and bookmark as well as the institutionalization/ celebration of Disaster Safety Day. In addition, provision of equipments in the pilot areas was also accomplished. After having an inventory of the community's resources, the project conferred a number of hi-tech gadgets to back up the available search and rescue materials as well as their early warning system. The City Government also took initiative by playing a major role in reducing the community's deficiencies in terms of equipments. As part of their preparedness for emergency response, the CDCC was able to tap the budget department to allocate funding for the purchase of immediate facilities. This complemented the project's role in enhancing the capacities of the BDCC in emergency preparedness.

The DRR plans from the eight pilot areas were then integrated to the City DRR plan which featured the compilation of appropriate measures that can be put into practical use during preparedness, mitigation, emergency and recovery stages.

Plan to Action: Flood simulation exercise

To put to test how well the community understood the essence of disaster risk management, a city wide flooding simulation was conducted. Around 300 community members, city government, regional government offices, international non-government organization, religious groups, neighboring municipalities, health organizations, media and civil society participated. Through their well coordinated efforts, the event became a big step towards

realization of their vision. The simulation helped each sector involved to share their knowledge and skills in preparedness and response by allowing others to witness, impart comments and eventually replicate. They learned from actual practice rather than relying on theoretical framework alone. Delineation of tasks, multi-sectoral participation and articulation of suitable responses were challenges that the activity tried to address.

Figure 2. Kids as Role Players: Children's active participation during the mock flooding situation in Brgy. Mangin, one of the project's pilot communities



This first simulation for flood response slated in the city derived insightful comments and reflections starting from the role players to the observers from various public offices and international disaster experts. One of their significant observation was the element of "good practice", since the CDCC manifested a composite response during its activation. Gender sensitivity was embodied since women were active actors in the emergency operation center (EOC) and presence of people's knowledge on history of disasters in their locality became instrumental in achieving responsive actions.

Lessons learnt

What Dagupan has gone through is indeed an experience worth sharing. CDP did well as a vehicle in bringing together the city's primary actors to withstand their weaknesses not only in the social side but also in the technical, physical, economic and political aspects when dealing with the harmful forces of nature. It gave way to the pursuit of capable LGU, community people and private individuals who will work hand in hand to integrate disaster management in their development plans and decision making processes. The people themselves were the champions, since without their enthusiasm and persistence the exercise would have been a figment of imagination. Transcending their differences in principles and offsetting their individual interests have brought them the haven of social cohesion towards resilience where safety, good quality of life and sustainable development flourish.

Presently, PROMISE is in its second phase of implementation. What remains to be a challenge is the institutionalization of the processes, that since the beginning of the project. To confront the consequences of the political transition, the project team is planning to have a Disaster Risk Management Orientation for the newly elected city officials along with the appointees using their enhanced capacities and developed linkages bonded by a common purpose of protecting the general welfare.

* To access a copy of the flooding simulation kit, you can get in touch with CDP through e-mail: cdp@info.com.ph

On the effect of urban features on human casualty level in large and populated cities

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Urban features increasing disaster risks in urban areas

Although it has been strongly recommended in modern “regional and urban planning” not to develop on earthquake faults or surface rupture zones, highlighted recommendations in this article are only applicable to the new cities or renovation of existing cities. This is while many large and populated cities in the world, including the capital cities of several countries are located in highly seismic regions, and many of these cities have suffered extensively during the past earthquakes. For these cities vulnerability assessment is a major part of the seismic risk reduction program. In spite of the obvious effect of urban features on the level of human life loss and casualty in case of earthquakes, this effect has not been addressed thoroughly by researchers, so far. This article will reflect on various structural and urban factors, which can be used for seismic vulnerability evaluation of urban environments. Also, highlighted are different aspects in which the urban features can contribute to the increase of human earthquake vulnerability. Findings and results from a study on different structural and urban features in district number 14 of Tehran metropolis are briefly discussed.

The vulnerability evaluation of urban environment

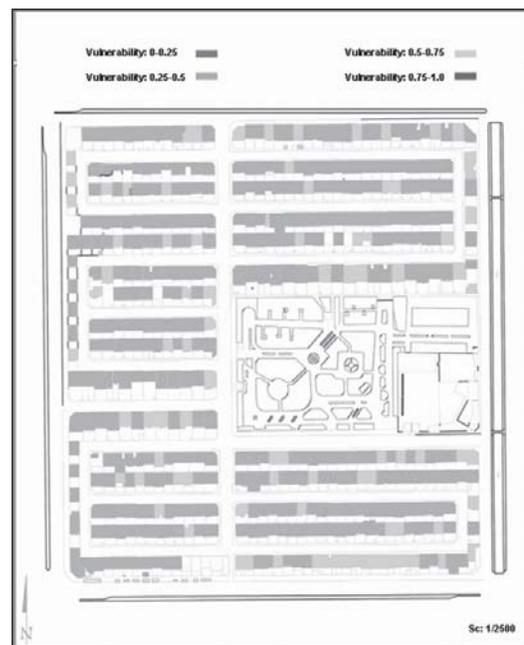
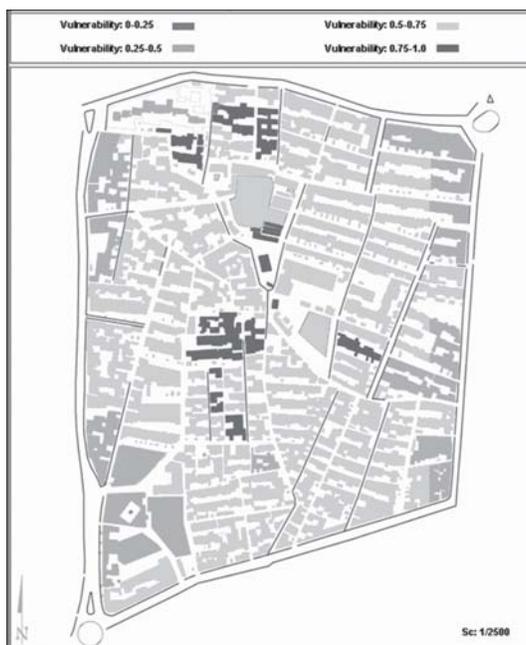
The seismic vulnerability of a building, regardless of the number of people living or working in it, of its location in an urban setting, depends on the following factors:

- Architectural form and the building orientation
- Structural system of the building, particularly, its lateral load bearing system
- Weight of the building
- Closeness of the building’s natural period of vibration and that of site soil vibration
- The building age from the aging of materials point of view as well as the time of code enforcement and employment in the community
- Type(s) of construction materials used for the structural members as well as the nonstructural elements of the building
- The quality of workmanship employed for building construction

The number of people who are present in a building at the time of an earthquake affects the number of deaths, but there are other urban planning aspects that affect human vulnerability in any urban environment. These are:

- Population density
- Accessibility
- Land use in the neighborhood
- Compatibility of land use and land conditions
- The situation of lifeline systems and public facilities¹
- The existence of appropriate large open spaces around densely populated areas¹
- The location of the Emergency Management Centre in the city¹
- The presence of emergency water reservoir such as elevated water tanks in open areas of the city, so that they can be used by the stricken people without any need to pump¹
- The situation of large public complexes and buildings such as sport complexes, malls in providing sufficient services up to their capacity to the stricken people¹

Figure 1: Vulnerability levels of building in areas 1 (left) and 2 (right) of district No. 14.



Studying District No. 14 of Tehran Metropolis, Case Study
For the evaluation of human vulnerability, the structural vulnerability of every building is estimated first based on the corresponding factors, then the effect of urban conditions is taken into account as an amplifying factor using the corresponding urban factors. It should be mentioned that although the effects of structural factors have been studied separately by difference researchers, a complete investigation, in which these factors have been studied comparatively is not available yet. This is also true with regard to the urban factors. Furthermore, there is no published work with regard to the comparison between the effects of structural factors with those of urban planning so far. The Delphi technique² and Analytic Hierarchy Process (AHP) model³ are suggested as a Problem Solving Technique for earthquake vulnerability evaluation in urban environments, and are used in this study.

Table 1. Comparison of the buildings' structural vulnerability in the two selected areas

Structural Vulnerability		Area 1	Area 2
	Low Damage	0	0
	Moderate Damage	11	31
	High Damage	178	169
	Extreme Damage	11	1

Two areas of district No. 14, with different structural and urban features were selected for comparison (Figure 1). In each area 200 buildings were considered and the database of structures and human settlements for all of them were gathered and prepared. Detailed information of these buildings can be seen elsewhere⁴. Two new maps were generated by combining the mapped data with the four levels of damage in Table 1 (Figures 2 and 3). The effect of urban features was considered in the two selected areas by combination of Delphi and AHP models. This process imported vulnerability functions into a GIS environment, and the amplification factors due to the urban features were calculated and applied to the results obtained by structural vulnerability factors alone.

Findings

The final results in Figures 2 and 3 show that the contribution of urban factors have increased, in average the human vulnerability is around 70% and 33% in areas 1 and 2, respectively. The combination of Delphi technique and AHP model allows the risk assessor to have a reading of the factors, which influence the level of risk, not just from the potential physical damage but also from an economic, social and political perspective. In this way it is possible to initiate a risk management plan that guides the preventive measure which should be taken in each area in the city district, according to the real risk reduction capability and available resources.

Of the two selected areas in district No. 14, area No. 1 has priority over area No. 2 for resource allocation and risk

Figure 2. The effect of urban factors in increasing the human vulnerability in area 1

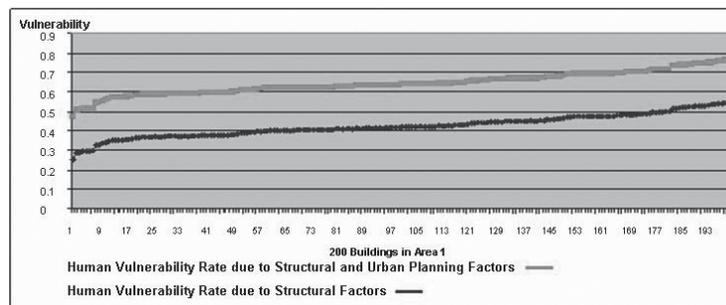
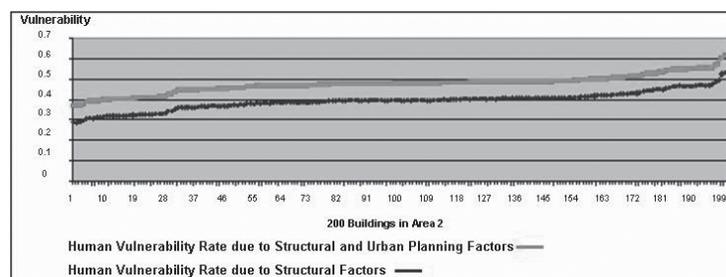


Figure 3. The effect of urban factors in increasing the human vulnerability in area 2



planning. Different urban patterns are affected differently by earthquake and therefore, each urban pattern should have its own selection of vulnerability indicators and corresponding weight factors calculations. On the other hand, each urban pattern should have its own AHP and Delphi process. Note that the method proposed for urban vulnerability evaluation and applied to Tehran district No. 14 is just an initiation, and verifying the proposed method is impossible unless earthquakes happen in Tehran to compare the predicted results of the method with the real numbers. Until it is verified, the proposed method should be used for comparative studies to help prioritize city districts for upgrading their buildings or modifying their urban features.

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The experiences of BAM recovery programmes

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Background

On 26 December 2003, a 6.3 Richter scale earthquake struck the historic city of Bam district in Iran. Approximately 85% of the houses, commercial units, health and educational facilities and administrative buildings in the city and surrounding villages were either severely damaged or completely destroyed.

Institutional arrangements

Following the Bam earthquake, a Task Force for Prevention and Management of Natural Disasters was instituted. Its regulations were approved by the Cabinet and the appointment of the chairmanship of the First Vice President made it a functional body. A secretariat has been established since, to follow up the approvals of the Task Force in the presidential office. UNDP has developed strong partnership with the Task Force from the beginning. The executing agency for recently approved Government-UNDP Joint Five-Year Programme: "Strengthening Capacities for Disaster Risk Management 2005-2009".

Experiences of early recovery following the Bam earthquake

Recovery and reconstruction periods after disasters are unique opportunities to introduce numerous benefits to the affected area's development. Recovery actions can also be regarded as a therapeutic process to assist individuals and their community to rebuild their lives and livelihoods. Cultural, symbolic and historic values of damaged site are very important to the inhabitants and should not be destroyed. The loss of these components of the community may result in social dissociation and weakening social cohesion, and lead to a lack of interest among the locals to participate in reconstruction.

Recovery with multi-sectoral decision-making and community participation

During the medium term of recovery, UNDP with other UN agencies worked closely with the Government of Iran, local and provincial authorities, the affected communities, private sector and subject matter specialists to provide technical inputs for the reconstruction programme of Bam through focused workshops on sectoral themes such as urban development and planning, management of recovery programmes, social sector, public-private and public-professional partnership, building techniques etc.

For preparing this document *UNDMTP: Rehabilitation and reconstruction* 1st ed. was used as the basis of comparison with the experience of the Bam recovery programme.

They also supported and co-organized capacity building, study tours to visit the recovery programmes (including Gujarat study tour), and training programmes on a variety of subjects for reconstruction managers, engineers and communities (local masons and home owners).

The review and approval of the City Master and Detail Plan took ten months, and highlighted an area for UN technical support to speed up the process for future reconstruction programmes. Other areas of priority to provide technical support in recovery programmes are: setting up institutional and managerial arrangements for the design, planning, implementation, monitoring of the reconstruction programme and site selection in time-effective manner. Elaborated further below:

Site Selection:

Discussions and making final decisions on the need to relocate the city took significant time, which delayed the reconstruction process. The discussions proved that the relocation of an entire community is usually not effective and is rarely feasible. Despite the risks of populations inhabiting in dangerous sites, relocation to safe sites is not normally feasible in social, cultural, developmental or economic terms. In Bam region the inhabitants have been highly dependent upon date plantations, tourism; land ownership and family attachments, etc.

Adopting appropriate techniques:

One building technology (steel-frame) was mainly promoted in the area. The Housing Foundation of the Islamic Revolution argued about difficulties in monitoring compliance with building codes of other building techniques, which are allowed by the national building codes of (Standard 2800). If the government subsidised for fuel and some other products are taken into account, the steel-frame structure will be the most cost-effective technique. Therefore, other locally introduced appropriate environment-friendly techniques, which rely mainly on human resources were not promoted largely due to expensive direct costs of human resources. Free technical services on earthquake resistant constructions were provided to the affected people through an Engineering Technical Services and Exhibition Site.

Maximum use of local resources:

Reconstruction programmes should lead to job creation for locals rather than just importing technologies, and creation of jobs for externals/outside. Locals should feel that they are the main stakeholders of reconstruction programmes, and that they are the ones who benefit from these programmes the most; otherwise, they would not participate actively in the programmes. This way, the risk of high rate displacement would emerge, and consequently, economic regeneration might fail.

Targeting aid:

Every family should not receive the same amount of loan, grants and assistance. This underlines the need for more direct support from international organizations and the donors to target the vulnerable groups as well as to continue providing advice to the government on ways to identify such groups. UNDP supported the local authorities to coordinate provision of financial aid of INGOs to more

than 750 single female-headed families in Bam, through the housing reconstruction programme.

Capturing the lessons learned and institutionalising the experiences from disasters and recovery programmes:

A lesson learned workshop was organized three months after the earthquake. The reconstruction phase also provided an unique opportunity to evaluate national programmes' efficiency and effectiveness according to the real scenario of the disaster. A few and isolated efforts in terms of organizing thematic review consultations, studies and publishing and documenting the lessons learnt are going on in different sectors. Documentation and integration of efforts are to be strengthened further.

Using recovery programme as an opportunity to enhance standards of earthquake safety in not only Bam but other vulnerable areas of Iran:

Reconstruction offered unique opportunities to introduce a range of measures including more serious attention to obligatory building records and registration files and training of masons to reduce future risks to persons and property. This was due to the highlighted public and political awareness following the disaster, which stimulated a demand for safety.

More is needed to be done in building capacities and awareness of *local communities, local masons* on earthquake resistant building technologies and creating the demand among the local community for a better compliance with the building codes. Masons are the base of the pyramid of human resources, who are involved in reconstruction, they should receive regular trainings on earthquake resilient construction. A guideline on earthquake resistant building techniques was prepared for the local masons.

UNDP Housing Reconstruction Programme adopted concrete frame structure, commonly used local building technology, which was allowed in national building codes. The Housing Foundation-UNDP Joint programme focused more on capacity building activities for local building workers and engineers, the programme's beneficiaries, and community members.

Slow speed of recovery programmes:

Although the government always invests significantly in recovery programmes in Iran, due to bureaucratic scenarios, sometimes complex and lengthy processes for obtaining a design, approval and sourcing the needed materials, sustainable reconstruction becomes relatively slow. In addition, capacities of the private sector is low to conduct the recovery programmes, and incidences of illegal and criminal conduct by private contractors, cause more delays in Bam. People's raised expectations in getting more financial aid and lack of proper mechanisms for sustained information exchange on the aids, delayed the reconstruction process.

The main factor of delay in rebuilding sustainable housing, which was identified by the national managers was provision of transient shelter in the urban areas for each household. Purchasing, transferring and installing,

plastering and finishing some 23,000 prefabs took lot of time, energy and resources. If the government avoided transient shelter, it would have speeded the recovery of permanent housing. In rural areas, where the prefabs were not provided, the physical reconstruction completed in almost two years while in the urban areas of the Bam and Baravat regions, it has taken more that three years.

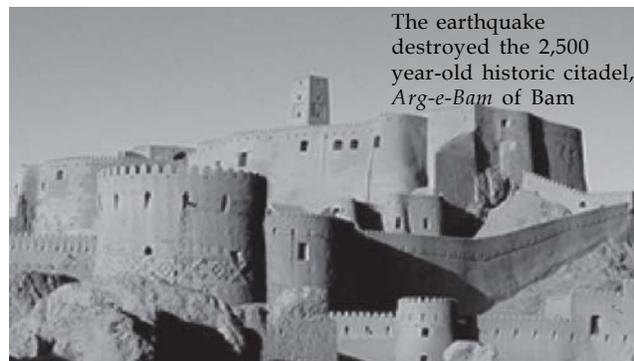
Successful reconstruction is closely linked to the resolution of ownership problems. Enforcing land use planning controls into reconstruction planning such as tenure of agricultural land and improving the land ownership are the issues that should be grasped and considered by reconstruction programmers. Due to migration and demise of large number of landowners, difficulties were faced in resolving the ownership issues causing further delay in the recovery of Bam.

Risk reduction yet to receive more weight in development programmes:

The experience of the Bam earthquake highlighted the fact that, while there are strong existing and emerging institutional arrangements at the national level, the capacities at the local and intermediate level are relatively weak. Despite significant technical capacity on all aspects of disaster risk detection and management, the implementation of these at the local community level is low. Therefore, translating policies into practice at the local and intermediate levels will be the main strategy of the Government-UNDP National joint five-year Programme: Strengthening Capacities for Disaster Risk Management in I.R.Iran. The Management and Planning Organization is the executing agency of the programme, which is a potential multi-donor programme that is currently funded by UNDP and the Government of I.R.Iran.

The road map for a safer community in Iran:

- Translate policies into practice at the local level.
- Strengthen capacities on all aspects of disaster risk management at the local and intermediate levels.
- Build a knowledge base on existing and emerging patterns of disaster risk; good information on natural hazards alone is not enough.
- Build capacities to mainstream disaster risk reduction into development processes.
- Link disaster management at local, provincial and national levels.
- Use Bam experiences and lessons to reduce risk in other vulnerable parts of Iran and the region.



The earthquake destroyed the 2,500 year-old historic citadel, Arg-e-Bam of Bam

Some emerging hazards in Bangladesh metropolises

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The Chittagong landslide

Most Bangladeshis, barring a few environmentalists and academicians were not prepared to see what happened on the morning of 6 June 2007 in Chittagong. More than 120 people perished in their sleep, buried under avalanches of mud. Chittagong is a city dotted with small hills in southeastern Bangladesh. Incessant rainfall over a period of nearly six hours had triggered landslides in succession at different locations of the city. Disasters are nothing unusual for Bangladeshis which have experienced more than its fair share of floods, oceanic surges, storms and catastrophic maritime accidents; but landslides killing such a large number of people in the city left most Bangladeshis awestruck.

The changing face of development

Urbanization in Bangladesh is going on at a very high pace, driven mainly by migrants from rural areas. Dhaka is experiencing a growth rate between 3 and 4 percent per annum. The frenzy of growth and the tremendous pressure it puts on land in these two cities have led to sound practices of planning and construction being flouted and ignored. Resource-strapped city authorities are hard pressed trying to match supply of services with rapidly expanding demand. One of the key consequences of these is the rising threat of hazards that did not exist or were infrequent so far.

The tragedy at Chittagong was a result of indiscriminate cutting of hills, to make room for 'development' and to sell the soil removed from the hills, leaving portions of the hill surface devoid of vegetation, often at a precariously steep slope. Under the circumstances, landslides were inevitable. The destruction of hills also clogs up the drainage channels with soil eroded from the hills.

In Dhaka, where there are no hills, the pressure on limited buildable land has resulted in the filling up of wetlands and encroachment of waterways. Increased runoff and obstructed drainage channels have exacerbated urban flooding. A few hours' of rain, a very common phenomenon in the monsoon season, now inundate large tracts of the city.

The rapid growth of urban economy and population has also resulted in a rising tendency of improper construction. A large number of buildings in the cities are not designed or constructed by qualified professionals. Even in buildings erected by corporate bodies who employ professionals, corners are cut in the haste to maximize returns at the cost of structural quality. A number of buildings in Dhaka have collapsed under their own weight in the recent past. The Spectrum Garment building collapse of April 2005 claiming 76 lives, and the Phoenix Garments building collapse of February 2006 killing 22 persons are cases in point. These incidents are stark warnings of what may happen when extreme natural forces inevitably act simultaneously on the city structures at some point in future.

Another form of looming disaster that can be seen on the horizon is the scarcity of water, especially but not exclusively in Dhaka. The Dhaka Water and Sewerage Authority (WASA) is unable to meet the current demand of water and the daily shortfall in supply is around 800 million liters and increasing. Around 80 percent of the supply is extracted from underground with deep tube wells. The rest comes from the rivers. Environmentalists have been warning against excessive extraction of subsurface water, but the water in the rivers around the city has become polluted beyond treatment in a viable manner. The sources of pollution are untreated sewerage, industrial affluent and spills from marine vessels. Even the subsurface water is now reportedly under threat of contamination from the surface. These are very disturbing signs of an impending water crisis that would have far-reaching and disastrous consequences.

Challenging measures

Bangladesh has a reasonably good body of laws and regulations for protecting the environment. The laws prohibit the cutting of hills and filling of water bodies. Much of the weaknesses in the legal framework for regulating construction have also been removed with the adoption of the Bangladesh National Building Code (BNBC) and the Building Construction Rules (BCR) for Dhaka Metropolitan City. BNBC was formulated in 1993, but the official gazette notification making it mandatory to follow the code was published in November 2006. The Code has extensive provisions to ensure safety against wind, fire and seismic hazards. The rudimentary Building Construction Rules of 1996 was totally revamped for Dhaka City in April 2006. This set of rules incorporates a system of holding responsible designated technical personnel for each phase of design, construction and occupation. The rules not only attempt to assure quality construction, but also ensure that a higher portion of lots is left without construction to reduce runoff and increase recharging of underground water. Similar rules are now being prepared for Chittagong City.

Dhaka Metropolitan Development Plan (1995-2015) has strict directives against building construction in areas delineated as flood flow zones and sub-flood flow zones. Dhaka WASA has been conducting periodic drives to rid the canals in the city of illegal encroachment. Projects to improve storm water drainage are being implemented. NGOs like the Bangladesh Environmental Lawyers'

Association are taking to court organizations that defy the ban on filling up water bodies. This has acted as a deterrent and several 'land development' projects remain suspended. Tanneries in Dhaka, a major source of river pollution, are being rehabilitated at a site away from the city where effluent treatment plants will also be installed.

While Bangladesh has no dearth of legal tools to promote a safe environment, the problem has been with enforcement. Apart from institutional issues such as poor resources, manpower and capacity, endemic corruption has been a hurdle to enforcement of laws. The present non-political government in Bangladesh has embarked on an offensive against corruption. Already several persons responsible for hill cutting in Chittagong have been arrested (before the tragedy took place). It is hoped that the government would include measures in the system to ensure effective enforcement of laws in future. One area where laws may be revised and updated is storage and transportation of hazardous material, an issue that is becoming a matter of serious concern as the country continues on its path to industrialization.

Bangladesh has earned international acclaim for different aspects of disaster management. However, the experience and expertise of Bangladesh lies mainly in dealing with hazards in rural areas. The need to improve preparedness and capacity to meet growing hazards in urban areas cannot be overemphasized.

Experiments on reducing urban risks in India

SEEDS India

The current levels of risk in urban centres across India, are largely a result of change that has taken place in the country in the latter half of the 20th century. In the short span of 50 years the number of urban centres in India grew from 3060 to 5161. In terms of absolute numbers, the urban population grew from 62 to 285 million-an increase of 450 percent!

Considering the strategic importance of urban centres to any developing economy; and the potential damage that can result due to increasing risk; such an issue would get high importance. However, very little effort has really gone into reversing the trend. Small and medium disasters continue to recur and a hugely indifferent urban community and the under-resourced, under-staffed local governments manage to just about make half-hearted attempts to address the problem.

Over the years, due to a rapid shift from primary to secondary and tertiary sectors of economy, urban centres witnessed sudden spurts in their population. While change took place rapidly, the conventional planning process failed to accommodate the same with equal speed. In India, the town planning process has followed the

standard routine of preparing comprehensive city development plans with twenty year perspective. The responsibility of plan preparation rests with the town and country planning departments of states, or with city development authorities. The plan making process follows a linear routine of survey-analyze-plan. Procedures typically begin with extensive data collection, followed by lengthy data analysis. Options emerge, which undergo a thorough review involving respective local authorities before the plan is prepared. It is a lengthy process, culminating in inflexible plans that often run into difficulty during implementation, because they assume institutional and administrative resources that are rarely available. As the Delhi's Master Plan drafted in 1962 (India's first Master Plan) has shown, urban growth has continued in the shadow of an un-implementable Master Plans, leading to increasing trends of risks.

Urban risks usually stem from local and micro-level problems that cumulate into big disasters. Encroachments on river beds in Mumbai have led to complete collapse of the city in event of heavy rain. Non-implementation of basic building bye-laws often cause huge buildings to collapse. Perpetration of shanty structures have led to devastating fires in the past. If urban risks have to be reduced, their causes at the micro-level-the neighbourhood, have to be addressed. Local knowledge and wisdom have the potential to provide solutions. SEEDS has experimented with the Community Action Planning (CAP)¹ process and has tested the same in various cities across India. The Action Planning process has characteristics many of them shared with the better known PRA techniques. It is problem based and opportunity driven; based on achievable actions; participatory; reliant on local knowledge and wisdom; non-reliant on complete information; small in scale; incremental rather than comprehensive and has visible, tangible objectives.

Trials in Community Action Planning

In 1997, SEEDS partnered in a DFID supported project titled, "Reducing Urban Risk, India". Working in two low income neighbourhoods, the team discovered community perceptions of risks are inherently driven by their need to sustain their economic activity and protect their assets. For them, living with floods was acceptable but losing their household assets in fire wasn't. The action planning led to community led efforts that could locally prepare them against fire risks. For the SEEDS project team, who had started working on the basis of flood problem in the neighbourhood, this was a pleasant surprise and useful learning. The solutions suggested and implemented by the community were realistic and replicable.

Similarly, SEEDS worked with local communities in the city of Ferozabad, Uttar Pradesh where local industry manufacturing glass bangles had caused severe degradation of the environment, in the city of Bikaner where rapid development had caused irreversible damage to a historical lake in the city; and in Rohtak which grew out of a small hamlet into a sprawling settlement thus exposing itself to floods. In each case, the action planning process helped the communities to consolidate their problems, and articulate their needs. Communities could identify locally implementable actions. This created a healthy partnership between citizens and local authorities.

Did such community led exercises actually lead to lowering of risks at the city level? No. Among the lessons learnt, it was concluded that community action planning exercise is dependent on a number of factors, which in these cases acted as a constraint for SEEDS. First, community action planning is very “neighbourhood based”. In order to make impact at city level, such exercises have to be replicated simultaneously covering the entire urban community. With limited resources, this could not be possible. Second, the exercise requires good facilitators. Such facilitators are hard to find. And third, results of simultaneous action planning exercises have to be consolidated at city level and translated into city level action plan. Since such action is a culmination of various “neighbourhood based community plans”, the same could not be achieved. Lessons learnt from such experiences translated into better planned approach subsequently. Realizing the need for solutions within limited resources and fewer facilitators, schools became a useful target as local simulators.

Safe Schools, Safe Communities

Schools and school children being the centre of any community, serve as vehicles of entry into local community. As part of this approach, schools are engaged in local disaster management planning both within and in their immediate environs. Schools being spread geographically in any city, become both the starting point for community led risk reduction action, while also serving as ‘safe havens’ in event of a disaster. In the earthquake affected cities in Gujarat, in Port Blair affected by the 2004 Tsunami and the potentially vulnerable Shimla city in Himachal Pradesh, the Safe School to Safe Community approach is increasingly gaining acceptance and recognition by the local communities. Hopefully, the efforts that have been initiated would lead to long term mitigation action and “disaster sensitive” urban development plans.

¹*Action Planning for Cities : A Guide to Community Practice; Authors Nabeel Hamdi and Reinhard Goethert. John Wiley & Sons. 1997*

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Emerging earthquake risks in urban areas of developing countries Located in seismic zone: A case of Kathmandu valley

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Urban disaster risk is growing in almost all settlements located in high-hazard zones in developing countries. This is true for the old historic settlements, such as Kathmandu (Nepal) or Dhaka (Bangladesh) or Shimla (India) and also for the new settlements that have grown around the old cities, and even in the so-called planned cities because not very many of them have considered adequately the risks posed by natural hazards to which the cities have been exposed to. The ever-increasing risks due to natural hazards is due to two reasons: a) increase in the intensity and extent of natural hazards due to changes in the physical environment; the latter is caused either due to anthropogenic activities or due to the effects of climate change.

In this paper we try to explore the sources of risks and their dynamics based on the case of Kathmandu Valley, which is susceptible to primary (shaking) and secondary (liquefaction) earthquake hazards, landslide and flood hazards.

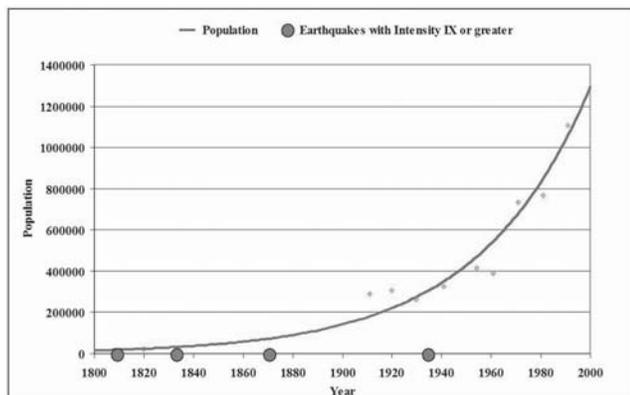
Kathmandu Valley, the capital of Nepal, lies in a highly active Himalayan seismic zone. According to the recorded history of earthquakes since 1205, the Valley experienced about nine episodes of earthquake shaking equal to or larger than IX MMI in the past 8 centuries. In the past 2 centuries alone, the Valley experienced four events of large earthquake shaking, including the 8.3 magnitude Great Bihar-Nepal Earthquake of 1934 when almost half of the existing building stock in the Valley was destroyed. Several parts of the Valley experienced liquefaction during the historical earthquake. Kathmandu also experiences floods regularly-several bridges were destroyed by floods in the past, many settlements located in the flood plains are believed to be under increasing threat. Landslide is another problem, especially along the terrace slopes in the valley floor and the mountain slopes in the periphery of the Valley.

Thus, although the earthquake hazard may be considered as constant, the extent as well as intensities of other hazards such as landslide, flood and urban fire, etc are increasing, which combined with the increasing vulnerabilities, brings a rise in hazard risks.

The Emerging Risk

Disaster risks are increasing mainly due to three main causes: a) population growth leading to increase in the number of population exposed to the hazards, and b) relative decrease in capacities to manage the risk and cope with the resulting disasters, and c) lack of knowledge.

Figure 1. Earthquakes shaking in Kathmandu Valley during 1800-2000 and the population growth during the period



Population growth in urban areas is universal and is getting more pronounced in the developing countries due to several demographic and economic factors. Past decade witnessed accelerated population growth in urban and urbanizing areas of Nepal because of the armed conflict and insurgency.

Population growth leads to the following impacts:

1. Increased population density in the existing or new settlements
2. Fragmentation of building lots into smaller parcels of land
3. Vertical growth of buildings; add-on floors on existing buildings becomes the rule
4. New settlements in the fringe of urban municipalities. Previously administered as rural areas, new settlements and illegal settlements in marginal areas, flood plain areas, swampy lands; development of slum areas.

All the above processes add to the already existing vulnerabilities due to a) lack of hazard/disaster risk awareness, b) lack in capacities in the implementation of building codes, building bylaws, land use plans, fire codes, c) lack of proper policy, legal or administrative mechanisms to address the disaster issues within the formal urban areas or in the illegal settlements. Further, creating any land use plan for the already built-up areas such as the city core areas and implementation of the plan is almost impossible. The commercial and economic value of the land and the building in the city core has a dynamics that demands very fast, knowledgeable and convincing decision-making which usually can not be expected of the old bureaucratic municipal structure. Even for the non-core areas, the land use plan or the city growth plans usually are not implemented effectively, largely because they are faulty, not corresponding to the current-day realities, do not consider natural hazards, not

respected by the authorities and not liked by the population.

Decreasing Capacity to Manage Disasters

Emergency services, lifelines or critical facilities that were installed in the past are not adequate for the present-day population and their life-style. Crowded emergency wards in hospitals, lack of water in the distribution pipes of reduced period of water supply, encroachment of public open spaces, pollution of water bodies, inability of the limited number of fire engines to access disaster sites because of narrow width of the roads, etc evidence the decreasing capacities of cities in managing disasters. Many of the existing systems, for example, the fire services, were established for smaller impacts, and are unable to provide services in the present-day conditions.

Lack of Proper Knowledge Management on aspects of DRM

Lack of knowledge and understanding is painfully seen at all levels. However, even the available knowledge that exists is not managed properly. For example, the knowledge to make the buildings significantly safer against earthquake is known and consolidated into the building code of Nepal. Further, it has been demonstrated that the additional cost for achieving the earthquake-resistance is manageably low. However, to this date, most of the universities do not teach the national building code to the graduate or undergraduate level engineering classes, and myths prevail on the high costs of achieving seismic resistance for new or existing buildings. Extreme poverty is many times taken as the excuse for the high levels of disaster vulnerability, however, one does not find any mention of disaster reduction in any of the poverty alleviation/reduction policy or programs. The Nepal MDG does not speak of any disaster reduction as the path of achieving the MDG goals.

How to address the problem?

Any further building up of vulnerabilities and risks should be stopped. The risks accumulated over the years should be reduced, and the urban dwellers should be assisted to be prepared for the residual risks. The process should be continued in a long term. A large earthquake is already overdue in Nepal, and Kathmandu may be hit again in the not so distance future. For this, the country should also develop plans and policies for building back better, once an earthquake takes place.

This calls for a) putting in place proper strategies, policies, and legislations for disaster risk management at national and city levels, b) Conducting participatory risk assessment so that the potential victims and the vulnerable are engaged in the risk assessment and remediation process, c) enhancing the knowledge on risks and the risk reduction and preparedness measures for all stakeholders with due consideration of cross-cutting issues such as gender, human rights, environmental protection, social inclusion and securities, d) controlling the important vulnerability factors and reducing the risks by involving all stakeholders and running sustainable participatory programs, and e) planning and

preparedness for effective response including establishment/strengthening of emergency response system, development and implementation and updating of emergency preparedness and response plans, conduction of drills to ensure suitability of the emergency response plan, propositioning of emergency supplies at community, district and provincial levels, developing a framework for coordination of all key players of emergency response.

With this strategic framework, adapted after HFA 2005-2015, the cities should undertake the following priority actions:

1. Prepare and implement a disaster risk management master plan (DRMMP) for the city. The master plan should embody a mitigation plan and an emergency response plan.
2. Approach for master planning should be modified from the traditional concept of master plan as a document. The master planning should be rather defined as a process which involves and engages all stakeholders, engenders commitments, fosters collaboration and coordination.
3. Implementation to be run in parallel to the master planning process. Some of the priority implementation agendas could be a) strict implementation of the building codes and the byelaws, with equal emphasis on “compliance” and “enforcement” measures, b) strict adherence to the land use plans and modification of the plans as necessary to ensure acceptability, c) capacity building and awareness to enhance demand for a safer city, and d) institutional reorganization, reform and strengthening so that the city administration could address the issues with a new outlook and urgency.

A city with an affordable level of safety against natural hazards is a prerequisite for its sustained development. A city with a culture of safety among its citizens attracts goodwill, investments and prosperity for all.

Training Calendar and Urban Program Events of ADPC

- 2nd Governance and Disaster Risk Reduction course, 17-21 Sep 2007
- 8th Flood Risk Management Course, 8-19 Oct 2007
- 3rd Regional Training in Landslide Risk Management under RECLAIM , Mar 2008
- PROMISE Working Group Meeting, May 2008
- 7th Earthquake Vulnerability Reduction for Cities Course, Jun 2008
- 3rd Governance and Risk Reduction Course, Sep 2008
- 9th Flood Risk Management Course, Oct 2008

Ensuring safer shelter and infrastructure in urban built up areas

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The vulnerability to natural disasters of shelter and infrastructure facilities within urban areas is rising, independent of the fact that they belong to large urban agglomerations or secondary cities or urban slums due to the poor quality of construction, poor planning of land use within the built up areas, lack of programs to meet the demand for housing for urban poor, economic activities associated with building stock and infrastructure.

The building stock in an urban area can be classified into several groups depending on the ownership, functional characteristics, construction type, value, heights so on. We can consider only three broader categories or groups depending on the characteristics of the construction. Engineered buildings, which are designed and supervised by engineers are generally supposed to be of high quality and meet the building code requirements. Normally, the dwellings and other small-scale commercial buildings and community infrastructure are the second category. Such buildings are not built as per the designs by engineers and hazard resistant features are not taken into consideration in construction. The third category is the buildings within informal settlements which are considered to be adhoc or semi-permanent type of buildings of varying quality and safety.

It is evident from the existing practices of developing countries in Asia that safer construction cannot be achieved only through a building approval process. Also, it is not a problem that can be tackled only through a stringent engineering strategies and solutions. Therefore, it is worthwhile to investigate root causes of the problem if adequate measures are to be taken to improve the building stock within the urban build up to make them safer against future hazard events. Even the so-called engineered buildings are not being constructed to the designs in some cases although such designs are subjected to approvals prior to construction by the city authorities. Observations after disaster events show that there are many instances where such buildings are not constructed following the approved set of drawings.

Many feel the reason for unsafe housing can be directly attributed to economic vulnerability of the occupants. From the rapid surveys carried out by ADPC in the disaster affected areas in many countries, it is evident that house owners are keen to invest very little money for construction of the structure itself but more investment goes into interior decorations, tiling, ceiling, painting etc. Earthquakes occur in various parts of the world but most individual building owners are yet to become conscious

of the fact that the structural safety is more important than the interior and exterior decorations of the house. The buildings constructed without adequate measures to withstand the ground acceleration due to earthquakes are highly vulnerable and become death traps for occupants in case of occurrence of an earthquake. Conventionally evolved non-engineered and semi-engineered buildings are more vulnerable to earthquakes and may suffer moderate to very severe damage, which depends on the design, construction process, age and maintenance of buildings. Cost effective Earthquake resistant design and construction will reduce the economic impacts and losses of lives and injuries but only few understand the importance of creating such a mind set among house owners.

Similar principals apply in the context of other types of natural hazards. The houses inundated by flood water for a considerable period need to be protected from weakening of the structure due to water absorption or the high velocity of flood water currents. In the cyclone prone areas, houses have to be built to withstand high winds. In most of the drought prone areas, soil structure tend to shrink during dry periods and expand during wet periods. If the foundations built on such soil are not designed to withstand lateral loads, cracking and foundation displacements can be a common problem. This applies to structures and infrastructure such as roads, bridges, drainage systems, and water, gas and other supply lines, irrigation canals, irrigation structures, etc. In landslide prone areas people need to understand the potential risk associated with the land and how buildings can be constructed without compromising the stability of the slope where they build.

The type of building material used defines the strength parameters of structural components and the elements. Methods of construction adopted and workmanship directly attributes to the quality of construction and plays an important role in ensuring the safety standards of buildings. Most developed countries have incorporated the solutions to ensure the building safety in the form of codes that mandate integration of safety standards for design and construction of engineered buildings and institutionalized them in the building permit process. The basic philosophy of the code and purpose is to prevent injuries to people not essentially to reduce damage. In a large earthquake, the building may undergo considerable structural and non-structural damage but as long as the building does not collapse the intent of the code can be met. Most of the government buildings and infrastructure as well as many buildings constructed by reputed established contractors with private sector investment come under the category of engineered buildings. The regulation and construction supervision of such engineered buildings are not easy. Adequate supervisory mechanism employed by the owners and the willingness of the contractors to build to a high degree of safety following the design drawings are important features which make both sides accountable for building safety.

In order to reduce the vulnerability of buildings, it is essential to make the builders and property developers understand their role in order to ensure the accountability.

Not many such builders and property developers are willing to do construction under the supervision of a qualified set of engineers, with the participation of skilled and qualified construction workers, using high quality building material as per the designs. The construction workers need to be equipped with skills and competencies to handle the work with minimum supervision by engineers so that they maintain high quality standards throughout. Programs initiated by the Government institutions for training, certification and quality assurance of construction workers is a must for any developing country and more vocational training institutions have to be created to assure that. The city authorities are often blamed for involvement in corrupt practices for providing building permits. It is also important to create a mindset among such officials so that they are refrained from such practices. Some countries are trying to evolve new ways of controls such as third party verification process to improve the existing building permit process and inspection procedures to integrate further checks and balances. But the most important factor is to increase the conciseness of the building owners so that they seek advice from qualified professionals before purchasing such buildings or during construction process. The media can play a main role in educating them and giving basic knowledge on safety features that should be incorporated in any type of building depending on the proneness. Safety should be a primary important factor for any occupant of a building before it becomes a deathtrap.



Based on the records of past post-disaster damage assessments, the majority of housing destroyed are owner built or provided by small scale property developers. In many developing countries, majority of shelter construction is carried out by the house owners themselves or small scale builders and rarely do they get any technical assistance from qualified and specialized set of engineers or construction technicians who has the knowledge to integrate hazard resistance features in construction. To improve the quality of such buildings, the general guidelines for construction can be developed depend on the hazard type and making them available freely to builders, especially to house owners. Such guidelines can be used to improve the building quality and local governments can make available approved type plans to reduce the difficulties involved in building permit process. When designing such type plans it should be carried out through a participatory process so that city authorities will be able to provide designs to match the taste and to include cultural social practices of dwellers.

This should be complemented through initiatives by local governments for training of skilled construction workers, building contractors and even engineers involved in such schemes. The supervisory staff within local bodies also should be aware of such techniques as they become the regulatory authorities within local government administration.

As per the records of UN-HABITAT, 2001, Asia accounts for more than half of the world's slum population, which is around 563 million at the beginning of the new millennium. The slum population is mostly comprised of those who have migrated from rural areas. The rural population moves into cities with the hope for better living conditions, facilities, employment opportunities and other economic and social benefits. In the absence of formal arrangements provided by cities or any other organization to accommodate them in formal settlements what they can afford is only the informal settlements. There are other reasons such as personal relationships, cultural and social networks, ethnicity and religious clustering etc for increase in population in informal settlements. Affordability as well as convenience and closeness to work place, neighborhood networks help them to find locations for temporary or permanent stay within the informal settlements and since there are no regulations to control the density of such locations progression of vulnerability and crowdedness continue to grow in such informal settlements.

The most common feature of these informal settlements is weak or non-engineered buildings, unplanned land use, infrastructure and services. Since most of them are illegal or unregistered settlers, local government authorities pay limited attention to them and unregistered settlers are also reluctant to pay for services and taxes imposed by local government authorities. Generally most of the local governments are weak in enforcement and implementation of city bylaws and regulations which controls the land use and constructions within the jurisdiction. In such areas the city authorities also do not attempt to take adequate steps to control the growth and expansion into more marginal areas prone to natural hazards or to improve the living conditions in such areas. These are some of the reasons for the progression of vulnerability of informal settlements. If the risk mitigation initiatives can be incorporated in urban planning and building permit process the cities can regulate expansion of informal settlement into hazard prone areas.

Poverty has become a collective reality for those living in underserved communities vulnerable to the hazard impact. To assume that poor people do not see the problem is far from the truth. They understand their vulnerability and also the reality of living in unsafe conditions. What they wish to have is the means to solve problems using affordable solutions to mitigate their risk. They lack resources to make the place they live safer or the possibility to move elsewhere. It is necessary to introduce credit programs to meet their needs and to provide additional resources for strengthening the houses or for building new houses. The contributions and the services of the poor, make city life more cost effective and affordable to many. For example bicycle rickshaws in Dhaka have become the cheapest mode of transportation

for middle income groups, but many rickshaw-pullers who live below poverty line can not afford to have decent shelter within the city. Many street vendors in Bangkok city offer cheaper, delicious and healthy food to many including tourists, but again can not afford to live in formal housing within the city. This is the situation with poor segments of service providers in many cities and in the absence of formal arrangements for such groups, they move into informal settlements. Impact of natural and man-made disasters to such settlers occupying the vulnerable areas is observed to be very high because of their physical vulnerability to natural calamities. So the city authorities should consider housing for urban poor as a serious need in order to eradicate the urban poverty and to reduce slum population.

In order to improve the building practices, effective financial instruments also are needed. For achieving the task of quality and safety incorporation of hazard resistant elements in construction is essential and this also can be achieved through employment of techno-financial instruments such as incentives and dis-incentives to discourage construction in prone areas, controls through lending and finance mechanisms, provision of micro-credit facilities for retrofitting of houses and property insurance. Normally it is not compulsory for builders to get insurance cover for buildings in most of the countries in Asia. This should be a part of housing loans or micro-credit provided for new construction and retrofitting of old structures. Insurance has three roles to play in managing the risk. First it provides a means for reimbursement of damage service providers in many cities and in the absence of formal arrangements for such groups to move into informal settlements. Impact of natural and man-made disasters to such settlers occupying the vulnerable areas is observed to be very high because of their physical vulnerability to natural calamities. So the city authorities costs allowing victims to recover from losses. Second it spreads the cost of irregular and geographically confined losses overtime and space. Third it can be used to encourage actions at individual and community level to reduce exposure to hazard events. The procedures developed for regulating at various levels depend on the competence of the staff available in local bodies to follow techno-legal regimes.

Conclusions

As seen from many developing countries control alone will not help in building safer shelter or infrastructure. Many laws and regulations are not designed to reflect the reality and existing governance process of urban local authorities do not permit any participatory actions for making them more realistic and practical. Most local bodies suffer due to inexperience and inconsistency of the staff responsible for risk assessment, risk based land use planning, implementation of by-laws in regulation of construction. The building contractors and professionals need to be accountable for building quality and safety. The construction workers need to benefit from programs for training & capacity building, certification and continuous skill verification processes initiated by the government vocational training institutions. Enhancement of level of awareness of the occupants of buildings is necessary to educate them about the need for safer housing to reduce their vulnerability to natural hazards.

Integrating mitigation in urban construction-Building byelaws and regulatory framework in India

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The Indian subcontinent is highly prone to natural disasters on account of its unique geographic, topographic and climatic characteristics. Overall, nearly 85% of India's landmass is prone to calamitous event-droughts (68% of the net sown area), cyclones (8% of the landmass), earthquakes (59% of the country), tsunamis, landslides and various other events. Wherever events have occurred near human settlements the damage and loss has been astronomical. Much of the vulnerability is accentuated by the vulnerability of the built environment which includes housing as well as social infrastructure. The 2001 Gujarat earthquake death toll was reported at 13,805 and injury cases at 1,67,000. Much of the deaths and injuries were caused because of the collapse of buildings. 215,000 houses fully collapsed and 928,000 houses were damaged in this event.

Underlying vulnerabilities

Over the last few decades, Indian cities have witnessed phenomenal expansion in the wake of the new economic paradigm of globalization. With 285 million urban populations, which amount to roughly 29% of the total population, India is witnessing a new spurt in the number of urban centres. As of now, India's urban population is distributed among 4,689 centres with 59% of the households below the poverty line. The decadal urban growth rate of 31.2% is almost double the rural growth rate of 17.9%. At this rate, 10:90 urban rural population ratio of the early twentieth century is likely to be reversed by 2050.

Due to the spurt in the economic development and services sector, many urban centers in the country today are experiencing expansion as never seen before. However, it is also seen that this is leading to haphazard and unplanned development in the urban settlements and urban fringe as well. Further, the existing settlement planning has not included the location context with reference to the existing hazard zones. This is further compounded with inadequate attention being paid to the safer construction practices, lack of enforcement of building byelaws and implementation of codal provisions in the design and construction practices. The population of the urban centres is larger than at any time in history, and there is hardly a place on land where a large

earthquake or a major flood in any of the major urban centres can occur without causing damage. In spite of the ongoing risk reduction programmes, there is also an urgent need to tackle inadequate preparedness and response planning at the administration as well as in the community level. The urban local bodies do not have adequate capacity to undertake preparedness and mitigation planning activities.

There is considerable scope for the reduction of risk through the application of disaster prevention and mitigation efforts based on, for instance, improved land use and settlement planning, safer building practices, effective risk transfer mechanisms and innovative financing mechanisms to address pre-disaster protective measures and post-disaster re-housing and rehabilitation - provided that societies ensure the application of these in a manner consistent with the needs of sustainable development. Several attempts have been made by the National and the State government to meet this challenge.

Meeting the Challenge

As earthquakes and other natural phenomena continue to raze buildings to the ground, the knowledge and the resources put into the creation of a habitat today seems to be unable to prevent the number of casualties in each event. The urban and the rural community continue to face the challenge to mitigate loss of life and damage to property from a probable event. It is important to address critical development issues keeping in mind the existing hazards and the vulnerability in the region and help bring together all identified stakeholders to look into more careful and coherent planning to mitigate the impact of future events. Professionals engaged in the construction of the buildings and infrastructure have to shoulder the responsibility to make the built environment safer and aim towards a common goal in reducing the vulnerability. It has already been demonstrated in past events (especially the Killari and the Gujarat earthquake) that there is an unacceptably high death toll due to collapse of weak designed structures. Making the built environment safer is a complex and multidimensional problem as it has to be worked upon in consideration of social and cultural context while appropriately drawing upon sciences and engineering/construction technology. The experiences so far conclusively demonstrate that we are far from the goal.

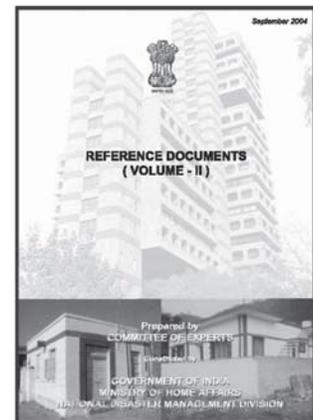
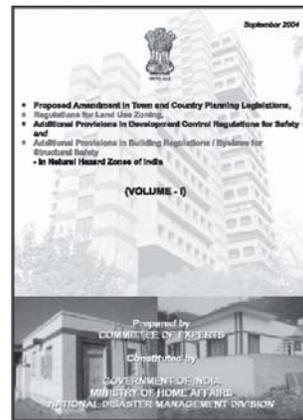
It is important to meet the challenge head on and aim in achieving the goal of sustainable risk reduction. For protecting the existing and future development works from the disastrous impacts of the natural hazards a holistic approach needs to be adopted. Such an approach would consider parallel actions consisting of creation of public awareness, education and training of professionals and construction workers, research and development on implementation technology, incorporation of safety aspects of natural hazards will be needed in addition to engineering, architecture and planning measures, which should cover land use zoning, planning of habitat, implementation of building codes in all new constructions, and seismic retrofitting of existing vulnerable buildings and infrastructure for upgrading earthquake resistance. The challenges, key issues and their interlinkages needs

to be appreciated/understood. By and large these gaps have been identified. It is time to ensure that planning developments and expansion of habitats take into consideration safety against natural hazards. New buildings constructions have mandatory provisions of safety elements with respect to the multi-hazard profile in the region & the construction fraternity demonstrate and encourage owners for retrofitting of unsafe buildings. In the current scenario the cooperation and collaboration among many institutions with diverse perspectives would be critical to success.

Integrating disaster mitigation into urban and regional planning involves two aspects—one, physical planning and its implementation, the other, development control regulations and enforcement mechanism. Both these aspects are of a critical concern and need to integrate risk reduction measures at various levels. With this understanding, the practitioners and administrators have initiated action towards developing a techno-legal regime.

The Ministry of Home Affairs, Govt. of India constituted a Committee in 2004 to develop **Model Building Byelaws** and the review of Town and Country Planning Act, develop the zoning regulations on the recommendations of the National Core Group on Earthquake Mitigation set up by the Ministry. The committee has proposed amendments in the Town and Country Planning Legislations by incorporating various terminologies pertaining to natural hazards, natural hazard proneness and mitigation under relevant sections. Additional provisions have been suggested for formulating the regulations for land use zoning and development control/building regulations with regard to natural hazard mitigation. Recommendations are made for additional provisions to be incorporated in the development control regulations for safety in natural hazard prone areas and the building regulations/byelaws for structural safety. Details of various BIS codes relating to structural safety for natural hazards are given for the guidance of the professionals to design the structures/buildings, keeping in view of the provisions of such codes against different natural hazards. Also, a detailed Structural Design Basis Report format has been prepared for ensuring the compliance of essential elements of various BIS codes by the concerned professionals. The qualifications, duties, responsibilities and supervisory mechanism are detailed out in the document with relevant forms. The Committee also impressed upon the need to have a law for professionals in the form of 'Architect Act' for engineers and professionals so that their qualifications, responsibilities, duties could be spelled out and channelized in a better, coordinated and unified manner. The Committee observed that there are large areas where Town Planning Legislation and Development Control/Building Regulations are not applicable and the sanctioning authority in such areas is either Panchayat in the rural areas or Development Commissioner through Central Public Works Department (CPWD/PWD) or other such agencies. Therefore, the Committee recommended that in such areas, the sanctioning authority should be advised to take into consideration provisions regarding the structural safety in natural hazard prone areas while sanctioning development/projects in such areas under their respective legislation.

The 'Model Building Byelaws and additional provisions for structural safety in hazard prone areas of India' is brought in two volumes. *Volume one* contains details in the form **Proposed amendment in Town Planning Country legislation (chapter 2)**, **Regulations for Land use zoning for natural hazard prone areas (chapter 3)**, **Additional Provisions in Development Control Regulations for Safety in Natural Hazard Prone Areas (chapter 4)** and **Additional Provisions in Building Regulations/Byelaws for Structural Safety in Natural Hazard Prone Areas (chapter 5)**. These are supplemented by details given in the Appendixes, wherever necessary. The documents studied and referred to in volume one are Annexed in Volume two. Volume two contains model Town and Country Planning Act in the Year 1960, Revised Model Regional and Town Planning and Development Law, Model Urban and Regional Planning and Development Law (Revised) UDPFI Guidelines, Existing Town and Country Planning Act in States, Development Control Regulations of Ahmedabad – AUDA. Both the volumes can be downloaded from the website of the National Disaster Management Division, Ministry of Home Affairs, Govt of India-<http://www.ndmindia.nic.in>. Post 2001 Gujarat earthquake, the National Government and the State Government are working towards putting in a robust techno-legal regime in place. Legislative changes are being further supported by training and strengthening of the local authorities.



The new regime aims at safe construction and safe development. Simultaneously systems are being developed to ensure sustainability of these activities and developing policy to target towards the implementation of robust development control regulations and improvement of the existing building stock. The problem of existing unsafe housing stock across the country needs to be addressed and it is therefore suggested to prioritize a scheme and develop/institutionalise a system to focus on strengthening or retrofitting measures. This multi-task activity will require decades of focused work and every stakeholder including the administrators & policy makers, enforcing & regulating agencies, construction professionals and individual house owners is crucial in implementing this regime.

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Comprehensive revision of building byelaws- A case of Mangalore city

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Urban growth and its implications

About half of the world's population (47%) lives in urban areas, reaching an overall 65% by 2050, growing at a rate of 2% every year¹. One of the implications of this urban growth is disasters. Many disasters occur in urban areas, affecting hundreds of thousands of people every year through loss of life, serious injury and loss of property & livelihood. India is highly vulnerable to disasters, especially earthquakes. 59% of its landmass is prone to earthquakes of moderate to severe intensity². During the period 1991-2002³, more than 30,000 people lost their lives and there was enormous damage to property and infrastructure due to earthquake disasters alone.

To address this risk, the Government of India and the United Nations Development Programme launched the Urban Earthquake Vulnerability Reduction Project, a sub-component of the Disaster Risk Management Programme in 38 cities of the country located in Seismic Zones⁴ III, IV and V having a population of half a million and above.

Mangalore is one of the project cities. Several programmes for awareness generation, capacity building, development of preparedness and response plans at the administrative & community level and development of the techno-legal regime have been initiated by the District Administration, Dakshina Kannada in association with the Local Government and Local Academic Institutions.

This article details, the development of the Techno-Legal Regime for Mangalore to improve the Administrative Governance by:

- Improving the planning and development of build environment and infrastructure
- Strengthening the enforcement and compliance mechanisms for systematic & sustainable development.

¹ *Global Environmental Outlook 3, 2002*

² *National Disaster Management Guidelines: Management of Earthquakes, NDMA 2007*

³ *EM-DAT: The OFDA/CRED International Database (Accessed 1 June 2007)*

⁴ *Bureau of Indian Standards, IS 1893-2002, Part 1*

⁵ *Mangalore Urban Development Authority Zoning Regulations, 1992*

⁶ *Corporation of the City of Mangalore, Building Byelaws 1991*

⁷ *Vulnerability Atlas of India*

As part of Disaster Risk Management Programme, a Technical Committee was constituted for suggesting measures to revise the existing Building Byelaws of the Mangalore City Corporation. Participation and education being central to sustainable development and participation being educative, the Deputy Commissioner constituted the committee comprising of academicians, technocrats, industrialists, planners, government officials, and community based organizations including other stake holders to address this core issue and educate the stakeholders.

The Committee studied various documents including the GoI-MHA Expert Committee Report¹, National Building Code 2005, Town & Country Planning Act, Karnataka Municipal Corporations Act, and Building Byelaws of other cities in India which had recently revised their byelaws. The Draft Report was prepared keeping in view the sustainable and systematic development paradigm and was circulated widely. Based on the constructive feedback received from various stakeholders and experts, the Report² was finalised.

Zoning regulations have been updated with clear guidelines on land use considering the projected growth of the city, maintenance of public health & general hygiene, safety & welfare of the community to ensure appropriate economic and healthy development in tune to the coping capacity. Several recommendations were included for planned development:

- (a) Restriction on height of buildings in designated areas
- (b) Transferable Development Rights (TDR) for compensating acquisition of private property by authorities
- (c) Road width signage including further widening prospects displayed on all major roads
- (d) Periodic upgradation of skills of personnel in all the regulatory and licensing authorities

Figure 1. Unsafe and unscientific vertical excavation



Provisions for different types of buildings have been outlined. Mandatory compliance with safety requirements introduced to curb unscientific construction practices. Minimum depth or width of site, maximum height of building or minimum setback, and maximum plot coverage has been specified for safety to the site and adjacent sites.

Special clauses referring to structural design, fire and life safety, safety of personnel during and after construction and construction requirements have been introduced.

Guidelines prescribing distance of Building from Electrical Lines, Safety against Natural Hazards, Review of Structural Design, Parking and Facilities for Physically Challenged Persons have been included.

Under safety against natural hazards, guidelines and safety measures against earthquakes in building construction, protection from cyclonic wind damage, and protection of areas from floods have been included. Third party verification is made mandatory for certain buildings (Table 1).

Table 1. Proof checking (third-party verification) requirements for structural design

Sl No.	Type of structure	Submission from Structural Engineer	To be proof checked
1.	Load bearing buildings upto three storeys	SDBR*	No
2.	Buildings upto seven storeys (RCC/ steel framed structures)	SDBR Preliminary design	Yes Yes
3.	Buildings greater than seven storeys (RCC/ steel framed structures)	SDBR Preliminary design Detailed structural design & drawings	Yes Yes Yes
4.	Public Buildings** (A) Load bearing upto three storeys (B) RCC/ steel structures	SDBR SDBR Preliminary design Detailed structural design & drawings	No Yes Yes Yes
5.	Special structures***	SDBR Preliminary design Detailed structural design & drawings	Yes Yes Yes

* SDBR – Structural Design Basis Report

** Public building – assembly of large number of people including schools, hospitals, courts

*** Special structures – large span structures such as stadium, assembly halls or tall structures such as water tanks, TV tower, chimney, light house etc.

Strengthening the enforcement and compliance mechanisms for systematic & sustainable development

The existing system of registration of professionals has been overhauled. Guidelines as to qualifications, enrollment, duties, responsibilities obligations and liabilities for practicing architects, engineers & consultants have been prescribed with checklists.

Liability and responsibility of professionals associated with any type of construction/development has been unambiguously stated. Professionals would not be held responsible for the severe damage or collapse occurring under the natural forces going beyond the prescribed design limits. Structural damage/failure due to poor workmanship, quality of foundation/construction or mistakes/drawbacks in the design etc., would constitute professional misconduct.

Clauses included for environmental protection and management are: control of air and water pollution, control of drains, sewers, drainage and sewerage works, control of development along rivers and in costal regulation zone, control on mining and quarrying and control on mega projects.

The "Mangalore City Building Byelaws 2006 - Technical Committee Report" showcases and streamlines development activities of the urban areas of Dakshina Kannada in a systematic manner and will also serve as a model for other cities in India. The report was prepared keeping in view the basic requirements¹ of building byelaws providing safe habitat (safety from accidents and natural disasters), good health and peace of mind.

¹Committee of Experts (2004): *Model Town & Country Planning Legislation, Zoning Regulations, Development Control, Building Regulations/Byelaws for Natural Hazard Zones of India-Vol. I & II*, Available at www.ndmindia.nic.in (Accessed on 17 June 2007)

Government of Iran strengthens capacities for disaster risk management

Dr. Victoria Kianpour, UNDP Iran

In the aftermath of the Bam earthquake on 26 December 2003, there is renewed commitment from the Government and various UN agencies in Iran to intensify efforts towards securing Iran against future disaster risks. Five-year **National Government-UNDP Iran Joint Programme for Strengthening Capacities for Disaster Risk Management** is the flag-ship programme of UN/UNDP in Iran for reducing disaster risks. The programme objectives are aligned with the broad outcomes identified by the UNDAF/UNDP Country Programme for the Islamic Republic of Iran (2005-2009) in the area of disaster risk management. The latter's emphasis on building strong disaster risk management capacities, especially through garnering community awareness and participation; enhancing coordination mechanisms amongst stakeholders at the local and national levels; and developing systems for effective disaster risk management at all levels to develop a strategy for reducing disaster risk in Iran.

Systematic capacity building of strategic actors in earthquake risk management at the National and City level is one of the key components. ADPC Thailand, contracted by UNDP Iran is helping build the capacities of the Government officials and other relevant stakeholders in Gorgan and Kerman, two target cities of the programme.

In the first of its series, a workshop on "*Knowledge Networking and Meeting Management and Facilitation Skill*" was organized in Tehran from 12-14 February 2007.

An *Urban Earthquake Risk Reduction* programme is being piloted in two medium cities in Iran namely Kerman and Gorgan with a main objective to enhance local capacities for earthquake risk management and subsequently, replicating it to other cities across Iran; designing and applying the national level plan/ program strategy document to the intermediate and local levels; and successively combining the exercises with a process of creating benchmarks from these pilots as a means to standardise and regulate building codes across the country.

The programme has four major components; public awareness and education on earthquake risks, developing disaster management plans and establishing minimum standards for earthquake risk management, reviewing the existing building permit process, strengthening the institutional arrangements for implementation of building codes, training and capacity building for earthquake risk reduction. To support achieving the programme outcomes, ADPC and NSET-Nepal conducted two workshops on "*Urban Earthquake Risk Management*" in Gorgan and Kerman. A total of 78 participated in the training programme.

One of the project activities in the two pilot cities was to demonstrate earthquake risk mitigation in health facilities. In this context, UNDP/MPO with technical cooperation from ADPC and NSET, Nepal organized a workshop on 14-16 March 2007 in Gorgan on the "*The Safety Medical Infrastructure Workshop*" in collaboration with Ministry of Health and Medical Education. The workshop sensitized the hospital managers about the importance of mitigating structural and non-structural vulnerabilities in health facilities and putting in place management plans for dealing with a crisis situation.

Workshops on "*Community Based Disaster Preparedness and Education*" were held in Gorgan and Kerman in technical collaboration with ADPC, Bangkok and National Society for Earthquake Technology, Nepal. The first workshop took place in Gorgan city from 20-24 May 07 and the second workshop was held from 27-31 May 07 in Kerman. A total of 70 participants from project secretariats, Red Crescent Societies, Municipalities, NGOs, communities, the advisor to Governor-General on women affairs, representatives of the women groups and other key Government departments participated in the workshop. The participants were trained in methodologies for conducting community risk, vulnerability and capacity analysis, development of community based risk reduction planning and implementation of risk reduction activities.

News & Events

Regional Consultative Committee Program on Mainstreaming Disaster Risk Reduction into Development Planning, Policy and Implementation in Asia (RCC MDRD)

- **4th meeting of the advisory panel of the RCC MDRD Program, 14-15 May, Bangkok**

In order to guide the development and implementation of the RCC MDRD program, the MDRD Advisory Panel was formed in February 2005, comprising RCC Members from 11 countries; Bangladesh, China, Cambodia, India, Indonesia, Lao PDR, Pakistan, Philippines, Sri Lanka, Thailand and Vietnam. The 4th meeting of the advisory panel was held with support from UN/ISDR along with USAID/OFDA with the objective to seek guidance on Phase II of the RCC MDRD program.

- **Priority implementation project under the RCC MDRD into education sector, May, Cambodia, Lao PDR and Philippines**

ADPC in partnership with UNDP under DIPECHO 5th Action Plan for Southeast Asia, meetings were organized with the Project Working Group (PWG) in each country to implement the project activities. The 2nd PWG meeting in Cambodia, Lao and the Philippines were conducted in July to assist PWG members in reviewing their existing lower secondary curriculum and to support the integration of a DRM module in selected grade levels by providing a sample of DRM curriculum.

- **Technical workshop on finalization of RCC guidelines on mainstreaming DRR into road sector, 27-28 Jul, Thailand**

Under the RCC MDRD program, one of the program components is to develop RCC guidelines on mainstreaming DRR into national and sectoral planning processes. With support of UN/ISDR and SIDA and in partnership with National Disaster Coordinating Council (NDCC) and Department of Public Works (DPWH), Philippines, ADPC has been implementing the Priority Implementation Partnership (PIP) on Mainstreaming of Disaster Risk Reduction into Road Sector in the Philippines. Learning from the experiences of PIP in the Philippines, a technical workshop was organized in Bangkok to finalize the RCC MDRD guideline on mainstreaming DRR into road sector. The workshop was attended by technical experts from Central Road Research Institute, India, Department of Public Works and Highways, Philippines, National Disaster Coordinating Council, Philippines, Mekong River Commission (MRC), University of Philippines, infrastructure and private sector professionals involved in infrastructure financing.

Flood Emergency Management Strengthening (FEMS) Project, May-Aug, Cambodia

Under the Flood Emergency Management Strengthening project, ADPC in collaboration with Mekong River Commission and GTZ, participated in the 5th Program Coordination Committee Meeting (PCC), at the Regional Flood Management & Mitigation Center (RFMMC), Phnom Penh, Cambodia. The quarterly PCC meeting is organized by the Flood Management and Mitigation

Programme (FMMP) to discuss the FMMP implementation in the past 3 months and to present the next 3-month plan. Implementation of the following activities were undertaken:

- **Strengthening the capacities of Community-based Flood Management (CBFM), Jul, Cambodia**

ADPC in collaboration with a Khmer NGO, Srer Khmer, conducted two provincial preparatory meetings for Provincial Committee for Disaster Management (PCDM), District Committee for Disaster Management (DCDM) and Commune Committee for Disaster Management (CCDM) in Kandal and Prey Veng provinces, Cambodia to discuss and present the planned CBFM activities. This was followed by a meeting for reviewing Community-based Flood Management (CBFM) training materials for the CBFM orientation session. In late July 2007, the CBFM orientation sessions were conducted in four communes, two each in Kandal and Prey Veng provinces.

- **Raising the awareness of women-headed household on flood risk reduction, 26-27 Jun, Cambodia**

ADPC, together with partner NGO, Positive Change for Cambodia (PCC), conducted two preparatory meetings in Kandal and Prey Veng provinces, Cambodia, respectively. The meetings were attended by delegates from PCDM, DCDM, CCDM, Provincial and District Department of Woman Affairs and commune women focal points to present and discuss activities in the months of Jun-Sep 2007 on raising the awareness of women-headed households on flood risk reduction.

- **Installation of flood mark and billboards in villages of two communes in Sithor Kandal district of Prey Veng province, orientation training for flood mark operators, Jun, Cambodia**

ADPC facilitated the installation of flood marks in nine villages in Sithor Kandal district, Prey Veng provinces of Cambodia by the Department of Hydrological and River Work technical team. A training on how to read and record flood water from flood mark and maintaining the flood mark was conducted for CCDM and village authority.

- **CBFM orientation session in An Giang and Dong Thap, Vietnam**

Two CBFM training for staff of District and Commune Committee for Flood and Storm Control (DCFSC and CCFSC) were conducted in Tan Chau district, An Giang province and Tan Hong districts, Dong Thap Province in June and July 2007. These training are based on the concept of trainings of trainers, where trained commune level staff from CCFDC can conduct orientation sessions in other communes of the same district.

- **Billboard in Tan Chau district, An Giang and Tan Hong, Jul, Vietnam**

Five billboards in each of the target districts of Tan Hong, Dong Thap, Tan Chau and An Giang province, were installed. The billboards aim to deliver messages on the importance of teaching children to swim and strengthening houses before flood season.

Support for Implementation of Flood Preparedness Programs at Provincial, District and Commune Levels in the Lower Mekong Basin (Phase III), May-Aug, Lao PDR, Cambodia

Under the ADPC-MRC-ECHO project on support for implementation of flood preparedness programs at provincial, district and commune levels in the Lower Mekong Basin (Phase III), the following activities were undertaken:

- Finalization of a Lao version of the Flood Preparedness Manual for the Provincial and District level authorities with wide consultation with the national level disaster management experts of Lao PDR.
- Conducted a training program from 3-6 Jul for the provincial and district level authorities in Khammouane province in Lao PDR on development and implementation of Flood Preparedness Program. The Department of Disaster Prevention and Management (DDPM) and the Thailand National Mekong Committee (TNMC) also participated in the discussion on trans-boundary flood assistance between Thailand and Lao PDR.
- Conducted a School Flood Safety Program (SFSP) in Vietnam and Cambodia targeting the School authorities and Student on Flood Safety issues.
- Flood Preparedness Program developed in Kratie Province in Cambodia and priority activities identified in the FPP such as Safe Area improvement and Emergency Kindergarten Management were initiated in Cambodia and Vietnam, respectively.

ADPC signs MoU with Kasetsart University, 8 May, Thailand

ADPC and Kasetsart University signed a MoU in Bangkok concerning the Asian Program for Regional Capacity Enhancement for Landslide Impact Mitigation (RECLAIM) in Bhutan, India, Indonesia, Nepal, the Philippines, Thailand and Sri Lanka. The MoU confirmed terms of collaboration on exchange of knowledge & information in the fields of geological and geo-technical hazard risk management in general and the RECLAIM Project implemented by ADPC, in particular. For more details on the RECLAIM project, visit ADPC website at <http://203.159.16.18/v2007/Programs/UDRM/PROGRAMS%20&%20PROJECTS/RECLAIM/Default-RECLAIM.asp>.

Regional workshop on Incident Command System for Disaster Management, 8-11 May, Indonesia

Under the US Indian Ocean Tsunami Warning System (IOTWS), ADPC co-facilitated a "Regional Workshop on Incident Command System (ICS) for Disaster Management" in Jakarta. Good practices and lessons learned as well as key issues and challenges in developing a standard emergency system in the Indian Ocean countries were discussed. The workshop was conducted in partnership with the US Department of Agriculture and US Forest Service.

Enhancing Community Resilience to Natural Disasters in Southeast Asia, 9-19 May, Cambodia, Vietnam

Under the Enhancing Community Resilience to Natural Disasters in Southeast Asia (ECR-SEA) Project, ADPC reviewed and updated project activities in consultation

with national and local partner agencies. In Quang Tri, Vietnam ADPC facilitated the constitution of a local working group. A follow up visit was made in Prey Nop District, Sihanoukville, Cambodia, on 1 Jun to form a local working group and to finalize project action plan in partnership with the Groupe De Recherche et D'Echanges Technologiques (GRET). The ECR-SEA project is funded by the Danish Agency for International Development (DANIDA).

Activities in Vietnam included constitution of local working groups for project implementation at provincial and commune levels; profiling of pilot communes; and testing of the application of Typhoon Tracking Map as a tool for risk communication. The National Hydro-meteorological Service of Vietnam is the key implementing partner. ADPC assessed the status of meteorological instrumentations in Cambodia vis-à-vis standards set by the World Meteorological Organization (WMO). The assessment focused on surface observation networks operated by the Department of Meteorology in Cambodia.

Fifth Mekong Annual Flood Forum, 17-18 May, Vietnam

ADPC participated in the 5th Mekong Annual Flood Forum in Ho Chi Minh City, Vietnam, organized by Mekong River Commission Secretariat. The theme for this year was "Improving Inputs towards Medium-term Flood Forecasting and Warning in the Mekong Basin". ADPC presented three papers, "Developing Risk-Based Locally-Specific Warning Information". This paper discussed ADPC's experience in the generation and application of disaster risk information. The other papers presented were 'Data and information need for the development and implementation of provincial and district flood preparedness program-Cambodian experiences' and 'Information Needs of Women in Flood Prone Areas in the Mekong Delta of Cambodia'.

Partnership for Disaster Reduction Southeast Asia (PDRSEA), 11 May, Thailand

In the 4th phase of the PDRSEA project, ADPC in partnership with UNESCAP and under the DIPECHO 5th action plan for Southeast Asia, the project team met with its project partners in the Philippines, Indonesia, Cambodia and Vietnam to initiate country level planning activities and signed a MoU with respective national government disaster management authorities in Bangkok. The following activities were undertaken:

- **Strategic Planning Workshop, 21 Jun, Philippines**

A strategic planning workshop was organized by the National Disaster Coordinating Council (NDCC) of the Philippines with ADPC and UNESCAP in Manila. The draft strategic plan to integrate CBDRM into the Socio-Economic Development Process in the Philippines, was introduced by General Rabonza, Administrator of OCD and Executive Officer of NDCC.

- **Strategic Planning Workshop, 9 Aug, Vietnam**

The strategic planning workshop for Vietnam was held in Hanoi. The workshop was co-organized by Department of Dyke Management, Flood and Storm Control (DDMFSC), UNESCAP and ADPC.

For more on the PDRSEA project, visit <http://www.adpc.net/pdr-sea/phase1.htm>.

Coastal Community Resilience project, 20-26 May, Tamil Nadu, India

ADPC finalized the implementation strategy of the Coastal Community Resilience (CCR) project; facilitated the implementation of working groups at district and community levels in Nagapattinam and Cuddalore District; organized a one-day orientation session on CCR and its elements for the working group; and identified training needs for the proposed CCR training program. The CCR project is undertaken under the US IOTWS Program.

Advocacy Skills for CBDRM, 3-9 Jun, Vietnam

ADPC facilitated two training courses on "Advocacy skills for CBDRM" in Hue and Hanoi under DIPECHO CBDRM Advocacy Network Initiative (DANI) in Vietnam. The objectives of these two training were to enhance the skills of the DIPECHO partners and other NGOs to be better equipped in their advocacy role in CBDRM implementation. The training courses focused on practical advocacy skills in the context of CBDRM as well as on the importance and examples of synergies of DM with other development fields.

ADPC participated at the Global Platform on Disaster Risk Reduction, 5-7 Jun, Switzerland

A high level delegation from ADPC participated at the Global Platform on Disaster Risk Reduction held in Geneva. The global forum brought together all parties involved in disaster risk reduction, namely Governments, United Nations agencies, international financial institutions, regional bodies, civil society, the private sector, and the scientific and academic communities to raise awareness on reducing disaster risk, increase the profile of disaster risk reduction as part of development and climate change adaptation with a multi-stakeholder undertaking with Governments' playing a central role, and additionally, share experiences and good practices. ADPC attended the HFA consultation for Asia & the Pacific and made presentations together with ISDR and ADRC on Baseline Status Report on DRR in Asia and Pacific, and on major progresses and challenges in achieving HFA objectives and mainstreaming DRR into development in the Asia & Pacific region. ADPC attended one of the side events, "Reducing Disaster Risk and Building Resilience to Disasters in cities," organized by the Global Forum for Urban Risk. Other side events that ADPC actively participated were the Hyogo HARDTalk, the International Recovery Platform Side Event-A Global Catalyst for Better Recovery and Capacity for Disaster Reduction Initiative (CADRI) Workshop.

Regional multi-hazard early warning system: National consultation meeting, 14 Jun, Indonesia

ADPC, on behalf of the US Indian Ocean Tsunami Warning Systems (IOTWS) Program, conducted a national consultation meeting on policy and institutional assessment for early warning and disaster management in Jakarta in partnership with the Indonesian Government. The consultation meeting shared findings of the disaster risk management policy and institutional assessment report with national stakeholders, which was conducted in Indonesia in late 2006. The meeting addressed gaps in the assessment in consultation with the stakeholders.

Assessments of disaster risk management policy and institutional framework in Indonesia, Sri Lanka, and Thailand were conducted from Jul-Oct 2006.

ADPC participated in Good Urban Governance for Building Resilient Cities, 27-30 Jun, India

The Good Urban Governance in South Asia (GUGSA) project funded by USAID India culminated in a Regional Conference and Training Workshop in Hyderabad, India. Dr. Bhichit Rattakul, ADPC Executive Director a.i., chaired the session on "Building a Foundation for Good Urban Governance." In addition, ADPC made presentations on governance and disaster risk reduction, the vulnerability profile of South Asian cities, earthquake risk reduction measures in Asia, and being part of the creation of a Regional Network of Local Authorities that promotes inter-agency learning.

Climate Risk Management: Climate Change Adaptation Targets (CCAT) project initiation, 17-24 Jul, Mongolia

ADPC launched a new project titled, Climate Change Adaptation Targets (CCAT) in Mongolia. The project explored the applicability of climate change adaptation targets as a means to mainstream climate change adaptation measures into development planning. The CCAT project is undertaken within the framework of a project carried out by ETC International titled, "Netherlands Climate Assistance Program," which is executed on behalf of The Netherlands Ministry of Foreign Affairs.

Climate Forecast Applications (CFA) for Disaster Mitigation in East Timor project initiation, 20-24 Jul, East Timor

ADPC's CFA for Disaster Mitigation Program, which is currently implemented in Indonesia and the Philippines, is being expanded to cover East Timor. The first field mission was undertaken to develop partnerships with key institutions that would be involved in program implementation and to identify opportunities for climate forecast applications. The United States Agency for International Development Office of Foreign Disaster Assistance (USAID-OFDA) is providing support to the CFA Program.

Regional multi-hazard early warning system: Emergency response full scale simulation exercise, 27 Jun, Sri Lanka

Under the US Indian Ocean Tsunami Warning System (US IOTWS) Project, ADPC and the US Forest Service facilitated an emergency response full-scale simulation Incident Command System (ICS) exercise in Galle District, Sri Lanka.

School-based disaster risk management project, Jul-Aug, Sri Lanka

In partnership with GTZ, MEEPE, NIE and district Disaster Risk Management coordinators, ADPC developed an outline for emergency management plan for schools in Sri Lanka. The outline was discussed and feedback received in a workshop for school principals in Colombo.

Workshop on Development of the Regional Disaster Health Information Network, 10-11 Jul, Thailand

ADPC in partnership with World Health Organization Regional Office for Southeast Asia (WHO-SEARO) and US National Library of Medicine organised a workshop on the development of a Southeast Asian Disaster Health

Information Management Network (SEADHIN). Participants included representatives from the US National Library of Medicine, Center for Public Service Communications, Pan American Health Organization (PAHO), SEARO, Thammasat University, Ministry of Health-Sri Lanka, and ADPC. Participants from Indian Library of Medicine and the University of Indonesia were also invited to attend the workshop. The meeting discussed and clarified the concept of SEADHIN and possible mechanisms for collaboration.

National Disaster Management Authority steering committee meeting on Science and Technology for Disaster Management and International Monsoon Conference, 19-29 Jul, India

ADPC participated in the National Disaster Management Authority's (NDMA) Steering Committee Meeting on Science and Technology for Disaster Management and International Monsoon Conference in Bangalore.

ADPC attended International symposium on the civil defense development strategy in the 21st Century, 25-28 Jul, China

ADPC was invited to attend the "International Symposium on the Civil Defense Development Strategy in the 21st Century" in Shanghai, China. The workshop was organized by the China National Civil Defense Office and undertaken by the Shanghai Municipal Civil Defense Office. A presentation was made on the role of public health emergency preparedness training activities for civil defense organizations in Asian countries.

Memorandum of Understanding with government agencies, Jul 2007, Mongolia

In July 2007, four Mongolian national agencies, namely the National Emergency Management Agency (NEMA), Ministry of Food and Agriculture, Ministry of Nature and Environment, and National Agency for Meteorology, Hydrology and Environmental Monitoring and ADPC signed a Memorandum of Understanding to cooperate on early warning arrangement, climate change adaptation, and disaster preparedness and mitigation. ADPC has a long-standing collaboration with NEMA through ADPC's Regional Consultative Committee on Disaster Management.

PROMISE coordinator's meeting, 31 Jul, Thailand

ADPC's Program for Hydro-Meteorological Disaster Mitigation in Secondary Cities in Asia (PROMISE) held a PROMISE country coordinator's meeting to discuss programmatic reporting (project financial reporting, project management and administrative procedures) and monitoring and evaluating in Thailand. Representatives of all program partners from five program countries (Bangladesh, Pakistan, the Philippines, Sri Lanka and Vietnam) attended the meeting. PROMISE is funded by the office of Foreign Disaster Assistance (OFDA), USAID and is being implemented by ADPC. For more on PROMISE, visit <http://203.159.16.18/adpc/Programs/UDRM/PROMISE/Default.asp>.

Training & Workshops

Workshop on "Slope Failure Monitoring and Intervention, 7 May, Philippines

ADPC attended a workshop in Baguio City, Philippines on "Slope Failure Monitoring and Intervention" sponsored by the Asian Program for Regional Capacity Enhancement for Landslide Impact Mitigation (RECLAIM II). ADPC made presentations with its implementing partner, Norwegian Geotechnical Institute (NGI). RECLAIM has a demonstration project in Thailand and the Philippines and is funded by the Royal Norwegian Government.

Urban Earthquake Risk Management Workshops, 20-31 May, Iran

ADPC collaborated with UNDP Iran and organized two workshops on Community-Based Earthquake Preparedness and Education in Kerman and Gourgan. The workshops provided training and guidance on developing local-level projects for community-based earthquake preparedness and education in the Earthquake Risk Management Plan of the demonstration cities of Kerman and Gourgan. The activity was organized under a joint 5-year program between the Government of Iran and UNDP-Iran.

ADPC trains journalists, 30 May, Thailand

ADPC provided training in Bangkok to 16 press journalists from Cambodia, Lao PDR, Myanmar, Thailand and Vietnam in a course held by the Indochina Media Memorial Foundation. This half-day session focused on the role of the media in disasters and community-based disaster risk management.

Training on Coastal Community Resilience, 4-8 Jun, Thailand

ADPC, together with the US National Oceanic and Atmospheric Administration (NOAA), University of Rhode Island (URI), and Thailand's Department of Disaster Prevention and Mitigation conducted a training program on Coastal Community Resilience (CCR) in Phuket, Thailand. The training program combined principles, elements of disaster management, coastal management, and community development.

4th ADPC Community-Based Disaster Risk Management (CBDRM) Course review, 22-23 May, Thailand

A dialogue during the 4th Community-Based Disaster Risk Management (CBDRM) course review by experienced practitioners from a range of regional and international organizations and selected CBDRM course alumni resulted in a revised curriculum being drafted integrating the reviewer's inputs on new and emerging CBDRM concepts, models, framework, tools, focus, experiences and best practices. The final curriculum with the enhanced modules will be integrated and adapted into succeeding ADPC CBDRM courses and activities.

Indonesia Disaster Management Workshop (DMW), 6-8 Jun

ADPC participated in the Indonesia Disaster Management Workshop (DMW) hosted by BAKORNAS PB in conjunction with the Center of Excellence in Disaster Management and Humanitarian Assistance (COE) with the support of the United Nations through the UN Technical Working

Group (UNTWG). In line with the project, Partnerships for Disaster Reduction Southeast Asia Phase IV (PDRSEA4), ADPC provided a presentation on Community-based Risk Reduction (CBDRR) in Asia.

ADPC conducts CBDRM course, 11-15 Jun, Tajikistan

ADPC conducted a CBDRM course for the Center of Competence for Disaster Reduction (CCDR) with funding from the Swiss Agency for Development and Cooperation (SDC). The target groups were DRM practitioners, managers of non-DRM development programs and governmental officials.

ADPC facilitated a course on CBDRM for Oxfam Sri Lanka in Jun in Colombo, Sri Lanka, with funding support from Oxfam GB. The objectives were to provide opportunities for practitioners to learn essential skills and knowledge in community based disaster risk management and to address implementation challenges in a systematic manner. The course highlighted integrating DRR tools into development projects and on other cross cutting issues.

Earthquake Vulnerability Reduction Course, 17-20 Jun, Bangladesh

ADPC in collaboration with CARE Bangladesh organized a course on Earthquake Vulnerability Reduction for engineers working in different cities and municipalities of Bangladesh. The objective of the course was to enhance the participants' awareness of earthquake vulnerability and their role in promoting its reduction. This is under the Strengthening Household Abilities to Responding to Development Opportunities (SHOUHARDO) project of CARE Bangladesh, where ADPC is providing technical assistance.

Training of Climate Field School facilitators, 18-22 Jun, Philippines

Under the Climate Forecast Applications (CFA) for Disaster Mitigation Program, a training for Climate Field School facilitators was conducted in Dumangas Municipality, Iloilo Province, Philippines. The training was participated by agricultural extension officers and workers who constitute the pool of Climate Field School facilitators in Dumangas, Iloilo. The CFS aims to enhance the capacity of extension workers and farmers to understand and apply climate information in order to reduce flood and drought risks in agriculture. The CFS is one of the flagship projects under the CFA Program and is a collaborative undertaking among the Philippine Atmospheric Geophysical and Astronomical Services Administration (PAGASA), Provincial Government of Iloilo, Municipal Government of Dumangas and ADPC, with support of the Office of Foreign Disaster Assistance of the United State Agency for International Development (OFDA-USAID).

National Strategic Planning Workshop, 20-22 Jun, Philippines

In collaboration with UNESCAP, ADPC facilitated a National Strategic Planning Workshop in Manila as part of ADPC's commitment to strengthen and institutionalize Community-Based Disaster Risk Management (CBDRM) into national government system. As an essential activity of the project, Partnerships for Disaster Reduction Southeast Asia Phase IV (PDRSEA4) worked towards

drafting a national strategic plan for the Philippines to advocate ownership in national programmes and local entities, enhancing the capabilities of CBDRM practitioners, and the expansion existing partnerships. The main thrust of the activity was to strengthen the role of NDMOs on disaster risk reduction and promote the adoption of CBDRM by multiple development stakeholders.

Community Basic Emergency Response Course (C-BERC), 2-6 Jul, Pakistan

ADPC held the Community Level Basic Emergency Response Course (C-BERC) in Hyderabad, Pakistan. C-BERC is a training program designed to enhance the capacity of the community to respond to emergencies and disasters. The main subjects include, managing utilities and putting out small fires; basic medical aid, search-and-rescue, and others. This course is an activity under Program for Hydro-meteorological Disaster Mitigation in Secondary Cities in Asia (PROMISE) Pakistan.

ADPC successfully conducted the C-BERC at the Sarvodaya Bandaragama Training Center in Bandaragama, Sri Lanka from 21-25 May. It was supported by the Sarvodaya Health Unit and was attended by 24 community members from Kalutara and surrounding areas. The activity was under PROMISE Sri Lanka. PROMISE has demonstration projects in Hyderabad (Pakistan) and Kalutara (Sri Lanka), as well as Chittagong (Bangladesh), Dagupan (Philippines) and Da Nang (Vietnam). The program is funded and supported by the US Agency for International Development-Office of US Foreign Disaster Assistance (USAID-OFDA).

ADPC's 35th Regional Training Course on Disaster Management, 14 May-1 Jun, Thailand

ADPC's 35th DMC was held in Bangkok and Pattaya providing comprehensive disaster management knowledge and skills to enhance the capabilities of executive managers who have key disaster management responsibilities. The regional three-week training course on Disaster Management provided comprehensive disaster management knowledge and skills, enhanced capabilities and capacities of disaster practitioners who are in key disaster management responsibilities. 22 participants from 13 different countries namely Afghanistan, Bangladesh, Bhutan, India, Indonesia, Iran, Malaysia, Maldives, Qatar, Singapore, Sri Lanka, Tajikistan, Thailand, Vietnam completed the course successfully. The course involved active participation during interactive lectures and reflections on a range of key issues raised during discussions and practical activities.

ADPC's 7th Inter-regional training course on Public Health and Emergency Management in Asia and the Pacific (PHEMAP-7), 18-29 Jun, Thailand

The PHEMAP Program is a partnership between WHO Regional Offices for South East Asia (SEARO) and Western Pacific (WPRO) and ADPC, and supported by the Royal Government of Norway. The course is specifically designed for people who play critical roles in health emergency management and coordination roles in managing the health risks of emergencies. 31 participants from 13 different countries namely

Bangladesh, Cambodia, China, India, Indonesia, Malaysia, Mongolia, Nepal, Philippines, Sri Lanka, Thailand, Vanuatu, and Vietnam representing Ministries of Health, Red Cross and International Organization for Migration attended the course. The collaborating partners are ADPC, WHO-WPRO, WHO-SEARO and the Royal Government of Norway.

Community Emergency Management course, 16-20 Jul, Philippines

ADPC held an emergency management course in Dagupan, Philippines. The course coincided with Dagupan City's Disaster Preparedness Day. The course included advanced skills for community emergency response and management of emergency operations centers. This course is an activity under PROMISE Philippines. PROMISE is funded and supported by the US Agency for International Development-Office of US Foreign Disaster Assistance (USAID-OFDA).

Community-Based Disaster Risk Management (CBDRM-16) 16-27 Jul, Thailand

ADPC regional CBDRM training was conducted in Bangkok. 37 participants from 19 countries including ActionAid International Cambodia, Aga Khan Planning and Building Service (AKPBS)-Pakistan, Concern Afghanistan, Concern Worldwide, Department of Hygiene and Prevention-Lao PDR, Educational Development Center-Maldives, Ernst & Young Advisory Services, Fida International, Local Government Unit-the Philippines, Ministry of Atolls Development, Ministry of Health- Lao PDR, National Disaster Management Office-Lao PDR, Save the Children, Stanford University, SurfAid International, Tearfund, UNDP, UNICEF, Thai Red Cross, World Vision Indonesia, World Vision International and World Vision North Sudan participated.

Tsunami Science and Preparedness Training Program, 21 Jul- 4 Aug, USA

ADPC was on mission to Seattle, USA to participate and provide input to the First Tsunami Science and Preparedness Certificate Program organized by US National Oceanic and Atmospheric Administration, University of Washington Extension and Program Integrator of US Indian Ocean Tsunami Warning System (IOTWS) Program. ADPC discussed and shared ideas about the ongoing Coastal Community Resilience

initiative in the Indian Ocean Region. This is part of the overall development of materials on end-to-end early warning and preparedness. ADPC collaborated with the program organizers to oversee the transfer of knowledge and curriculum to the Asian Institute of Technology for the next round of offering the certificate program in Asia.

Workshop on the improvement of building permit process, 22-25 Jul, Iran

ADPC collaborated with UNDP Iran in organizing a workshop on the improvement of building permit process. The workshop was held in Kerman, Iran and provided training and guidance on city-level institutional arrangements required for enforcing building codes. The activity was under a joint five-year program between the Government of Iran and UNDP-Iran. ADPC is providing specific consulting services for the workshop.

Public Health in Complex Emergencies (PHCE-6), 13-25 Aug, Thailand

ADPC's 6th international PHCE course is a two-week residential fee-paying course that focuses on critical public health issues faced by humanitarian workers in complex emergencies. The goal of the course is to enhance the capacity of humanitarian assistance workers and their organizations to respond to the health needs of refugees and internally displaced persons affected by these emergencies. ADPC is conducting the course in partnership with World Education, Inc., International Rescue Committee and World Education, Inc., International Rescue Committee, American University of Beirut-Lebanon, Makerere University, and Institute of Public Health-Uganda.

Community Basic Emergency Response Course (C-BERC), 15-17 Aug, Thailand

ADPC is conducting the Community Basic Emergency Response Course (C-BERC) in Ranong, under the Thailand Post Tsunami Sustainable Coastal Livelihoods Program funded by USAID Asia. The three day training program was based on the C-BERC training program developed by ADPC and designed to train communities on the fundamentals of emergency medical first response. ADPC is conducting the course in partnership with the Asian Institute of Technology (AIT) and the Thai Red Cross (TRC) Society.

Regional Training Schedule for 2008, Bangkok

Code	Course Title	Schedule/Duration
GRSDM-2	Use of GIS and Remote Sensing in Disaster Risk Management	12-23 May
FDRM-9	Flood Disaster Risk Management	6-17 Oct
DMC-37	Disaster Management Course	10-28 Nov
CBDRR-17	Community Based Disaster Risk Reduction	TBA, 2 weeks
PHMAP-8	Public Health and Emergency Management in Asia and the Pacific	TBA, 2 weeks
PHCE-7	Public Health in Complex Emergencies	TBA, 2 weeks
HEPR-6	6 th International Course on Hospital Emergency Preparedness and Response	TBA, 5 days

September 2007

TBA : To be announced

For more information, visit <http://www.adpc.net>

Reading

- **Knowledge Series - Geo, Natural catastrophes 2006 - analyses, assessments, positions.**
http://www.munichre.com/publications/302-05217_en.pdf
- **Munich Re's geoscientific knowledge**
www.munichre.com
- **Cities at Risk-UN International Decade for Natural Disaster Reduction, Geneva, 1996**
http://www.crid.or.cr/crid/CD_Asentamientos_Humanos/pdf/eng/doc8327/doc8327.htm
- **UN Habitat-State of the World's Cities 2006/7 Available in English/Spanish/French**
<http://www.unhabitat.org/content.asp?cid=3397&catid=7&typeid=46&subMenuId=0>
- **Disaster Risk Management Series, No.3 Building Safer Cities, The Future of Disaster Risk. The World Bank**
<http://www.unisdr.org/eng/library/Literature/7759.pdf>
- **Knowledge Series-Megacities-Megarisks Trends and challenges for insurance and risk management**
http://www.munichre.com/publications/302-04271_en.pdf
- **Paper: From everyday hazards to disasters: the accumulation of risk in urban areas by L Bull-Kamanga, K Diagne, A Lavell, E Leon, F Lerise, H MacGregor, A Maskrey, M Meshack, M Pelling, H Reid, D Satterthwaite, J Songsore, K Westgate and A Yitambe. Page 193 - 204 Environment&Urbanization Vol 15 No 1 April 2003**
http://www.undp.org/bcpr/disred/documents/olddocs/risk_urban_africa.pdf
- **Paper: The vulnerability of global cities to climate hazards by Alex De Sherbinin, Andrew Schiller and Alex Pulsipher**
<http://eau.sagepub.com/cgi/content/abstract/19/1/39>
- **Background Paper on Disaster Resilient Cities, by Dan Henstra, Paul Kovacs, Dr. Gordon McBean, and Rob Sweeting. Institute for Catastrophic Loss Reduction, March 2004** <http://www.dmr.org/resources/Henstra.et.al-background%20paper%20on%20disaster%20resilient%20cities.pdf>
- **Mainstreaming disaster risk reduction in the management of urban planning and governance in Africa', Summary report on the African Urban Risk Analysis Network (AURAN) international workshop held from 7-9 March 2006, Cape Town, South Africa**
http://www.proventionconsortium.org/themes/default/pdfs/urban_risk/AURAN_March06_report.pdf
- **Japan's Challenge towards anticipatory and participatory Urban Disaster Risk Management: Case Study of Tonankai Earthquake Disaster Initiative**
<http://cepm.louisville.edu/IUPEA6/abspapp/okada-hriokazu/Okada%20Louisville%20paper.doc>

- **Public Report: Disaster Resistant Caracas**
<http://www.arch.columbia.edu/Studio/Spring2001/Caracas/report.html#>
- **World Watch Institute: State of the World 2007: Chapter 6: Reducing natural disaster risk in cities**

Conferences

- **UDMS - Urban Data Management Symposium 2007**
9 - 12 October 2007
University of Applied Sciences - Hochschule for Technik
<http://www.udms.net>, www.multimedia.fht-stuttgart.de/udms
- **International Earthquake Symposium Kocaeli 2007**
22 - 26 October 2007
Kocaeli - Turkey
<http://kocaeli2007.kocaeli.edu.tr>
- **International Conference on Urban Disaster Reduction**
San Jose, Costa Rica, 12 - 15 November 2007
<http://www.fig.net>
- **International Conference on Urban Disaster Reduction**
27-29 November 2007, Taipei, Taiwan
<http://www.ncdr.nat.gov.tw/2ICUDR/>

**ADPC's course on
GOVERNANCE AND DISASTER
RISK REDUCTION, 17-21 September 2007
Bangkok, Thailand**

The objective of the course is to develop a cadre of local government professionals sensitive to issues presented by recurrent hazards. The course intends to increase their knowledge in disaster risk reduction, on urban governance and disaster risk management, to be responsive to the needs of vulnerability reduction, and to create opportunities for mainstreaming risk reduction as a component of urban governance. Specifically, the course aims at building capacities and more understanding of governance issues in relation to disaster risk reduction at the local level. The secondary objective of the training is to build the capacity of national training partner institutions, which will make an attempt to institutionalize the training program at the national level.

The course consists of broad related issues of governance, namely Vulnerability and Governance; Institutional Aspects of Local Disaster Risk Management; Approaches, Systems and Methods for integration of disaster risk reduction in governance; and Planning for Change, with particular emphasis on:

- Developing and implementing the city-level Risk Reduction Plans
- Institutionalizing of community-based Disaster Risk Management in local government policy and development programs.

For more information, visit <http://www.adpc.net>

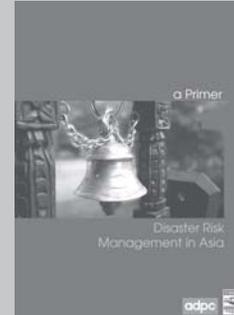
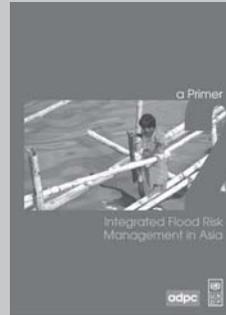
Websites

- **ADPC-Urban Disaster Risk Management (UDRM) Home**
<http://www.adpc.net/Programs/UDRM/Default.asp>
- **ADPC-Asian Urban Disaster Mitigation Program (AUDMP)**
<http://www.adpc.net/Programs/UDRM/PROGRAMS%20&%20PROJECTS/AUDMP/Default-AUDMP.asp>
- **ADPC-Program for Hydro-Meteorological Disaster Mitigation in Secondary Cities in Asia (PROMISE)**
<http://www.adpc.net/v2007/Programs/UDRM/PROMISE/Default.asp>
- **ADPC-Strengthening Household Abilities for Responding to Development Opportunities (SHOUHARDO) 2005 – 2009**
<http://www.adpc.net/v2007/Programs/UDRM/Programs%20&%20Projects/SHOUHARDO/Default-SHOUHARDO.asp>
- **ADPC-Good Urban Governance in South Asia (GUGSA)**
<http://www.adpc.net/v2007/Programs/UDRM/PROGRAMS%20&%20Projects/Urban%20Governance/Default-URBAN%20Governance.asp>
- **Asian Program for Regional Capacity Enhancement for Landslide Impact Mitigation (RECLAIM)**
<http://www.adpc.net/v2007/Programs/UDRM/Programs%20&%20Projects/RECLAIM/Default-RECLAIM.asp>
- **Urban Master Planning Megacities: Mainstreaming Disaster Risk Management**
<http://www.proventionconsortium.org/?pageid=32&projectid=2>
- **The World Bank: Urban & Local Government: Disaster Risk Management On-line Program**
<http://web.worldbank.org>
- **Urban Disaster Risk Reduction and Regeneration Planning: Building Capacity for Future Natural Disaster**
www.worldbank.org/ieg/naturaldisasters/conference/presentations/krimgold_files/v3_slide0033.htm - 3k
- **Disaster Risk Management in urban settings: Aid Workers Network**
www.aidworkers.net/?q=node/458 - 11k
- **Pacific Disaster Center: Earthquake and Megacities initiatives**
<http://www.pdc.org/emi/emihome.html?sessionid=F6EE581BE8AD7A32403E336D4866070E>

ADPC Publications

Disaster Risk Management Primers for Asia

Primer 1 - Disaster Risk Management in Asia



Primer 2 - Integrated Flood Risk Management in Asia

<http://www.adpc.net/v2007/Programs/UDRM/PROMISE/Information%20Resources/PRIMERS/Default-PRIMERS.asp>

Safer Cities Case Studies 1-15 <http://www.adpc.net/AUDMP/library.html>

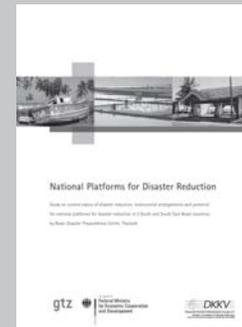
Safer Cities 16: Cooperation between Local Authority and Communities Reduces Flood Disaster Risk in Dagupan City, Philippines

Safer Cities 17: Good Governance and Post-Tsunami Recovery in Patong

Safer Cities 18: The Boy Who Cried, "Wolf!" or Why a Community-based Alert System is a good idea.

<http://www.adpc.net/v2007/Programs/UDRM/PROMISE/Information%20Resources/Safer%20Cities/Default-Safer%20Cities.asp>

Report: Sixth meeting of the ADPC Regional Consultative Committee on Disaster Management (RCC 6)



ADPC study: National Platforms for Disaster Reduction

Visit www.adpc.net
to download the publications and other
ADPC information resources

Typhoon & Flood Drill



The Dagupan CDCC discussing their next steps



Responding to a mock vehicular accident



Evacuation drill at Barangay Mangin



Flood Simulation Exercises in Dagupan

Dagupan City held a series of exercises on May 31 and June 6 to test their readiness for flooding and emergencies. Around 300 people took part in this initiative from the community, city government, regional government offices, international non-government organization, religious groups, neighboring municipalities, health organizations, media and civil society. There were two staging areas one in Barangay Mangin, and another in the City. Separate evaluations were made for the city-level response, for the Barangay Mangin response, and for the City Disaster Coordinating Council (CDCC) itself. The simulation has helped each sector involved to share their knowledge and skills in preparedness and response through allowing others to witness, impart comments and eventually replicate this kind of endeavor.

The scenario written for the exercise had a direct typhoon warning given to the city from the national meteorological agency (PAGASA), a flood forecast because of dam water release that will reach the city, accidents caused by the typhoon, constant monitoring of flood markers and subsequent evacuation of people in high-risk areas, and hospitalization of the deputized Chief of the CDCC.

Dagupan is one of the demonstration cities of the Program for Hydro-meteorological Disaster Mitigation in Secondary Cities in Asia (PROMISE) managed by ADPC. It is vulnerable to urban floods, storm surge, tsunamis, earthquakes and liquefaction. The Philippine partner is the Center for Disaster Preparedness. The City of Dagupan and Barangay Mangin are each winners of the 2007 Kalasag Award from their Region, the prestigious Disaster Risk Management Award in the Philippines. Dagupan City is a finalist for the 2007 Kalasag Award for highly-urbanized cities of the Philippines. The efforts in Dagupan City have been featured in two UN publications: Building Disaster Resilient Communities (2007) from ISDR, and HABITAT Debate Vol. 12 No. 1 (2006) from UN HABITAT.

The main activities identified for Dagupan include hazard mapping and participatory vulnerability assessment, community planning for disaster preparedness, the development of community-based end-to-end early warning mechanisms, establishing a Technical Working Group for disaster mitigation within the city disaster coordinating council, the establishment of emergency operation centers and emergency rescue teams, the establishment of a Disaster Information Management System using GIS software, advocating disaster mitigation by stakeholders including civic groups and the business sector, and mainstreaming disaster risk reduction into local legislation.

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Theme for the next issue of the Asian Disaster Management News, September-December 2007

Mainstreaming Disaster Risk Reduction into Education Sector

