

Asian Disaster Management News

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Linking Environmental Management to Disaster Risk Reduction

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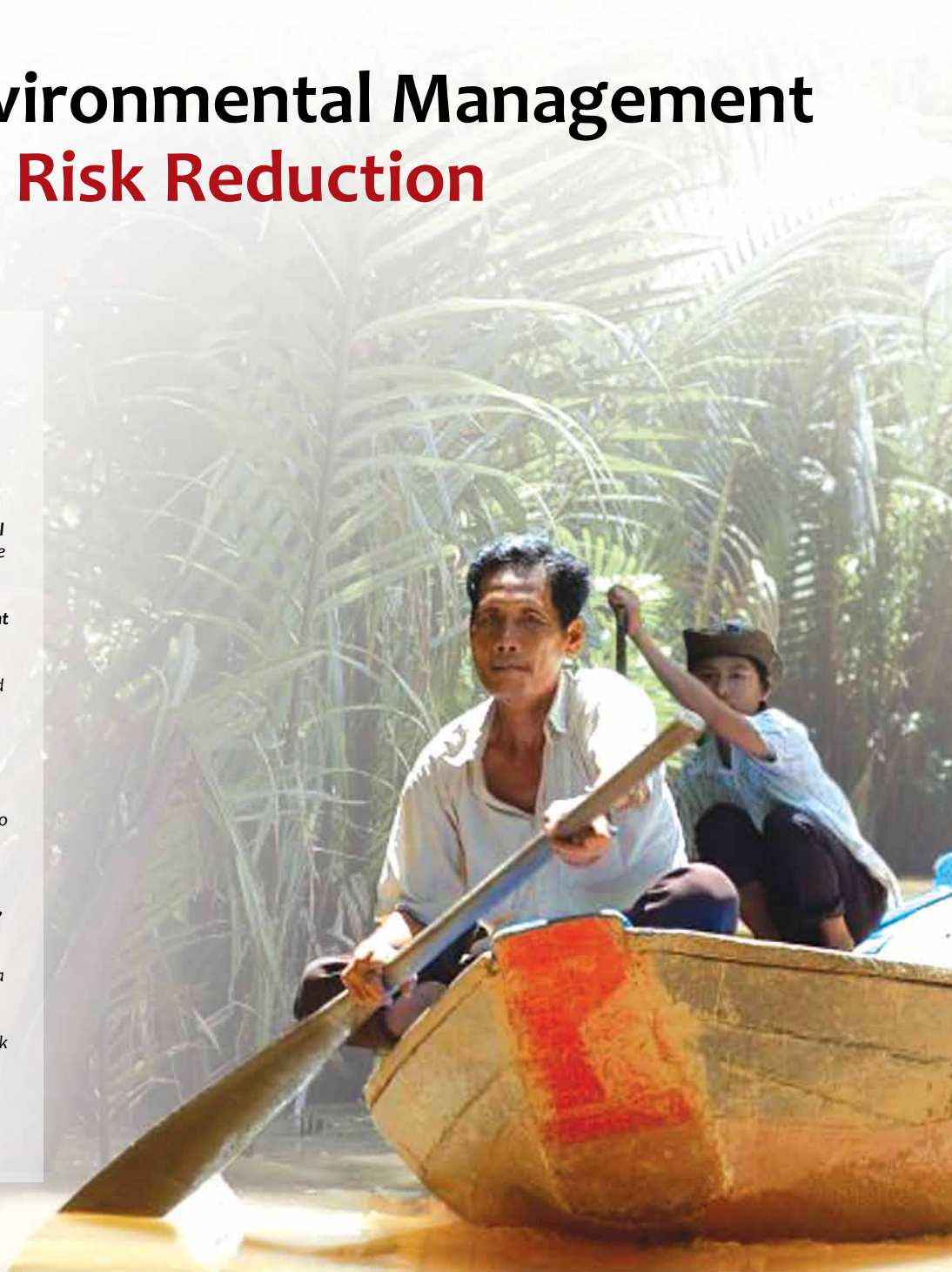
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Editor's note

It is clear that the environment and disasters are inherently linked. As 2004 "Living with Risk: A Global Review of Disaster Reduction Initiatives" rightly pointed out, Environmental degradation affects natural processes, alters humanity's resource base and increases vulnerability. It exacerbates the impact of natural hazards, lessens overall resilience and challenges traditional coping strategies.

The 2000 Millennium Declaration, the Hyogo Framework for Action 2005-2015, and the Millennium Ecosystem Assessment have come to the similar conclusion that environmental degradation, poverty and disaster risk share common causes as well as common consequences for human security and well-being. They also make clear that environmental management is essential for maintaining sustainable ecosystem services including 'regulating services' such as reduction of disaster risk.

The recently published 2009 Global Assessment Report on Disaster Risk Reduction: Risk and poverty in a changing climate, by the United Nations, too, identifies ecosystem decline as one of the underlying drivers of disaster-poverty nexus and hence emphasizes on the importance of environmental management. The report reiterates that resilient ecosystems are critical in that it provides for local communities with sustainable livelihoods by securing a reliable flow of goods and services, and thereby reducing vulnerability to an increasingly unpredictable climate.

ADPC has been fully aware of the linkage between environmental sustainability and disaster risk reduction and has been continuously advocating the idea through its thematic area of work. Example in-

cludes the study undertaken in 2004 on 'Environmental degradation and disaster risk', the study conducted for ASEAN on establishment and operationalization of an ASEAN emergency response and strategic planning institute for environment disasters, development of the tool on 'How Resilient is your coastal community?' a guide for evaluating coastal community resilience to tsunamis and other hazards, and the development of the regional training manual on 'Disaster Risk Reduction for Coastal Zone Managers'. With an objective to strengthen the working partnership with agencies working on issues related to environmental management, ADPC is an active member of the 'Disaster Environment Working Group for Asia' and the 'ISDR Partnership for Environment and Disaster Risk Reduction'.

This special issue of ADPC Asian Disaster Management Newsletter in 2009 focuses on the linkages between disaster risk reduction and environmental management. There is a clear need to work further and together with partners in closing this gap between environmental management, disaster risk reduction and development and we are sincerely grateful to all the contributors to this special issue for sharing their views and experiences on the subject and how to link the theory to practice.



Mr. Aloysius J. Rego
Editor in chief

Linking Discourses of DRR and Environmental Management: evolving example of "Resilience based approach" as an interfacing tool

By Atiq Kainan Ahmed

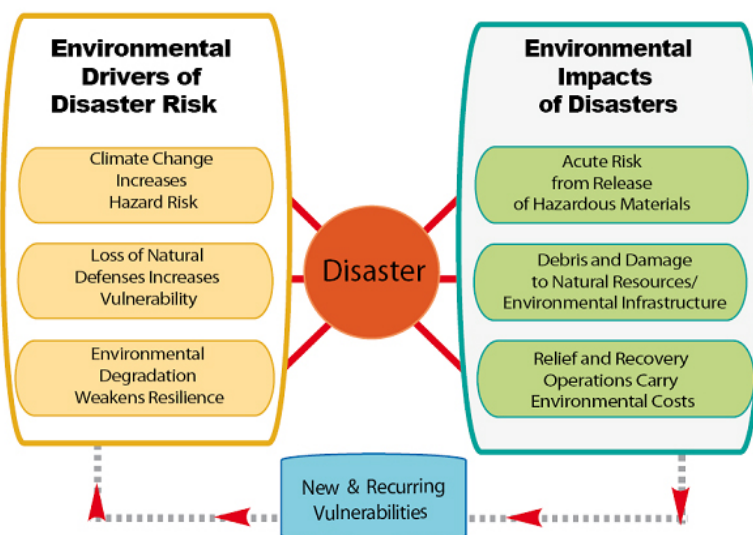
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In the past decades, Disaster Risk Reduction (DRR) and Environmental Management (both as two separate discourses and practices) remained inherently un-integrated to each other. But these two are not seen as disjuncture anymore. In recent times, the experiences of various mega disasters in critical ecological settings have called for an analytical look into the linkage vis-à-vis integration of these two discourses in a greater way.

The Hyogo Framework for Action (HFA), the Millennium Declaration and the UN Millennium Ecosystem Assessment have different points of departure but come to the similar conclusion that environmental degradation, poverty and disaster risk share common causes as well as common consequences for human security and well-being. The

links between DRR and environmental management are also clearly documented in the "Living with Risks" (UNISDR: 2004) which clearly outlines ways to integrate environmental management with disaster risk strategies.

There is growing evidence that environmental changes are increasing the frequency and intensity of natural hazards, and hence the level and patterns of often inter-related risks, exacerbating levels of vulnerability for people. Disaster occurrences often enrooted into the exposure to the environmental drivers which aggravated the disaster risk among the societies. On one hand, environmental and climatic changes increase the frequency and intensity of the various types of hazards, damage natural defenses (i.e. bio-shields, coastal vegetations) and increase the level of vulnerability of the people through environmental degradation and weakening the resilience of the people and eco-systems. The environmental impacts, on the other hand, contribute to the drivers and lead towards disasters. Communities face the multiple pressures of environmental impacts in terms of damages of natural resource bases, physical and social losses and ends up with delayed and long-recovery process. Both type of environmental “drivers” and “impacts” actually contributes towards creation of newer and recurring vulnerabilities.



Source: UNEP and ISDR

Incorporation of “Resilience” concept from Ecological discourses to DRR practices

The HFA has articulated uniquely the need to build national and community resilience for DRR in all the countries. This endorsement has initiated a new process of looking more carefully and analytically into the concept of “resilience” itself. The concept has its origin in the ecological and environmental science literatures but the major principles of resilience are found useful and needed for DRR practices.

“Resilience” is a complex multi-interpretable concept. CS Hollings (1973) introduced the concept into the ecological literature as a way to understand the non-linear dynamics of system changes. The “Resilience Alliance” (2002) identified the three defining characteristics of the concept: a) the amount of change the system can undergo but still retain the same control on functions and structure, or still be in the same state, with in the same domain of attraction (i.e. absorb shock); b) the degree to which the system capable of reorganization (i.e. bounce back); and c) the ability to build and increase the capacity for learning and adaptation. It is suggested that a resilient communities, like ecosystems, can better withstand “disturbance” (i.e. hazards, disasters) and adapt to change when needed. These defining characteristics of resilience are also found applicable in the DRR contexts. With the HFA focus on resilience practitioners have started to incorporate the concept into various DRR practices and a flow of knowledge started to look for ways to make linkages between the environmental and DRR elements.

Coastal Community Resilience (CCR) Initiative: a practical case of the linkage

In the post Indian Ocean Tsunami context, this was explored further and based on the major principles of resilience the “Community Resilience” framework was started to shape up as a standard of practice.

ADPC, partnering with NOAA, UNESCAP, USAID and other regional stakeholders have developed the initiative as a practical based example of linking “disaster related elements” with the “long term natural resource management and social elements”. This has unfolded a practical based approach for building resilience with an “end-to-end” early warning system connectivity in the Indian Ocean Region.



The CCR framework builds around practical experiences of DRR and Natural Resource Management concepts incorporating lessons about how to address coastal hazards, reduce future risks, increase the effectiveness of recovery, and adapt to changes within the community and the environment. A key lesson that CCR approach is build on is that single-sector DRR planning cannot solve the complexity of problems posed by natural hazards nor build resilience to them. It requires working across sectors such as environment, coastal management etc. and with a wide array of groups and organizations.

The CCR initiative further through its implementation stages by ADPC in countries such as Indonesia, Maldives, Myanmar, Sri Lanka, Thailand and others have proved that resilience requires integrated and holistic risk reduction measures and actions which cannot be established from either DRR or environmental management actions but through interfacing both. In this manner, a linked approach helps unexpected changes to be absorbed more easily, so that disaster scenarios can be avoided whenever possible.



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How Sustainable Environmental Management is linked to disaster risk reduction

C. Kelly, ProAct Network, (disasterkelly@yahoo.com) Mr. Kelly has over 27 years of field experience in humanitarian assistance programs dealing with compound disasters, droughts, food insecurity, insect infestation, hurricanes, epidemics, floods, war and other emergencies in developing countries. An affiliate of the AON Benfield UCL Hazard Research Centre, Mr. Kelly is a member of the International Research Committee on Disasters, the Society of Risk Analysis, The International Emergency Management Society and ProAct Network. Over this career Mr. Kelly has performed field and senior management tasks in over 18 disaster response operations. Recent professional work has included risk assessment and disaster management capacity building in Tajikistan, disaster risk reduction in the Sahel and assessing the environmental impacts during disasters (The Rapid Environmental Impact Assessment Project and Shelter and Environment issues for the Global Shelter Cluster). (The views presented in this paper do not represent those of ProAct Network.)

Sustainable environmental management is a relatively simple concept, though with a significant impact, the premise being those actions taken today which have an impact on the environment – and most actions do impact on the environment – should not lead to a reduction in the availability of needed resources or desired quality of life in the future. How this concept is linked to disaster risk reduction is discussed further in the following sections.

The Challenge of Sustainable Environmental Management

The basic challenge of sustainable environmental management is to only take actions which do not exceed the threshold for harm to a local environment and which do not limit the use of environmental resources in the future. This requires a long-term approach to selecting actions as well as a clear understanding of the impacts of these actions. While the concept may be simple, the devil is in the details, particularly because it is difficult for an individual to assess long-term outcomes of each action s/he takes.

At the same time, where individual actions are aggregated to the level of a community or a society it can be easier to assess and identify whether cumulative impacts cross a threshold to unsustainable environmental management. For example, an individual may take sand from a river, as is done in many countries for construction, but this may not be seen as having an impact of future resource use and quality of life. If, however, many individuals take sand from the same river to build a city – as has happened in Sri Lanka for the construction of Colombo – then there is insufficient sand coming from the rivers to replenish coastal beaches. The lack of sand for beaches impacts the quality of life of beach users such as tourists, fisherfolk and residents living near beaches and removes sand from future use as it has been turned into cement bricks and concrete. The only way to get the sand back to the river and onto the beaches is to tear down buildings and return them to their basic components, something that is unlikely to happen.

Because islands are often relatively closed natural systems, the challenge and impact of natural resource use is usually most evident and immediate, whether the island be as large as Sri Lanka or as small as

an atoll in the Maldives. However, the same impact can occur on a continental basis with the construction of levees to prevent flooding, which stop a natural replenishment of nutrients on flood lands and lead to changes in river dynamics and usability.

One can argue that most human actions, when aggregated to the right scale, cannot be managed in a sustainable manner. Yet, as we



Figure 1. "Long Xuyên, An Giang Province, Vietnam" - ADPC Flood Management Project © ADPC

gain more experience in living with larger populations needing more resources we are getting better at understanding and defining the cumulative impacts of human actions, and how these actions impact on current and future resource availability and quality of life.

The Link between Disaster Risk Reduction and Sustainable Environment Management

“The core to disaster risk reduction is a development process which identifies and incorporates potential disasters into managing the change which occurs through development. This process involves identifying hazards, their frequencies and magnitudes and impact, as well as the social and physical vulnerabilities of populations at risk.”

Once these elements have been identified and, ideally quantified, those managing the development process can then incorporate measures to reduce unacceptable risks, through reducing the impact of hazards, levels of vulnerability or, preferably, both.

The risk assessment process is incorporated into participatory disaster risk assessment tools such as those developed by Asian Disaster Preparedness Center (<http://www.adpc.net/pdr-sea/publications/12Handbk.pdf>). It is also a fundamental element in the environmental impact assessment process required in most countries for any major developmental undertaking.

Current practice is to define what is acceptable in terms of risk based on the views of the individuals, community or society which will experience the risk, and which will gain any benefits from accepting greater risk. Some societies willingly accept greater risks than others, making it hard to generalize as to what is an acceptable level of risk for everyone in the world.

Understanding local perceptions of risk is important in designing effective risk reduction actions. But also of importance is the equality of risk, that is whether some are more subject to a risk (e.g., those living in a flood zone) than others, and whether those living in such hazard zones gain benefits which are equal to the risk they experience.



Figure 3. “Long Xuyên, An Giang Province, Vietnam” - ADPC Flood Management Project © ADPC

What does risk assessment and perceptions of acceptable risk have to do with sustainable environmental management? One of the underlying challenges of risk management – the process of risk reduction – is to avoid transferring risk impacts into the future. For instance, building flood prevention embankments along a river which carries a high sediment load will commonly cause the base level of the river to rise over time, eventually increasing the likelihood of overtopping of the embankments and severe flooding. As such embankments are expected to prevent flooding for some time – i.e., move the risk impact into the future – the severity of the eventual flood may be greater than if flooding occurred each year, and was

an integral part of normal life. This type of problem has occurred in the Mississippi River in the United States, as well as in many rivers in Bangladesh.

Thus, risk reduction efforts which shift risk impacts to the future actually don’t reduce risk, but transfer the impact to those living in the future. This may be fine for those who avoid floods today, but it leads to increased and unnecessary hardship and possibly deaths in the future. In short, risk reduction which just transfers risk to the future is not really risk reduction and these risk reduction efforts are not sustainable. Eventually the risk is realized and people suffer.

On the other hand, risk reduction which reduces current risk without transferring risk to the future is sustainable, as people in the future will not be subject to increased risk. At the least, such risk reduction actions would not use natural resources at rates which have a negative impact on the future quality of life. At best, sustainable risk reduction actions can lead to an improvement to current and future quality of life.



Figure 2. “Long Xuyên, An Giang Province, Vietnam” - ADPC Flood Management Project © ADPC

The idea of avoiding a future transfer of risk as a way to make disaster risk reduction sustainable and a complement to sustainable environmental management is a relatively new idea in the field of risk reduction. As experience is gained with linking disaster risk reduction and sustainable environmental management, and with anticipating the future impacts of present actions, we will be better able to reduce risk over the long-term and not just reduce risk today at the expense of the future.

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Healthy Ecosystems for human security

Michael Dougherty, IUCN Asia (Michael@iucnt.org) is Regional Communications Coordinator at Asia Regional Office of IUCN.

In the past two decades, more than 200 million people have been affected every year by disasters, most of them occurring in parts of the world where communities are less prepared to face them.

“The steady rise in the number of natural disasters and in the number of people, whose lives and property are affected by them, is now increasingly recognized as a result of environmental degradation. And all of this is exacerbated by climate change,” says Neville Ash, Head of IUCN’s Ecosystem Management Program. “What we need to do now is make sure the disaster risk community puts ecosystem-based management at the heart of all preventive and disaster-relief policies.”

Why do ecosystems matter?

Climate change and natural disasters such as landslides and floods are putting millions of people at risk, especially women and children. Their vulnerability is exacerbated by ongoing environmental degradation, more people living in exposed areas, increased frequency of extreme weather events and by government policy.



Earthquake damage, Pakistan 2005 © Karl Schuler, IUCN

Healthy ecosystems, such as wetlands, forests and coastal areas, including mangroves and sand dunes, provide buffers to extreme events. They are especially critical to people who depend on natural resources for their livelihoods and physical security. Post-disaster recovery efforts often create more environmental problems than the event itself, for example, by locating refugee camps in ecologically-sensitive areas or through inappropriate waste management. Disaster prevention and climate change mitigation policies could become more effective by integrating sustainable ecosystem management practices.

Five reasons why ecosystems matter to disaster risk reduction:

1. Human well-being depends on ecosystems that enable people to withstand, cope with, and recover from disasters. Disaster-resilient communities, especially in rural areas, are based on healthy ecosystems and diverse livelihoods;
2. Ecosystems, such as wetlands, forests, and coasts can provide cost-effective natural buffers against hazard events and the impacts of climate change. According to the World Bank (2004), investments in preventive measures, including in maintaining healthy ecosystems, is seven-fold more cost effective than the costs incurred by disasters;
3. There are clear links between resource degradation and disaster risk. Degraded ecosystems are unable to provide the benefits that help communities to reduce their vulnerability to disasters. In addition,

many disasters are caused by reoccurring conflicts, which are based on competition for scarce natural resources – and once a conflict has started it can also lead to additional environmental degradation;



Flooded city, Bangladesh © CNRS

4. Healthy and diverse ecosystems are more robust to extreme weather events. Disasters can affect biodiversity through the spread of invasive species, mass species mortality, loss of habitat and poorly designed post disaster clean-up efforts. This may have a negative impact on progress toward achieving the objectives of the Convention on Biological Diversity and Millennium Development Goals; and
5. Ecosystem degradation reduces the ability of natural systems to sequester carbon, exacerbating climate change impacted disasters.

Ecosystem-based disaster risk reduction supports human security

IUCN is assessing and promoting ways of managing ecosystems that allow ecosystems and people to enhance their resilience and adapt to the impacts of climate change and disaster events.

“Investing in ecosystems to reduce the risk of hazards and support livelihoods is key to building resilient communities,” says Jeff McNeely, IUCN’s Chief Scientist. “Disasters kill people but they also have immense environmental impact on affected areas. In order to reduce biodiversity loss, we need healthy and diverse ecosystems, which are more robust to extreme climate events.”

There is an increased understanding that ecosystem-based approaches can be equally or more beneficial than infrastructure or technology-based solutions. Relevant IUCN regional offices and thematic programs have already been confronted with the urgent realities of post-disaster assessments and providing guidance to governments or IUCN members on community resilience, the role of ecosystems in disaster risk reduction and long-term recovery guidance.

More reading sources:

Ecosystems and Disasters: IUCN’s work on Disaster Risk Reduction Brochure, June 2009, IUCN
Incorporating environmental safeguards into disaster risk management: a training module. 2008, Ecosystems and Livelihoods Group Asia, IUCN

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Need of the Hour: Disaster Risk Reduction and Environmental Management

By Manel Jayamanna (chitra_manel@yahoo.com) As a specialist in Disaster Management, Natural Resources and Environmental management, Poverty and Development planning and management, Ms. Manel Jayamanna has been working extensively in the field.

It is well established that there is a cyclical inter-linkages between environmental management and DRR. The environmental degradation exacerbates the disaster impact and vice versa. Deforestation, forest management practices, unsustainable agricultural practices, overexploitation of coastal and other ecosystems can exacerbate negative impacts of disasters leading to flooding, landslides, mud slides, silting, contamination of water both ground as well as surface water affecting human lives.

The disasters cause serious impacts not only on human lives but also on the natural as well as built environment of the geographical region wherever the disaster strikes. The impact of Asian Tsunami on coastal ecosystems and of earth quakes in Pakistan and China provide evidence to this effect.

Despite these achievements the discussions are continued with increased interests on the same subject highlighting same issues and concerns. This indicates that some thing is not right with us; i.e disaster managers, environmental managers, development practioners, and all the parties contributing to manage disasters.

The links between DRR and environmental management are comprehensively documented in the “Living with Risks ” published by the UNISDR in 2004. It clearly outlines ways to integrate environmental management with disaster risk strategies. These include the following:

- Assessment of environmental causes of hazard occurrence and vulnerability,
- Assessment of environmental actions that can reduce vulnerability,
- Assessment of environmental consequences of DRR,
- Consideration of environmental services in decision making processes,
- Partnerships and regional approaches to land use and nature conservation,
- Reasonable alternatives to conflicts concerning alternative uses of resources,
- Advice and information to involve actors in enhancing the quality of the environment.

The tools, techniques and modalities of undertaking above assessments and actions are also established either by adopting existing tools and techniques or modifying them to suit the needs of the disaster management. Concurrently, there are extensive efforts to invent new tools, techniques or institutional structures to integrate and “mainstream” disaster management with other disciplines.

In addition, the same document recommends the following areas of interventions that could bring positive results in managing disasters by harnessing the inherent links between DRR and environmental management:

- Application of adopted tools,
- Exchange of knowledge and practices,
- Adjustments in policy frameworks,
- Collaborations among the institutions working in environmental science and development sector, and
- Community participation.

The proceedings of the international, regional and even national conferences, seminars, workshops reveal that the above interventions are already considered and even endorsed.

What is not correct with us? It is the opinion of the writer that most significant factor contributing to this dilemma is the absence or lack of coordination among us. This is the present dilemma that many countries prone to disasters face today. Despite the scientific knowledge on inter-linkages between environmental concerns and the disasters together with the lessons learned during various disasters that occurred in the recent past the development partners are still concerned with ineffective and inefficient systems in place for disaster management. The fundamental issue for this dilemma is the

“Lack of coordination and collaboration” among the policy makers, planners, development practitioners and the other key stakeholders who are involved in managing disasters.

The partners who should implement a well coordinated action to recover from the disasters for instance, are acting either individually or in isolation. While the disaster managers are concerned with the aspects of emergency operations and recovery rest of the concerns are either ignored or not considered, the environmental managers are largely or mainly focusing on environmental protection and conservation. These two groups are often in two different camps and their meeting together and taking action in a coordinated manner is seldom designed.

The experience of the disasters that occurred in the 21 century is full of evidence to this fact. For instance, Tokage Typhoon that hit Toyooka city in the Hyogo Prefecture of Japan in October 2004 clearly confirmed the need to incorporate environmental issues in disaster management. The Disaster Management Plans very often do not concretely incorporate environmental issues. The Environmental issues are handled by separate department which has few links or no links with disaster issues.

The separation among the disciplines is a common phenomenon that is visible clearly among the practitioners of the same disciplines. One would attribute this distancing to the fact that each subject or thematic concern that comes up due to the issues and needs of the nations attempt to develop that theme in full scale and to have its own identity in the literature. The wide angle perspectives are considered by involving multi disciplinary experts but very often 'hoarse eye' approach is practiced. For instance the tools and techniques developed and practiced in the environmental sector are quite adequate to incorporate DRR in not only in the environment sector but also in other disciplines. However there seems a reluctance on the part of environmental scientists to include Disaster Risk Assessment for instance in the Environmental Impact Assessments (EIA). The emphasis of the EIAs was largely on the impacts on the natural resources. The human dimension in the interventions seems less important. This is mainly a problem of the attitudes than the discipline itself. The EIAs some time ago were the sole domain of the Natural Scientists and the role of the Social Scientists or Economists and any other discipline was limited. However this situation is slowly changing now with a tendency to include human dimension in the environmental assessments.

Similarly the Disaster Managers were more concerned with the Human dimension that exposes people to vulnerability even to the extent of disregarding the broader social structures within which the humans do exist and are impacting with.

The general opinion is that the environment issues in a disaster situation are largely a matter of "waste management" issue. The larger dimension of environmental issues that has direct relevance with disaster management such as land use management, forest management, river basin management, ecosystem management and so on are presently being managed by separate agencies other than the environmental agency. The coordination among these agencies is of paramount importance for effective disaster management.

The lack of coordination is particularly highly visible in the recovery and preparedness stages of the Disaster Management process. The emergency phase may draw the attention of all relevant partners given the humanitarian concerns of the disaster. For instance during the immediate aftermath of Asian Tsunami in December 2004 almost all agencies including the private sector and civil societies not only at the national level but also at the international level came forward with outpouring numbers to assist the humanitarian aspects of the disasters. However this flood of assistance ended up in huge waste due to lack of coordination creating piles of unwanted relief material such a food, clothing, bottled water etc.



Child's painting on flooding in Vietnam © ADPC

Lack of coordination that was evident and visible during the emergency phase was further deteriorated gradually as the scenario moved towards recovery. The units or divisions within the same



Community based initiation on Rain Water Harvestry, Takeo Province, Cambodia © ADPC

agency were seen as competing for resources and higher visibility that resulted in waste of resources. The affected communities were compelled to bear the additional cost of this competition as observed in Tsunami hit countries in Asia particularly in Sri Lanka.

The solution therefore lies in the fact how effectively and efficiently the efforts of disaster management could be Coordinated. This writer would like to advocate the principle and the philosophy of righteousness of the mind as the correct path to solve this issue of lack of coordination. It requires a change in the attitude of the stakeholders. The individual service providers should be prepared to go beyond the box and render their services to the humanity irrespective of the identities such as class, color, nationality, remuneration and any division that human beings are divided in to different camps. Until and unless the human beings change their attitudes to serve themselves with positive and conducive attitudes, the lack of coordination will persist affecting the lives of all humans particularly the poor and less privileged groups of people in the society.

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The Unexplored Nexus: Environmental Management and Emergency Management in Post-Disaster Reconstruction, by John R.Labadie, Seattle Public Utilities
Living with Risk, 2004, United Nations International Strategy for Disaster Reduction (UNISDR)
Environmental Degradation and Disaster Risk, 2004 by Glen Dolecemasco, Asian Disaster Preparedness Center

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From Theory to Practice

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Jonas Joerin is a PhD student at the Graduate School of Global Environmental Studies, Kyoto University. His interest is on urban disaster risk. His research focuses on the resilience of urban areas (cities) with regards to climate-related disasters. For more details, please see: <http://www.iedm.ges.kyoto-u.ac.jp/>

Sustainable environmental management is a relatively simple concept, though with a significant impact, the premise being those actions taken today which have an impact on the environment – and most actions do impact on the environment – should not lead to a reduction in the availability of needed resources or desired quality of life in the future. How this concept is linked to disaster risk reduction is discussed further in the following sections.

Need for Environmental Management and Disaster Risk Reduction (DRR)

The fourth assessment report (2007) from the Intergovernmental Panel on Climate Change (IPCC) highlights that climate change is expected to be accompanied by an increased frequency and intensity of extreme climate events in many parts of the world. As a result many communities around the world are becoming more vulnerable against disasters, according to the recently published “Global Assessment Report: Disaster Risk Reduction” (2009) from the United Nations International Strategy for Disaster Risk Reduction (UNISDR). This article presents compelling new evidence of concentration of risk rural and urban settings whereby climate change will aggravate many of the socio-economic factors that drive vulnerability. As reviewed by UNISDR, disaster risk is growing as a result of unplanned urbanization, persistent poverty and ecosystem degradation. These risk drivers are likely to be exacerbated due to climate change.

Over the last two decades (1988-2007), 76 percent of all disasters were hydrological, meteorological or climatologically in nature. These accounted for 45 percent of the deaths and 79 percent of the economic losses caused by natural hazards. Population growth combined with more people living in hazardous areas: for instance, vulnerable urban areas will also increase risk over time, including the number of fatalities and asset damage. The IPCC attributes increasing drought and heavy precipitation in some regions, as well as extreme temperatures across the globe to climate change, and these trends will continue in the future. Moreover, developing countries experience disproportionately more fatalities where ninety per cent of all deaths from disasters over the last 25 years occurred in these countries. Today the need is greater than ever to manage weather-related risks in ways that support adaptation of the most vulnerable to a changing climate.

Activities of the International Environment and Disaster Management laboratory, Kyoto University

In the efforts to enhance environmental sustainability and thereby reduce the impacts of disasters, the laboratory of International Environment and Disaster Management (IEDM) has three independent and one cross-cutting research pillars: Climate Change Adaptation, Environment Disaster Education, and Urban Risk. Community participation is considered as the cross-cutting research pillar for all the three above-mentioned pillars. With the broader boundary of

community participation, research is conducted under the following topics: social capital, sustainable livelihood, sustainable community-based disaster recovery, community-based forest management, and corporate community interface (beyond the traditional corporate social responsibility). All these issues are very much based on the common concept of community-based interventions and its sustainability. In this write-up two cases of rural and urban risk reduction approaches are presented as illustrative examples of the above issues.



Figure 1. Collecting water in a stream in the mountainous area

Case study from Vietnam

One of our researches focuses on Ninh Thuan province, Vietnam. Rated the 59th poorest province of Vietnam, Ninh Thuan is one of the nine provinces that are most affected by drought.



Figure 2. Digging a new well in the coastal area

The province was severely affected by drought in August 2004 with reduction in rainfall by 50% of the normal. The drought has continued in 2005 and 2006 with poor rainfall during the first two cropping seasons. Prolonged dry days have caused significant damage to agriculture and changed the salinity of groundwater thus damaging aquaculture. The increasing drought events in Ninh Thuan province is a major concern for both the governments and local communities.

The data indicates that in some severe drought years and the years after the severe drought years, the area and yield of almost crops were lower than the normal years. After the severe drought of 2004, almost all areas of Ninh Thuan province became dried and the year 2005, the farmers could not cultivate in 75% area of paddy while some area have been shifting to maize and other crops.

Communities always seeking new ways to adapt, e.g., farmers change seeds and crops, applying traditional knowledge on weather forecasting, digging deeper wells, collecting water from the streams for multi-purposes of daily demands, etc. Some of these adaptation techniques are productive, but others carry a cost. Migration of young people increases the workload of the older people left behind.

The impacts of drought would be mitigated if the governments and organizations consider involving communities in the process of



decision-making. Such measures could include enhancing weather forecasting; improving water storage and irrigation; soil conservation; micro-credit; animal rearing, improved seeds and new crops, etc... The community-based drought preparedness is suggested for applying in drought prone areas. The environment management in the drought areas is also needed to reduce the secondary impacts of drought to the human health.

Climate Disaster Resilience Index

As mentioned in the first part, urban areas are highly vulnerable against climate-related hazards due to urbanization and high concentration of people in small areas. Thus, IEDM is researching on how to make urban areas or cities more resilient against such disasters. At current, one project is trying to develop a Climate Disaster Resilience Index (CDRI) for a large number of cities in India, which have different characteristics in terms of their exposure (coastal, river-based, mountainous, etc.) to the various kinds of natural hazards (floods, storms, drought in form of water scarcity, rainfall induced landslides, etc.). The aim is to provide a detailed assessment showing a city's resilience against such hazards according to five dimensions, which are: physical, social, economic, institutional, and natural. This ongoing study is followed after a pilot study (2008-2009) which examined 15 cities in several countries in Asia. Figure 4 shows how the end product of a CDRI looks like. This map in form of a spider highlights the resilience from Mumbai. It shows that the city is less vulnerable to physical aspects than to natural or institutional.

After having assessed the city's resilience this output (figure 4) should help city governments to take the appropriate measure (sound measures) to reduce the risk of disasters, like in developing or land-use plans, but also to build and increase the capacities of the citizens to be more resilient against natural hazards.

Conclusion

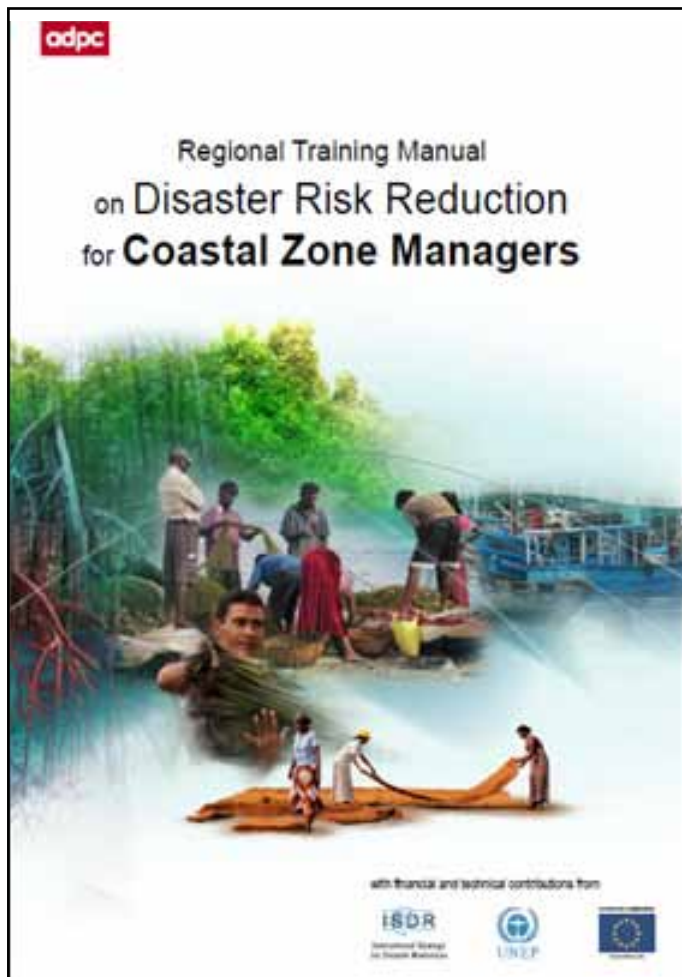
The previous examples show how IEDM is recognizing the consequences from climate change and is pushing for sustainable solutions in different fields all aiming to improve the security of human beings. The challenges are numerous and require a participatory approach involving all actors and stakeholders who are affected and responsible to take action for improvement. Linking environmental management and DRR is crucial to provide a holistic approach to deal with all these issues explained above.

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Building the Capacity of Coastal Zone Managers on protecting coastal ecosystems to reduce disaster risk

This article describes an initiative undertaken by the Asian Disaster Preparedness Center (ADPC) in partnership with the United Nations Environment Program (UNEP) and with support from United Nations International Strategy for Disaster Reduction (UNISDR) and European Commission AIDCO Program on developing training modules on disaster risk reduction for coastal zone managers in Asian countries.

Healthy ecosystems play a vital role in reducing the risk in coastal areas which are often impacted by natural hazards, thus leaving vast population in the coastal area particularly vulnerable. This risk is only expected to increase with the increasing impact of climate change. Thus it is essential to build the capacity of the coastal zone managers responsible for development activities along the coast, on measures and processes for protecting the coastal ecosystems and in return the wide range of services they provide including protection of natural shoreline. At the same time, it is very important to work with disaster risk reduction practitioners, to enhance their understanding of the services and benefits healthy ecosystems can provide, including disaster risk reduction.



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This regional training course has been developed aiming at building capacity of coastal zone managers to design and implement coastal development projects that enhance protection of lives and livelihoods while improving environmental quality and protecting ecosystem services. It is also aimed at enhancing the awareness of disaster risk reduction practitioners on the role healthy coastal ecosystems can play in disaster mitigation and prevention, emphasising the importance of adopting integrated coastal development planning (a combination of structural and non structural measures) for reducing risk. At the end of the training course, it is expected that the participants would be able to:

- Identify risks from natural hazards, including those increased by climate change, which impact coastal development projects and also improper coastal development processes which might lead to accumulation of risk in coastal areas;
- Understand the conceptual framework of risk reduction;
- Recognize various measures; structural and non structural, for risk reduction in coastal areas;
- Apply the theory and use practical tools in integrating disaster risk reduction in coastal zone management plans and programs; and

- Develop a list of actions which can be undertaken by the coastal zone managers in their daily work program in order to reduce the risk in coastal areas.

The course is structured in eight modules as outline in the adjacent box. The initial two modules of the course introduces the definitions and concepts in regard to coast and coastal zone management, highlight the importance of the coastline for the economy and the services the coastal ecosystem provides and which are at high risk from natural hazards and impacts of climate change.

In the following modules, the course attempts to introduce the framework for disaster risk reduction; Hyogo Framework for Action (HFA) and its five priorities for action and the importance of environmental management for achieving the goals of the HFA. Tools and techniques related to undertaking risk assessment in coastal areas are explained. Further the course introduces the various measures that could be adopted to reduce risk in coastal areas, like structural man made, structural ecosystem based and non-structural measures and how to link all these in an integrated manner. The final two modules help to identify entry points for integrating disaster risk reduction in coastal zone management policies, plans, programs and projects, thus aiming at influencing the way coastal development projects are planned, designed and implemented with a strong component on hazard resilient development. The course also aims to work with the participants in drawing up a list of actions, which should be undertaken in their respective organizations to make sure the initiatives they undertake in coastal areas are hazard resilient and do not add to the risk. Some of these actions the participants could directly initiate where as for some they could only advocate for and raise awareness among their peers. A visit to a nearby coastal area as means of connecting to the ground realities and familiarizing with the local agencies and communities and their existing systems and plans, forms a part of the module on field visit.

Course structure

- **Module 1:** Introduction to the Course
- **Module 2:** Knowing the coast better with a DRR perspective
- **Module 3:** Introducing DRR and its linkages with Climate Change Adaptation
- **Module 4:** Assessing the Coastal Risk from natural hazards
- **Module 5:** Measures for DRR in Coastal area
- **Module 6:** Understanding the ground realities: Field Exercise
- **Module 7:** Integrating DRR in CZM; from Policy to Action
- **Module 8:** Taking it back home; where to start from

The training course has been developed in close consultation with national agencies and technical organizations engaged in coastal zone management and disaster management in India, Indonesia and Sri Lanka and has benefitted greatly from inputs received from the participants of the regional training course organized by the Mangrove for Future (MFF) Program in Semarang in October 2008 as well as the MFF national coordinating bodies in the above mentioned countries and the participants of the Learning Opportunity event on 'Ecosystem services, disaster risk reduction and coastal community resilience' organized by the ADPC, UNEP and UNISDR at the IUCN World Congress in Barcelona, October 2008. Currently the training is planned for delivery at a regional level by ADPC in partnership with UNEP and other technical agencies/ initiatives (e.g. MFF) working in the area of ecosystems and environmental management and/ or disaster risk reduction in Asia.

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Rapid Disaster Risk Assessment of Coastal Communities: A Case Study of Mutiara Village, Banda Aceh, Indonesia

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A rapid disaster risk assessment was carried out to identify major hazards, assess vulnerabilities and analyze risks of future disasters and recommend key mitigating measures to make prospective communities in Mutiara village resilient to disasters. This article is prepared based on a rapid reconnaissance survey of the area where Canadian Red Cross (CRC) was planning to build houses for December 2004 tsunami-affected people. Data were collected both from primary sources in consultation with the people residing nearby resettlement area and local leaders, and secondary sources. For the analysis of the hazard and vulnerability of the prospective communities, the crunch and release models were used. Risk analysis was done using risk matrix.

Background

On Sunday, 26 December 2004, the greatest earthquake in 40 years with 9.3 magnitudes occurred about 150 kilometers off the west coast of northern Sumatra Island in Indonesia. The earthquake generated a disastrous tsunami that caused destruction in 18 countries bordering the Indian Ocean. The massive tsunami waves up to 30 meters high resulted in the losses of properties estimated at US \$ 9.9 billion (Oyola-Yemaiel 2006), and human casualties of more than 300,000. The highest number of deaths occurred in Indonesia followed by Sri Lanka, India and Thailand. More than half a million people were directly affected by the disaster in Indonesia alone. (Table 1)

After the tsunami event, the Canadian Red Cross (CRC), along with a number of international organizations including UN agencies, IFRC, National Red Cross and Red Crescent Societies and Non-Governmental Organizations, launched immediate response and recovery operations. CRC initiated interventions in five key areas: shelter, water and sanitation, livelihoods, health and disaster preparedness. This study has been carried out to assess the severity of the future tsunami and other major disasters on the prospective community in Mutiara sub-village of the CRC shelter program area.

The purpose of this rapid assessment was twofold: first, to identify major hazards, assess vulnerabilities and analyze risks of future disasters; and second, to recommend key mitigating measures to make prospective communities resilient to disasters.

Mutiara community, a village situated in the coastal area of Indian Ocean and surrounded by a river in the north and the ocean in the west, is prone to a number of major hazards such as earthquakes, local and regional tsunamis, flooding, volcanoes, inundation, river cutting, sea level rise due to climate change, epidemics, tropical cyclones and water and land pollution. In particular, since the village is too close to the coastline, the village is highly vulnerable to tsunami disaster.

Recurrence Period

Indonesia is surrounded by four major tectonic plates, the Pacific, the Eurasian, the Australian and the Philippines plates. All these major tectonic plates and their sub plates are presently active. Major earthquakes and tsunamis can be expected in the semi-enclosed seas and along the Indian Ocean side of Indonesia. Major earthquakes in the semi-enclosed seas can generate destructive local tsunamis in the Sulu, Banda and Java seas.



Figure 1. Alluvial soil- good ecological environment for mangroves, but too close to build the houses

Poor house quality, community dependence on coastal resources for their livelihoods, lack of community awareness on local hazards and disaster risks, depletion of coastal and aquatic resources, lack of institutionalized efforts for environmental conservation of coastal areas were the major vulnerabilities in the study area. Majority of the respondents expressed their opinion that the depletion of coastal resources has limited the livelihoods options and exacerbated the impact of flooding, earthquake and other natural hazards. The study also showed a clear link between natural hazards and environmental degradation. (Table 2)

Table 1. History of Tsunami in Aceh and Western Coast of Sumatra, Indonesia

Location	Date	Magnitude	Damage/Loss
Central part of Western Sumatra	10 February 1797	8	More than 300 fatalities
South western Sumatra	24 November 1833	8.8-9.2	Flooded all the southern part of west Sumatra
Central Sumatra and Nias	5 January 1843	7.2	Many fatalities
Western coast of Sumatra	16 February 1861	8.2	Several thousands fatalities
Krakatau	27 August 1883	Volcano-caused	Over 36000 deaths
Banda Aceh	1941	-	-
Aceh and Nias island (Indian ocean tsunami)	26 December 2004	9-9.3	More than 270,000 (in Indonesia, India, Sri Lanka, Thailand, Maldives etc)

Table 2. Environment and disaster linkages in the study area

Key hazards in the study area	Potential environmental impacts	Exacerbating environmental factors
Flood, High tide, tsunami	<ul style="list-style-type: none"> • sewage overflow • chemical release from farm, factories and roads • hazardous debris • water-damaged households chemicals (paint, pesticides, solvents etc) • loss of top soil and run off • ground and surface water contamination 	<ul style="list-style-type: none"> • habitat and ecosystem destruction (coral reef, flora and fauna) • water siltation, deforestation • Land use and land cover changes
Earthquake	<ul style="list-style-type: none"> • natural gas leaks, household and chemical release from damaged containers • building waste debris and potential mix of hazardous materials • land destabilization 	<ul style="list-style-type: none"> • topography and land cover • building codes and urban planning and urbanization processes

Results of vulnerability assessment using crunch model are shown in Table 3 below:

Table 3. Vulnerability analysis using crunch model

Hazard type	Elements at risk (Disaster)	Unsafe conditions	Dynamic pressures	Root causes
Tsunami, Earthquake, Flooding, Inundation	<ul style="list-style-type: none"> • Elderly, children, women, sick people • Crops damage • Complete damage of buildings, infrastructures, critical facilities such as hospitals, police office, schools and mosques • Coastal ecosystem damaged 	<ul style="list-style-type: none"> • Unstable livelihoods • Damage of critical facilities, buildings, infrastructures, and development assets • Damage of coastal resources such as mangroves/ palms and coral reefs • Land degradation, Low agriculture productivity, Disruption of societal cohesiveness 	<ul style="list-style-type: none"> • No secure land rights for marginalized people • Coastal ecosystem under pressure • Disruption of societal values and system 	<ul style="list-style-type: none"> • Lack of proper land-use planning • Poverty • Unequal distribution of resources and services; marginalized people compelled to live in coastal region for their livelihoods

Risk Analysis and Evaluation

People living in the nearby areas perceive the livelihood as more risk than the risks from tsunami, cyclone and flooding. They do not want to migrate from the area to safer areas because of the fear of livelihood alternatives in the new areas. Instead, they would like to be aware of the disaster events and adopt mitigating measures. The risk analysis using risk ranking (Table 4, Table 5) suggests that there is very high disaster risk in the locality.

Table 4. Risk ranking

Exposure	Probability	Consequence	Risk rating
Unlikely (1)	Unlikely to occur (1)	Insignificant (1)	3
Occasionally (2)	Some chance (2)	Minor property damage (2)	6
Often (3)	Could occur (3)	Lost time, injury or significant property damage (3)	9
Frequent (4)	High chance (4)	Severe injury and property damage (4)	12
Continuous (5)	Will occur if not attended to (5)	Significant human land property damage/ loss (5)	15

Table 5. Risk rating

Total score	Status	Recommendations	Mutiara case
3-5	Low	Requires monitoring	Since Mutiara receives 14 scores and falls in the serious status, therefore it requires immediate attention
6-10	Moderate	Requires attention	
11-15	Serious	Requires immediate attention	

Since it is not possible to mitigate Tsunami hazard, immediate attention should be given to enhance the capacity and reduce vulnerability thereby reducing disaster impacts.

Disaster Risk Reduction Measures

A number of risk mitigating measures have been proposed to reduce the future risk from tsunami, tidal waves and tropical cyclones. It is strongly advised to carry out these activities along with the other resettlement schemes.

1. Plant or enrich tree plantation (e.g. Mangroves, Palms, Casuarinas and bamboos etc) for the environmental conservation.
2. Higher design and construction standards needed; elevate houses that can help reduce the flood and tsunami disaster losses.
3. Provision of escape routes (hills, safe structures- schools and public buildings; but not hospitals). (Safer places should be within a distance of half an hour walk/vehicle). The essential feature of an escape route (evacuation route) is that it will get people to high ground as quickly as possible. Sites with a moderate upward slope should be chosen, where people can walk without much difficulty. Escape routes need to be perpendicular to the contour lines to gain elevation.
4. Road realignment to avoid inundation: Avoid damage and reconstruction, available for disaster relief, provide escape route for coastal villages (Standard width of the road, possible critical points, electricity poles etc).
5. Make communities aware of the escape routes and safer places.
6. Encourage households and communities to prepare contingency plan and land use planning and follow accordingly.
7. Launch livelihood programs, if not this might further make them vulnerable.
8. There is highly unlikely to strike another Earthquake-triggered tsunami in Aceh Province in near future, but Volcano, landslides and meteorite-triggered Tsunamis can occur at any time in the region. People living in coastal areas within 500m of sea coast can be affected by the tropical cyclones as well. Launch community awareness program from the very beginning of the settlement.

9. Reinforced cement concrete and brick buildings with foundations protected against erosion and walls parallel to the direction the waves are traveling, which offer the smallest possible front to hydraulic pressure, can resist tsunamis well.

Conclusions

Earthquake and volcanoes-triggered tsunamis and flooding are two biggest natural hazards with high damage potential in Mutiara sub-village. High tide, inundation and epidemics are also prevalent in the area. From all the aspects of vulnerability, i.e. social, physical, economic and environmental, this village is highly vulnerable to the future disasters risks. However, since the decade old livelihood pattern of the local community relies on the coastal ecosystem, the people in this community do not want to move elsewhere. Instead, they are eager to adopt the mitigating measures and cope with disasters themselves. Therefore, a number of risk mitigating measures have been proposed based on the local socio-economic circumstances. Permanent shelter program is recommended together with the proposed disaster risk mitigation measures. Besides, Disaster Risk Reduction concerns should be integrated into Environmental Risk Assessments (EIA).

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Linking Disaster Risk Reduction, Environment Management and Development Practices and Practitioners in Asia Pacific Region: A Review of Opportunities for Integration

Executive Summary of Working Paper of Disaster Environment Working Group for Asia (DEWGA)
January 2009

Goals and objectives

Taking action on disaster risk reduction (disaster risk reduction) and environment in Asia-Pacific is limited by the lack of a clear and comprehensive picture of existing plans, ongoing and completed projects in the region is lacking. Also missing is full comprehension of strategic entry points and platforms for integrating environment and risk reduction dimensions. In order to create a multidisciplinary community of practitioners in this region that is concerned with closing the gap among sectors with a view to increasing effectiveness of risk reduction, this study tries to identify available resources that link environmental management with disasters and risk reduction efforts. The study has the following specific objectives:

- » Compile a list of available resources that link environmental issues and management with disasters and risk reduction efforts in the Asia-Pacific region;
- » Build a body of knowledge and expertise on mainstreaming (synthesize knowledge);
- » Raise awareness of the intersections of environment, disasters and development and thereby provide a practical and common basis for practitioners from various sectors to discuss and agree on concrete plans and activities to advance mainstreaming;
- » Recommend strategic entry points and platforms for mainstreaming at the regional level; and
- » Build on relevant outcomes of the UNISDR Global Platform on Disaster Risk Reduction, in the regional context, e.g. agreed next steps

Scope of the study

Table 1: Strategic entry areas for integration

Environment-development convergence	Disaster-development convergence	Environment-disaster convergence
Economic opportunities for the poor	Integration of disaster risk reduction into government department activities	Early warning systems
Disaster and environment considerations in economic and infrastructural development	Land use planning and infrastructure planning	Local disaster risk reduction strategies (national and local institution)
Access to, and viability of, communal resources and biodiversity (including forest products)	Integration between 'traditional' and 'modern' agricultural and aquaculture technologies and management systems	National resources management based protection (mangroves, water catchments, forests)
Processing and marketing of local products	Linkages between local 'informal' institutions and authorities	Disaster risk information and capacities of national/ local institutions
Health and education	Diversity of crops, agro-biodiversity	National adaptation plans and vulnerability assessments to climate change
The role of local knowledge in economic development	Seed and input distribution, in particular local seed varieties and inputs	Coastal zone management
Adaptation livelihood strategies to Climate Change	Local research on crops, livestock and economic development that are adapted to the local climate	Urban drainage and water supply, hydroelectricity, solid waste management



Figure 1: Scope of the study

Recent trends of integration in Asia-Pacific

- » The storm protection and provisioning role of ecosystems is being increasingly recognized in Asia-Pacific, particularly after the 2004 Indian Ocean tsunami.
- » There are many efforts to integrate environmental issues into the disaster risk reduction process, particularly the recovery process in the 2004 tsunami-affected countries.
- » There are many tools for mainstreaming disaster risk reduction into development and environment.
- » There are some initiatives to mainstream environment and disaster concerns into development such as the RCC initiative for mainstreaming disaster risk reduction and environmental management, National Adaptation Programs of Action (NAPA) under the UN Framework Convention on Climate Change (UNFCCC).
- » Climate change and its potential impacts are not explicitly mentioned in sectoral or thematic strategies for disaster risk reduction, environmental management and development.

Key findings

- » The environment, disaster and development linkages have been recognized. However, the zone of convergence among three sectors for integration is negligible.
- » This study finds that there are not many projects/programs explicitly addressing the linkages to incorporate into their action plans.
- » There are many potential entry points.

Tools for disaster-environment integration

- » National Adaptation Programs of Action (NAPA)
- » Integrating disaster risk reduction concerns into environmental assessments for new developing projects
- » Environmental risk assessment, and environmental assessment strategies
- » Rapid environmental impact assessment

Tools for disaster-development integration

- » Poverty Reduction Strategy Papers (PRSPs)
- » Country programming framework
- » Sectoral integration
- » UN Development Assistance Frameworks (UNDAFs)
- » National Adaptation Programs of Action (NAPA)
- » Program and project appraisal guidelines
- » Early warning and information systems
- » Risk transfer mechanisms
- » International initiatives and policy forums

Specific strategic entry points for Asia-Pacific

- » Climate change adaptation strategies (particularly for hydro-meteorology related disasters such as floods, typhoon, drought)
- » Land use planning (particularly for landslide, flood, typhoon, and drought)
- » Post disaster sanitation and safe water (particularly for flood, typhoon, and tsunami)
- » Livelihood management (entry point for all types of disasters)
- » Coastal Zone Management (particularly for tsunami, storm surge, flood, beach erosion)
- » Urban planning (particularly for flood, storm)

Disaster Environment Working Group for Asia (DEWGA)



Recognizing that Disaster Risk Reduction (DRR) and Environmental Management (EM) are closely linked and that it is essential to systematically integrate environmental management into disaster risk reduction framework and vice-versa, the Disaster Environment Working Group for Asia (DEWGA) consists of six founding institutions from the Asia region namely, ADPC, CARE, Laboratory of International Environment and Disaster Management (IEDM) at Kyoto University, the International Union for Conservation of Nature (IUCN), Stockholm Environment Institute (SEI) and World Wildlife Fund (WWF) committed to increase the synergy between the two sectors and promote effective integration of environmental management concerns into disaster risk reduction programs and vice versa. Established in 2007, DEWGA acts as a small, semi-formal, open-ended, regional, action-oriented, cross-sectoral partnership to explore avenues through which the partners can work with each other to minimize long term environmental impacts and degradation, as a key disaster risk reduction measure.

The aim of DEWGA is to create a multi-disciplinary community of practitioners in the Asia Pacific region that is concerned with closing the gap among sectors with a view to increasing effectiveness of risk reduction – presuming that environmental sustainability is a key success factor – whether specific interventions on the ground or long-term strategies. It is envisaged that this will be achieved through the following objectives:

- Serve as a collective body to advocate and promote linkages between disaster risk reduction and environmental management;
- Create a space in which the partners can identify and undertake bilateral or joint programs of work;
- Exchange information on new and upcoming initiatives (e.g. events, programs, research and publications) that provide structured opportunities to strengthen these linkages;
- Actively promote integration of disaster risk reduction and environmental sustainability into respective work programs.

To promote collaboration and avoid unnecessary duplication in a number of disaster reduction partnerships in the region, the Group has joined the ISDR-Asia Partnership and of the UNEP-led ISDR Partnership for Environment and Disaster Risk Reduction as a regional partner in 2008. This ensures that the initiative is better linked and integrates its activities along the lines of the Hyogo Framework for Action.

Since 2007, DEWGA has been meeting periodically. As a first step towards working together it has developed the Working Paper; Linking disaster risk reduction, environmental management and development practices and practitioners in Asia and Pacific region: A review of opportunities for integration. The Working Group has also led session and made presentations on linking DRR and Environmental Management at regional conferences such as the recently held Disaster Management Practitioner's Workshop in

Phuket in September 2009 and the 2nd Session of the Global Platform on Disaster Risk Reduction in Geneva in June 2009.

The member organization takes up the secretariat function of the Working Group on a rotating basis. The current secretariat is IUCN. For more information on DEWGA please visit www.dewga.net or contact the focal person from the member organizations.

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Partnership for Environment and Disaster Risk Reduction

Partnership for Environment and Disaster Risk Reduction (PEDRR) is a global partnership comprised of UN agencies, international and regional NGOs as well as specialist institutes that collectively aim to influence policy and to scale-up and better coordinate environmental efforts in pursuit of disaster risk reduction, climate change adaptation and sustainable livelihoods. It promotes ecosystems management as means to reduce disaster risk, increase local resilience and adapt to a changing climate. PEDRR is currently chaired by UNEP (this is a bi-annual rotating position).

PEDRR includes: PEDRR includes the Asian Disaster Preparedness Center (ADPC); Global Fire Monitoring Center (GFMC); International Union for the Conservation of Nature (IUCN);



ProAct Network; Stockholm Environment Institute (SEI); UN International Strategy for Disaster Reduction (ISDR); United Nations University Institute for Environment and Human Security (UNU-EHS); United Nations Development Program/ Bureau of Crisis Prevention and Recovery (UNDP/BCPR); and World Wide Fund for Nature (WWF). ADPC, IUCN, UNDP/BCPR and ProAct have established programs focusing on environment-DRR-CCA linkages, with extensive local networks in specific regions and at country level.

For 2010-2011, PEDRR intends to compile case studies documenting field-level experiences that demonstrate ecosystems-based approaches in disaster risk reduction and climate change adaptation. This effort seeks to provide demonstrable evidence linking ecosystem services for risk reduction and will feed into the Global Assessment Report in 2011. A policy paper and workshop on environment and DRR are also envisioned.

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Special Article: Online Dialogue on Early Warning

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Between 13 May and 30 June 2009, the Stockholm Environment Institute (SEI) in cooperation with the Asian Disaster Preparedness Centre (ADPC), Macquarie University and the Raks Thai Foundation (CARE Thailand) hosted an online dialogue on 'Strengthening the last mile of tsunami Early Warning Systems in the Indian Ocean.' The dialogue was conducted as part of the project 'Early Warning and Community Preparedness: Strengthening the Technology – Community Interface' undertaken by SEI and its regional partners under SEI's Program 'Sustainable Recovery and Resilience Building in the Tsunami Affected Region'. The program was undertaken between 2005 and 2009 with financial support from the Swedish International Development Cooperation Agency (SIDA).

The purpose of the online dialogue was to share insights from SEI's stakeholder consultations in Thailand, Sri Lanka and Indonesia with a wider audience, and to provide an easily accessible platform that enabled a wide range of actors engaged in disaster risk reduction in the region and globally, to jointly explore recent lessons learnt in strengthening disaster preparedness and to develop tsunami early warning systems in the countries affected by the 2004 tsunami.

Participants were directly invited through targeted personal email invitations or alerted through postings on various disaster preparedness websites, including PreventionWeb, CabNet., RedR (<http://www.redr.org>) and UN International Strategy for Disaster Reduction (UNISDR). The discussions were moderated by staff of the host organizations and structured according to the key elements of people-centered early warning systems as defined by the UNISDR Platform for the Promotion of Early Warning (PPEW): risk knowledge; monitoring and warning services; dissemination and communications; and response capability. The dialogue raised many issues. Rather than attempting to include all of the points made, this summary aims to provide some highlights of the discussions.

1. Discussion on 'Risk Knowledge'

The discussion on risk knowledge focused on the consideration of local perceptions, contexts, information needs and capacities; systems that address multiple hazards; and the importance of high-level political will and leadership. One of the issues explored was whether EWS are strongly biased towards technology first and people later. In this context, there was considerable discussion about the notion of the 'last mile'. The term originated in the communications sector and has, in the context of EWS, been criticized by some because in their opinion it refers to an approach in which the delivery of warnings to the people at risk is the last step in a top-down approach to EWS development. In their view, EWS should be developed using a bottom-up approach that prioritizes the needs of the communi-

ties/users and engages them more actively in the development of the system. In this approach the interface of the community with the EWS is therefore seen as the 'first mile.' Others regard this distinction as semantics or a misconception. To emphasize the need to equally address all aspects of early warning, some actors refer to integrated end-to-end EWS that include hazard detection, warning and community-level response. Social inclusion, empowerment, equal participation, ownership, and decision-making were mentioned as crucial components of people-centered EWS. Another issue raised was whether vulnerabilities to hazards and the underlying causes of these vulnerabilities were sufficiently considered in EWS development. Factors contributing to social hazard vulnerability mentioned by participants include gender, poverty and social class (e.g., caste). Are these aspects sufficiently addressed? It was suggested that a better understanding of the multiple vulnerabilities of individuals and communities face is essential to the development of any multi-hazard early warning system. However, one participant noted that aspects of vulnerability are usually neglected, sidelined, or bypassed in favor of superficial approaches to vulnerability or focusing on the hazard.

2. Discussion on 'Dissemination and Communication of Early Warnings'

This focused on people's lack of trust in government actors; best ways to disseminate early warnings; the usefulness of standard methods and tools for improving community preparedness; and the polarization between government agencies and NGOs in the ways that each are working. Several participants noted that lack of trust is an issue when establishing EWS. This is especially the case in settings where governments are perceived as not being accountable and transparent. Also, there are many links in the 'trust chain' as messages are relayed from source to recipients. Early warning systems therefore rely not only on their internal structures to be

effective, but also on the surrounding governance context. Effective messages are coherent with their cultural setting. It was suggested that further community awareness-raising is needed to understand and respond appropriately to the differences between alerts, warnings and evacuation messages.

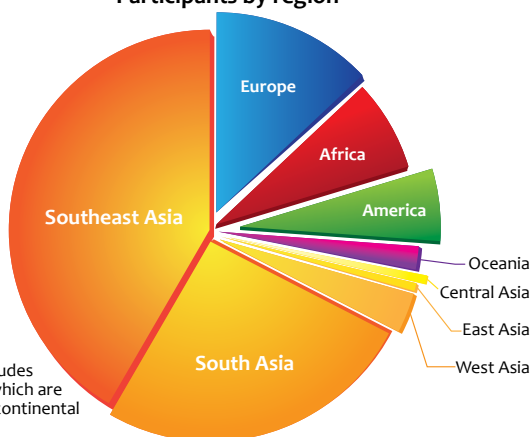
3. Discussion on 'Monitoring and Warning Services'

The third discussion dealt with issues relating to the technical components of EWS; prospects for funding and long-term sustainability of early warning activities; and guidance to improve policies and Standard Operating Procedures (SOPs). One particular challenge mentioned is the compatibility of different alert systems. One participant observed that after the 2004 tsunami a large number of organizations developed alert systems independently without ensuring compatibility, integration and adherence to government standards and regulations. In order to ensure that EW efforts become more integrated and sustainable, disaster management authorities need to map and test all of these systems to identify where additional programs are needed, and decisions need to be made as to which data will be shared and how. Another issue discussed was the establishment of institutional mechanisms, and the experiences in developing standardized processes, roles and responsibilities, and protocols (SOPs). One participant asked how the 'top-down desire for standardization can be balanced with the demonstrated need to contextualize processes at the local level relevant to the users of EWS'. This triggered a discussion on the applicability and transferability of Common Alerting Protocols across different contexts and situations.

4. Discussion on 'Response Capability'

In the discussion topic response capability issues discussed included capacity building through awareness raising, education and training efforts that start at primary education level; inspiring people to help themselves through community-led disaster preparedness and response teams; and developing protocols that enable rapid and effective responses on the terms of the people who undertake the responses. An important point made was that to be successful, government-led and community-led initiatives must occur together in order to assist and support each other. Participants referred to a number of sources that provide examples of demonstrated successes and failures from around the world that serve as a valuable

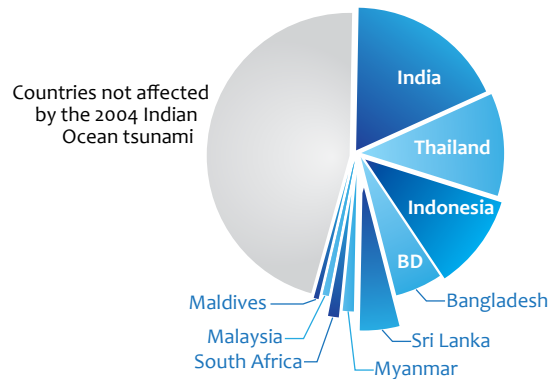
Participants by region



resource for learning and improving current efforts to strengthen disaster preparedness and early warning. One criticism was that much of the material available is in English only and that there is hence a need to develop networks and support materials in the local languages.

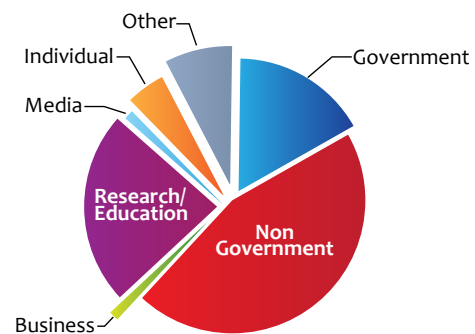
The dialogue drew a response of 154 registrations from 41 countries (see Figure 1 above). More than half of the registered participants represented countries affected by the 2004 tsunami. Almost 75%

Participants from countries affected by the 2004 Indian Ocean Tsunami



were from Southeast Asia and South Asia. The remaining 25% were from a very diverse range of countries, including Ethiopia, Nigeria, Madagascar, Tajikistan, Iceland and American Samoa, among others, indicating there was strong interest in early warning systems as a tool to address multiple-hazard risks beyond tsunami events. A

The Proportion of Registrants Representing the Different Types of Organisations



wide range of organizations were represented, with the majority of participants being affiliated with non-government organizations, research and educational organizations, and government authorities (see Figure 2 above).

The forum was successful in bringing together people from across the region, and in enabling interaction between policymakers, practitioners, researchers and community groups. Several participants shared web links to key documents, case studies, networks, databases and websites relevant to this forum and these were collected and compiled on a resource page accessible on the site. An evaluation survey, sent to all registered participants, showed that 20% of registered participants had posted comments to the dialogue. Overall, most respondents (95%) said they had found the dialogue 'very useful' or 'useful' for their own learning. These lessons can be valuable in planning and implementing similar online forums in the future.

We would like to thank everyone who has participated in the online dialogue for early warning. A summary report of the overall project will be posted shortly on www.adpc.net/odew and the home pages of the host organizations.

For more information please contact

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ADPC Highlights in 2009

FEALAC Symposium

ADPC, in cooperation with MFA of Thailand and with funding support from Thailand International Development Cooperation Agency (TICA), hosted the first FEALAC Symposium on Pan-Oceanic Cooperation for Disaster Risk Reduction during 9 – 12 November 2009 in Bangkok and Phuket, Thailand. The Symposium was attended by delegates from 16 Asian and Latin American countries including Argentina, China, Colombia, Costa Rica, Ecuador, Guatemala, Indonesia, Laos PRD, Malaysia, Myanmar, Paraguay, Peru, Philippines, Singapore, South Korea, Thailand and Vietnam, as well as



scientists, experts and specialists on disaster risk reduction (DRR) from Asian Disaster Preparedness Center (ADPC), World Health Organization (WHO), Pan America Health Organization (PAHO), International Federation of Red Cross and Red Crescent Societies (IFRC), Emergency and Disaster Management and Administration - Bogota, International Research Center on El Niño (CIIFEN), Center for the Cooperation of National Disasters Prevention in Central America (CEPREDENAC), Andean Committee for Disaster Prevention and Assistance (CAPRADE) and Thai Governments' specialists.



The Meeting provided an opportunity for FEALAC member countries to discuss ways and means to strengthen the cooperation on sharing adaptation strategies and methodologies among the countries, discussing adaptation challenges, and creating a net-



work of technical support and information sharing from the FEALAC member countries from both sides of the Pacific Ocean.

FEALAC Symposium web page: <http://www.adpc.net/fealac/index.htm>

RECLAIM Regional Workshop

ADPC organized a meeting "Regional Meeting for discussion and promotion of Early Warning Mechanisms for Landslides in Asian Region" during 25 – 27 November 2009 in Bangkok, Thailand. Throughout the three-day meeting, all government representatives together with ADPC and Norwegian Geotechnical Institute (NGI) focused on three main topics: Mechanisms of rainfall induced landslides, Landslide monitoring techniques and Early warning systems (EWS).



Automatic wireless rain gauge system with GPRS, Patong City, Phuket, Thailand

ADPC, with funding support from the Royal Norwegian Ministry of Foreign Affairs and with technical assistance from NGI, has been working on Asian Program for Regional Capacity Enhancement for Landslide Impact Mitigation (RECLAIM) since 2004. The main objective of the RECLAIM program is to enhance the capacity of professionals involved in landslide risk management by promoting a dialogue between decision makers and professionals about the theoretical as well as practical aspects and issues and challenges related to landslide risk management.

During the phase I & II for the last four years, the RECLAIM program was implemented in seven target countries including Bhutan, India, Indonesia, Nepal, the Philippines, Sri Lanka and Thailand. At the RECLAIM phase III, three new countries have been added, namely Bangladesh, People's Republic of China and Vietnam. The phase III will put more emphasis on the use of early warning systems for landslide prone areas, which have advanced fairly rapidly over the last years.

Every year, Asia accounts for the highest number of disaster events and the highest number of fatalities and affected victims in the world. However, little attention has been paid for natural disasters with isolated occurrences and low death rate like landslides. In fact, however, the cumulative fatal impacts of landslides on human lives, properties, socio-economic dimensions and the environment are greater than cyclones and hurricanes. However, little efforts have been made by the stakeholder institutions to understand the social and technical dimensions of this serious issue and thereby to develop cost effective landslide mitigation solutions.

RECLAIM web page: <http://www.adpc.net/v2007/Programs/UDRM/PROGRAMS%20&%20PROJECTS/RECLAIMII/Default-RECLAIM.asp>

Chinese Delegates Visits

As requested by Jiangxi Provincial Government, People's Republic of China, ADPC organized a study visit for a group of Chinese delegations. The delegation consisted of five government officials from the Office of the Mountain-River-Lake Development Committee (MRLDO), Meteorological Bureau and Agricultural Department of Jiangxi Province led by Mr. Zhang Qihai, Deputy Director-General of MRLDO. The study visit on Community Based Disaster Risk Management and Climate Risk Management was held on 17 - 28 November in Thailand (Bangkok and Phuket), Indonesia (Jakarta and Indramayu) and the Philippines (Manila and Dumangas). Ms. LingLing Jiang, the project manager of China and East Asia, accompanied the delegation to visit Indonesia and the Philippines after conducting activities in Thailand.



Understanding the link between economic impacts of natural disaster and developmental planning



ADPC held a regional consultative meeting on 'Development of Pre-Disaster Natural Hazard Loss Estimation Strategy' during 14 - 15 December 2009 in Bangkok, Thailand. With support of the Ministry of Foreign Affairs of the Royal Norwegian Government, the two-day meeting brought disaster management professionals, specialists in national planning departments and ministries, as well as sector based development planning specialists together from Bangladesh, China, Philippines, Sri Lanka and Vietnam which are prone to natural hazards. The consultative meeting aimed at identifying the national needs and challenges and building the country ownership on a course curriculum development about pre-disaster natural hazard loss estimation. Participants of the meeting included Director General of Disaster Management Bureau, Bangladesh, Director General of National Disaster Reduction Center of China (NDRCC), China, Secretary of Ministry of Home Affairs, Nepal, Chief Economic Development Specialist of National Economic and development Authority (NEDA), Philippines, Director General of National Building Research Organization (NBRO), Sri Lanka, and Director General of Department of Dyke Management Flood and Storm Control, Vietnam. The meeting also invited stakeholders from international organizations such as World Bank, UNDP, UNESCAP and UNISDR.

Strengthening early warning institutional mechanism through stakeholder forum in the region

Towards enhancing the institutional linkages between the national early warning agencies and its user agencies, ADPC in collaboration with the National Meteorological Services (NMS) of Sri Lanka and Indonesia organized National Monsoon Forum on 26th to 30th November 2009 respectively. The objectives of the National Monsoon Forum are:

1. Ensure that weather, extreme events and climate forecast products, including their uncertainties and limitations, are understood by and communicated to users on a regular basis
2. Provide a platform for inter-agency coordination of policies and programs for dealing with potential impacts of climate-related hazards on seasonal basis
3. Encourage forecast applications for mitigating risks in various climate-sensitive sectors;
4. Provide a platform for understanding risks posed by/ opportunities brought about by past, current, and future climate
5. Provide a platform to foster a regular dialogue between early warning agencies and its users and to facilitate strengthening of end-to-end multi-hazard early warning systems in the country.

Department of Meteorology (DOM), Sri Lanka, convened the 2nd National Monsoon Forum in Colombo on 26th November 2009. A total of 43 participants from the 24 user agencies participated in the forum. In Indonesia, National Agency for Meteorological, Climatological, and Geophysical Agency (BMKG) convened the 3rd National Monsoon Forum in Jakarta on 30th November 2009, which was attended by 67 participants from 19 agencies.

Monsoon Forum a.k.a Early Warning Forum /Seasonal Climate Forum is a multi-stakeholder institutional mechanism anchored around the monsoon season in the country and held twice a year (before and after the monsoon). The forum aims to foster a constant dialogue between early warning agencies (information providers) and the users of its forecast products and services. Monsoon forum activity is supported under the regional project "Facilitating the Integration of Tsunami Warning by Strengthening Multi-Hazard Early Warning Systems in Sri Lanka, Viet Nam, Indonesia and the Philippines" funded by the American Red Cross.

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Zoonotic Disease Project: One Day Workshop



ADPC, with support of the Rockefeller Foundation, conducted a one-day workshop to identify the scope for a comprehensive curriculum on zoonotic disease in 8 December 2009. The workshop was intended to identify which subject areas are already well documented and have available content, and which subject areas represent gaps that need further development.

The final curriculum will be segmented into distinct modules that could be taught individually or together as the entire course. The module content will be modeled after the Harmonized Training Materials Package (HTP) developed by the Global Nutrition Cluster in collaboration with Nutrition Works. That curriculum, as in the case of the zoonotic disease curriculum, covered a broad range of subject areas which were required to meet the differing needs of governments and international agencies in different contexts.

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Upcoming ADPC Events

26 – 29 January 2010: ADPC is holding a workshop on Psychosocial Response to Disasters with a focus on Children in Asia. The three and a half day workshop will bring mental health and educational professionals who are working with children and teenagers together. The overall goal of the Workshop is to strengthen and sustain the national capacity in the management of psychosocial aspects of disasters and emergencies on children in Asia. For more info, please visit <http://www.adpc.net/v2007/Programs/PHE/PROGRAMS/PSYCHOSOCIAL/Default.asp>.

17 – 18 February 2010: ADPC is co-organizing a Regional Conference on 'Climate Change and Extreme Cyclones: Disaster Risk Reduction and Emergency Response in a Rapidly Changing World' with Bangladesh Disaster Preparedness Center in Dhaka, Bangladesh. The conference will provide a venue where stakeholders can share experiences, and bridge the gaps between extreme cyclone event and the rapidity to cope with such disasters and reduce its harmful impacts. For more information, please check the conference brochure at http://www.adpc.net/v2007/Downloads/2010/Feb/Conference%20Brochure_17-18Feb2010.pdf.

The 8th Meeting of the Regional Consultative Committee for Disaster Management (RCC 8)

will be held during 22 – 24 February 2010 in Manila, Philippines

The 8th RCC meeting is being co-hosted by the Office of the Civil Defence, National Disaster Coordinating Council of the Philippines and the Asian Disaster Preparedness Center, with support from the Government of Australia. The special theme of the 8th RCC Meeting will be on Implementing National Programs on Community based disaster risk reduction in High Risk Communities.

ADPC Regional Consultative Committee on Disaster Management has been established since 2000. The Committee comprises members of the ADPC Board of Trustees/ Advisory Council who are Heads of National Disaster Management systems of countries of the Asian region. The role of the Consultative Committee is to provide an informal consultative mechanism for development of action strategies for disaster reduction in the region and promotion of cooperative programs on a regional and sub-regional basis; so as to guide ADPC's work. To date, annual meetings have been held in 2000 and 2001 in Thailand, 2002 in India, 2004 in Bangladesh, 2005 in Vietnam, 2006 in China, and the 7th RCC meeting will be held in Sri Lanka in February 2008. Meetings are convened by ADPC and co-organized by the Government of the host country and have been attended by participants from over 30 countries. Deliberations have been focused on identifying priority needs of member countries for disaster reduction and on learning lessons from experience.

ADPC 2005-2008 Activity Report will be coming out soon.

ADPC Regional Training Schedule for 2010

4th Mainstreaming Disaster Risk Reduction into Local Governance (MDRRG-4)

25 – 29 January 2010 (1 week) Manila, Philippines
Fee: 1500 US\$

Disaster Management Course (DMC-39)

1-19 February 2010 (3 week) Bangkok, Thailand
Fee: 2700 US\$

9th Earthquake Vulnerability Reduction Course (EVRC-9)

1-12 March 2010 (2 weeks) Bangkok, Thailand
Fee: 2000 US\$

7th International Course on Hospital Emergency Preparedness and Response (HEPR-7)

8-12 March 2010
Fee: 1500 US\$

10th Inter-regional Course on Public Health in Emergency Management in Asia and the Pacific (PHEMAP-10)

17-28 May 2010 (2 weeks) Bangkok, Thailand
Fee: 2500 US\$ (by invitation for WHO/MOH participants)

5th GIS for Disaster Risk Management – introductory course (GIS 4 DM-5)

31 May – 11 June 2010 Bangkok, Thailand
Fee: 2000 US\$

Climate Risk Management: Science, Institutions, and Society (CRM-4)

June 2010 (to be announced) Bangkok, Thailand
Fee: 2500 US\$

19th Regional Learning Workshop on Community Based Disaster Risk Reduction (CBDRR-19)

19-30 July 2010 (12 days) Bangkok, Thailand

9th Training Course on Public Health in Complex Emergencies (PHCE-9)

12-24 July 2010 Bangkok, Thailand
Fee: 2400 US\$

End-to-End Multi-Hazard Early Warning Systems (EWS-3)

To be announced
Fee: 2500 US\$



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