

**LINKING DISASTER RISK REDUCTION,
ENVIRONMENT MANAGEMENT AND
DEVELOPMENT PRACTICES AND
PRACTITIONERS IN ASIA PACIFIC REGION:
A REVIEW OF OPPORTUNITIES FOR
INTEGRATION**

Working Paper

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Preface

The tragedy wrought by the 2004 Indian Ocean tsunami has resulted in the establishment of several innovative partnerships between environment, humanitarian aid and development organizations to find practical solutions for the lasting benefit of both people and nature in the Asia-Pacific region.

Long-term partners in Asia and beyond, WWF¹ and IUCN² each formed visionary alliances with the American Red Cross³ and CARE USA⁴, respectively in 2005. The primary aim in both cases is to reduce impacts of disasters by better integrating environmental sustainability into both reconstruction efforts in tsunami-affected countries, and into preparations for handling future conflicts and disasters anywhere in the world.

Building on this alliance, the four partners co-organized the inaugural National Conference on Community Disaster Risk Management in Thailand from the 22-23 January 2007 in Krabi, where a parallel workshop session on Environment and Community Disaster Risk Management was convened. The partners also submitted an article on their partnership to the third edition of the ISDR Informs Asia Newsletter.

Similarly, Stockholm Environment Institute (SEI) has embarked on a partnership with the International Federation of the Red Cross and Red Crescent Societies (IFRC) and the Sri Lanka Red Cross Society (SLRCS) with the overall objective to support the region's recovery from the tsunami by (i) generating knowledge, and (ii) building capacity of key regional partners in the areas of vulnerability assessment, sustainable livelihoods, and resilience building.

The linkage between environmental degradation and disaster risk has been a long-term area of interest at the Asian Disaster Preparedness Centre (ADPC)⁵. This has resulted in a proposal on the provision of regional training on the UNEP Awareness and Preparedness for Emergencies at the Local Level (APELL) program⁶ and the commissioning of the paper "Environmental Degradation and Disaster Risk" by Sida in 2004. ADPC was also commissioned by the Association of South-East Asian Nations (ASEAN) Secretariat to undertake a "Feasibility Study for Establishment and Operation of an ASEAN

1 WWF, the global conservation organization, is one of the world's largest and most experienced independent conservation organizations, with almost 5 million supporters and a global network active in more than 100 countries. WWF's mission is to stop the degradation of the planet's natural environment and to build a future in which humans live in harmony with nature, by conserving the world's biological diversity; ensuring that the use of renewable natural resources is sustainable; and promoting the reduction of pollution and wasteful consumption. WWF is known as World Wildlife Fund in North America, and as World Wildlife Fund for Nature elsewhere. www.panda.org

2 IUCN, The International Union for Conservation of Nature – is the world's largest and most important conservation network. The Union brings together 82 States, 111 government agencies, more than 800 non-governmental organizations (NGOs), and some 10,000 scientists and experts from 181 countries in a unique worldwide partnership. www.iucn.org

3 <http://www.redcross.org/>

4 CARE is a leading humanitarian organization fighting global poverty. Our mission is to serve individuals and families in the poorest communities in the world. Drawing strength from our global diversity, resources and experience, we promote innovative solutions and are advocates for global responsibility. We facilitate lasting change by strengthening capacity for self-help; providing economic opportunity; delivering relief in emergencies; influencing policy decisions at all levels; and addressing discrimination in all its forms. www.care.org

5 Disaster Management Systems team

*6 Production and Consumption Branch,
<http://www.uneptie.org/pc/apell/home.html>*

Emergency Response and Strategic Planning Institute for Environmental Disaster”⁷. ADPC’s commitment to establishing the linkages between environment and natural resources and disasters and disaster risk management is articulated in the Hanoi RCC5 Statement on “Mainstreaming Disaster Risk Management in Development (MDRD) and Enhancing Regional Cooperation” 2005⁸.

In the establishment of a disaster risk reduction and environmental management entity in Asia, it was acknowledged that the Laboratory of International Environment and Disaster Management, Graduate School of Global Environmental Studies, Kyoto University⁹, with its focus of research on developing a unique process-oriented participatory approach to environment and disaster management through direct involvement and ownership of the community, would be a valuable member in this endeavor.

Similarly, the UN/ISDR Regional Program for Asia and the Pacific is committed to strengthening the existing ISDR-Asia Partnership beyond the traditional disaster risk reduction community, by integrating environmental partners into this disaster risk reduction alliance.

Rationale

Taking action on disaster risk reduction and environmental management 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. The former will help to provide a common baseline and reference point for actors in various sectors, and will encourage complementarity and synergy; the latter facilitates effective engagement and partnerships.

The aim 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.

As alluded to in Thomalla et. al. (2006), there is a need to structure a multi-community dialogue and learning process between disaster risk management, the humanitarian response and the environmental management communities. In that light, the Disaster Environment Working Group for Asia (DEWGA) was founded in 2007 by six key agencies in the fields of interest: the Asian Disaster Preparedness Center (ADPC), CARE, International Environment and Disaster Management, Kyoto University (IEDM/ KU), IUCN, Stockholm Environment Institute (SEI) and WWF. The UNEP and UN/ ISDR subsequently joined as key support agencies.

⁷ http://www.adpc.net/dms06/sub_proj4_6.php

⁸ *Specific initiatives on mainstreaming of disaster risk management into the environment and natural resources sector are to:*

- *Include Disaster Risk Impact Assessment into Environmental Impact Assessment for new development projects;*
- *Link with the National Adaptation Plan of Action (NAPA) under the UN Framework for Convention on Climate Change; and*
- *Action on other environmental hazards and links between environmental degradation and disaster risks.*

⁹ <http://www.iedm.ges.kyoto-u.ac.jp/>

The goal of the Working Group is to encourage synergy, and to promote effective engagement and partnerships, between disaster risk reduction and environmental management actors to address global environmental change in an integrated manner. Specifically, the group works to:

- 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 programmes of work.
- exchange information on new and upcoming initiatives (e.g. events, programmes, research and publications) that provide structured opportunities to strengthen these linkages.
- actively promote integration of disaster risk reduction and environmental sustainability into respective work programmes.
-

While the geographic focus of DEWGA is the Asia-Pacific region, several subregions and countries are the current focus due to high levels of disaster risk, biological diversity and/ or value in risk reduction (presumed if not proven yet). This focus is reflected in the current draft of this working paper, namely: China and Japan (Northeast subregion), Bangladesh and Nepal (South), Indonesia and the Philippines (Southeast) and Cambodia and Vietnam (also in Southeast Asia, *i.e.* Greater Mekong Sub-region).

It is planned to expand this scope to include remaining sub-regions (as classified by UNEP): Central Asia and the South Pacific. Nonetheless, there are references to efforts in these sub-regions in the text to provide a sense of plans and activities in the broader environs.

Executive Summary

Goal 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 multi-disciplinary 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);
- 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 UN/ISDR Global Platform on Disaster Risk Reduction, in the regional context, *e.g.* agreed next steps

Scope of the study

The study focuses on the interfaces between these three areas: (i) Disaster-Environment convergence; (ii) Development-Disaster convergence; and (iii) Disaster-Environment-Development convergence. The Figure 1 illustrates the scope of the study and Table 1 shows the strategic entry points for the integration to be taken in the Asia-Pacific region.

Figure 1: Scope of the study

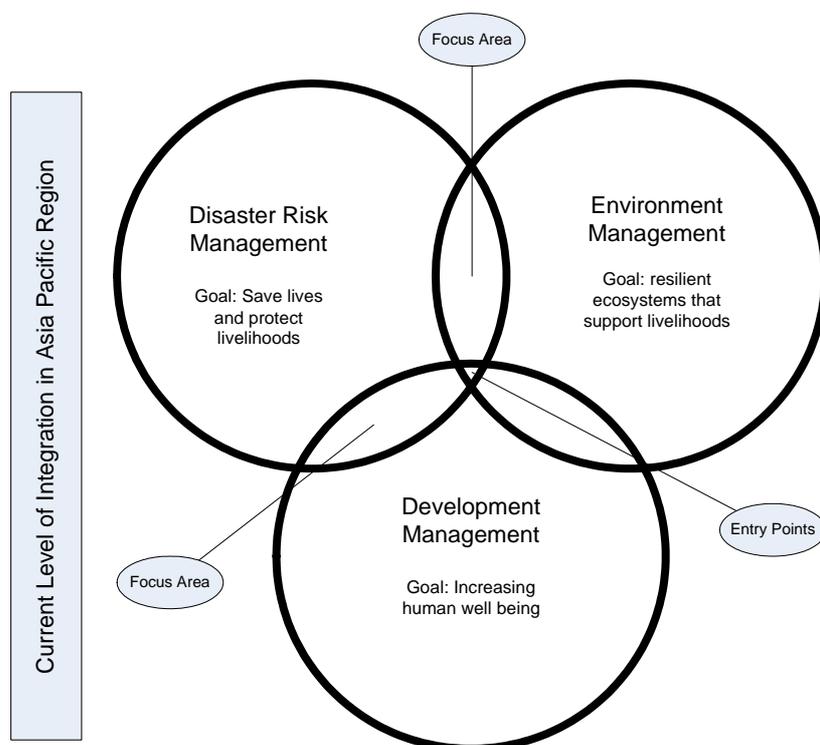


Table 1: Strategic entry areas for integration

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

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 Programmes 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 are 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 Programmes 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 Programmes 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

- Local integration strategies (entry point for all types of disasters)
- Climate change adaptation strategies (particularly for hydro-meteorology related disasters such as floods, typhoon, drought)
- Natural resource management: mangroves, coral reefs, water catchments, forests (particularly for landslide, flood, typhoon, drought)
- Coastal zone management (particularly for tsunamis, storm surge, flood, beach erosion)
- Urban management (particularly for flood, storm)

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Introduction

The environment and disasters are inherently linked. 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. Furthermore, effective and economical solutions to reduce risk can be overlooked.... Although the links between disaster reduction and environmental management are recognized, little research and policy work has been undertaken on the subject. The concept of using environmental tools for disaster reduction has not yet been widely applied by practitioners.

Source: Living with Risk (ISDR 2004)

There is a clear need to reinforce the importance of environmental concerns in the entire disaster management cycle of prevention, preparedness, assessment, mitigation and response and to integrate environmental concerns into planning for relief, rehabilitation, reconstruction and development. This will also require the enhancement of capacities to undertake short and medium-term activities in disaster management based on long-term environmental considerations.

Source: Klaus Toepfer (UNEP 2005a)

The International Decade of Natural Disaster Reduction (IDNDR) concluded that “environmental protection, as a component of sustainable development and consistent with poverty alleviation, is imperative in the prevention and mitigation of disasters” (ISDR 2002). Similarly, in 2002, a group of experts from the global change and disaster management communities met in Berlin and prepared a declaration that was presented at the WSSD (WSSD) in Johannesburg, South Africa. The declaration pointed to increasing evidence that environmental change and disasters are linked. Recently the UN/ISDR Environment and Disaster Working Group have also consolidated that notion. In their “Environment and Vulnerability: Emerging Perspectives” report, it is recognized that natural resource exploitation, urban development and environmental degradation all directly affect risk. Changes in weather intensities, circulation, hydrology, and sea level brought about by climate change have increased risk. The loss of ecosystem services that regulate floods and fires increases the vulnerability of vast populations in densely populated coastal areas and flood plains (ISDR 2007). In contrast, the consequences of disasters can be devastating for aquatic and land-based ecosystems. Urban infrastructure can reduce disaster risk, but in many cities where drainage, drinking water, sanitation and solid waste management are inadequate, they compound risk, while being further eroded by floods and storms (Schipper and Pelling 2006).

Moreover, the HFA, Millennium Declaration and UN Millennium Ecosystem Assessment have different points of departure but come to the similar conclusion that environment degradation, poverty, and disaster risk share common causes as well as common consequences for adverse effects on human security and well being. They also make clear that ecosystem services, environmental management and environmental information offer opportunities to reduce risk, decrease poverty and achieve sustainable development. disaster risk reduction must be incorporated, therefore, into the Millennium Development Goal process (ISDR 2005). While international frameworks have recognized the inherent links between disaster reduction, development, and environmental management, little research and policy work has been undertaken on the subject (ISDR 2002).

Although at present the environment management tools are not systematically integrated within the disaster risk reduction framework and vice versa, but it is important to be realized that the environmental tools were primarily developed from a risk management approach (ADPC 2006). For example, elements of the environmental management tools include risk assessment, hazard identification, spill response, and emergency/contingency planning. Those activities are central to the practice of disaster risk management. Other aspects of environmental management address such issues as water quality, protection of flora and fauna, and general health of the ecosystem, all of which may be affected by decisions and actions taken in the pursuit of disaster management (Labadie 2006).

In order to support advocacy, and to facilitate the design and implementation of environmentally sound solutions to the challenges posed by natural hazards, there is an urgent need to structure a multi-community dialogue and learning process between the disaster risk reduction, the humanitarian response and the environmental management communities. This scoping study, therefore, identifies and analyses available resources that link environmental issues and management with disasters and risk reduction efforts in the Asia-Pacific region in order to:

- Build a body of knowledge and expertise on mainstreaming;
- Provide a practical and common basis for practitioners from various sectors to discuss and agree on concrete plans and activities to advance mainstreaming; and
- Recommend strategic entry points and platforms for mainstreaming at the regional level.

This paper bases its analysis on case studies, examples, and the results of the questionnaires and interviews of practitioners and organizations working in environment, disaster, and development fields.

Disaster and Environment Linkages

Around the globe, land use and land cover changes are eroding the natural buffers that protect communities from hazard risk. These same changes often erode people's capacity to recover from disaster. Other environmental changes, such as anthropogenic global warming, promise to create new challenges to the security and sustainability of communities around the world. There are, however, opportunities to reduce disaster risk, and enhance community resilience. The impacts of disasters, whether natural or man-made, not only have human dimensions, but environmental ones as well (UNEP 2005a).

Worldwide, people in 'marginal' locations – on hillsides, on riverbanks, in floodplains – are experiencing increased disaster risk (IFRC, 2002). Research has shown us that many who live in such marginal areas have little choice in the matter. Most often, their choice of locations to settle mean they are left to select the “less worse” option (UNDP, 2002: 3). In the new millennium, there are more poor people (UNDP, 2006), and more living in marginal areas (ISDR, 2004; UNDP, 2004). But there are also many living in areas that are undergoing a transformation for the worse. Often, human activities are to blame for these environmental changes in the landscape. The Millennium Ecosystem Assessment identified that human activities – particularly agriculture and land-use change – are the primary drivers of ecosystem change and degradation (MA, 2005). Sometimes human activities consciously impact the environment, such as through deforestation for timber. But mostly human activities have negative impacts on the environment as a consequence of the way they are carried out. For example, energy production, industrial development and expansion of agricultural lands are all necessary activities to meet the needs of our growing global population, but these activities emit greenhouse gases and other pollutants causing climate change, acid rain and air pollution, contribute to biodiversity loss and depletion of water resources, which lead to a host of other environmental problems.

At the same time, it is becoming clear that environmental degradation is one of the underlying causes of disaster risk. Ample evidence indicates that better environmental information and/or environmental management could effectively support disaster risk reduction, post-disaster response and environmental and humanitarian recovery efforts. This has led to increased understanding of the contributions that natural systems make in reducing the impacts of disasters, the environmental consequences of disasters and of post-disaster recovery. But recent initiatives have focused almost exclusively on the social and development aspects of risk, emphasizing human vulnerability to hazards, and forgetting the vital component played by the environment in causing or reducing that vulnerability. It is the role of activities leading to environmental degradation that is the most frequently overlooked. To protect the environment as well as reduce disaster risk, we need to ensure that we understand the complete cycle of human-environment interactions. Disasters are traditionally defined by their impacts on humans. But taking the perspective that the environment provides a vital underlying resource base for human survival means that without environmental well-being, we cannot have human well-being. Thus, disaster impacts on the environment also lead to disasters for humans.

This section provides a conceptual explanation of the interlinkages between environment, disaster risk and development. The bottom line is that disasters do not occur 'by accident'. Underlying social, political and environmental factors determine the extent of the impact. But disasters also change the environment, and this change needs to be considered in planning and institutional design. Recognizing the environmental component of disaster risk reduction and integrating disaster awareness into environmental management are vital for sustainable development.

Impacts of environmental degradation on disasters

Environmental protection as a component of sustainable development consistent with poverty alleviation is imperative with the prevention and mitigation of disasters.

Principle 9, Yokohama Strategy

The role of environment in disaster risk reduction may be difficult to pin down. Early hazard studies, described the environment as 'dangerous' (e.g. Burton et al. 1978), associating the threat of danger with the environment. The terms 'environmental hazards' or 'environmental disasters' still appear frequently. In part, it is because disasters are associated with their triggering hazards, and when the hazards are so-called 'natural', this implies that they involve 'forces of nature', in particular extreme weather events. Weather is considered part of the environment, but is a flood a part of the environment? No doubt floods perform vital ecosystem services that include depositing nutrients land, which enhances the fertility of the land, and when they result in temporary wetlands, they provide vital breeding habitats for many kinds of species such as birds and amphibians. With a recognition that global environmental change is a reality, and an underlying acknowledgement of the role of human behavior, planning and decisions in determining how hazards affect society, scientists are also becoming aware of the mutuality between human activity and environmental change. It is with this recognition that an understanding has emerged that disasters do not come from the environment, but rather contribute to and are driven by environmental change and degradation.

The rapid loss of forestland around the world is changing the rainfall patterns (de Koninck 1999). Deforestation is not only linked with decreased rates of evapotranspiration, but also a reduction in moisture flow and water retaining capacity. These changes have been linked with large-scale deforestation, and have led either to drought and desertification or soil erosion, debris flow and floods. In fact, river and lake floods are aggravated by deforestation, which, in turn, causes erosion and clogs rivers. Water quality and quantity in the downstream areas are heavily affected due to the damage to the vegetation in the catchment areas, which reduce agricultural productivity in the downstream areas (Trong Cuc et al. 1996).

Studies show that river catchment areas that are largely deforested or wetlands that have been drained create very different hydrological regimes (Pearce 2001). When this factor is added to the climate change, it appears to be affecting the timing and pattern of the rainfall. Eventually, the rainfall may become more erratic. In this regard, the timing and volume of expected flooding are becoming more unpredictable. Impacts of deforestation are being felt more severely in the highlands, but they will eventually affect the lowlands: as rivers silt up, this affects croplands in the lowlands that depend on these waters. Flooding of cities will become more pronounced. According to Wang (2004), the world has seen many 'natural hazards' happening frequently due to environmental degradation recently.

The unsustainable over-use of resources causes pollution and ultimately leads to environment degradation. In particular, there is an increasing likelihood of human induced climate change which according to the latest projection of the Intergovernmental Panel on Climate Change, will result in more water related disasters especially for countries in tropical and sub-tropical latitudes (WMO&GWP 2006). These changes in temperature and related local rainfall variations affect the environment through accelerated desertification, land degradation, the availability of water resources as well as reducing the overall agricultural output. In addition, climate change is expected to affect sea levels and cause climate extremes. All these factors have a compounding effect on the occurrence and impact of disasters.

Many mangrove swamps and coastal forests are under severe threat from various river basin development activities and flood management projects. Flood prevention projects distort the flow variability and can

cause severe deteriorations of the coastal ecosystems. The degradation of mangrove forests significantly impairs their important functions such as shoreline stabilization and storm protection. The coastal forests become too degraded to absorb the energy of coastal storms, thereby increasing the flood and storm risks in the coastal zone.

Meteorological and hydrological events, such as typhoons, are hazards that cause heavy rain, high wind and sea surges. But the real damage also happens due to the vulnerability of the people who lie in its path. Post-disaster assessment of hurricanes and typhoons have clearly illustrated that, along with disaster preparedness, proper management of the environment – its air, land, water, forests, and wastes, go a long way in reducing the risks and vulnerabilities associated with typhoons. Environmental degradation, combined with human activities, is at the heart of numerous catastrophes such as flooding, desertification, fires, as well as technological disasters and transport accidents.

Some of the global environmental themes include – changing unsustainable patterns of consumption and production, climate change, desertification, drought, forests, industrial development, protecting and managing the natural resource base of economic and social development, waste management, water, etc. – all within the overall purview of disaster management and vulnerability.

Impacts of disasters on environment

It is important to look at the impact of disasters on the environment, as damage to environmental resources affects the environmental sustainability and poses challenges in achieving the MDG7 – ensuring environmental sustainability. Natural disasters are one of the factors directly causing environmental degradation. Natural disasters impair the resiliency of natural systems to disaster-related impacts. As a consequence, natural systems are left poorer. Several disasters in recent past highlighted the intrinsic environment disaster linkage not only in developing countries, but also in the context of developed countries such as Japan, USA, and Europe. Typhoons 21 and 23 of 2004 of Japan have shown critical needs to interlink disaster and environmental issues. While environmental degradation causes disasters, the impact of disasters are far-reaching, affecting the environment. The Typhoon 23 produced 48,000 tons of waste products in Toyo-oka city of Hyogo Prefecture of Japan, which amounted to 1.5 year of total waste production of the city (UNEP 2005b). This not only posed a significant threat to the city’s waste management system, it had far-reaching implications to the economy and natural environment.

Two specific issues are becoming increasingly prominent from an environmental perspective: impact on the natural environment, and impact of man-made environment. While the natural environment includes the ecology of the affected areas, waste issues are the main issues of man-made environment.

Impacts of Indian Ocean tsunami on mangroves, coral reefs, sea-grass, flora and fauna in the affected areas have been assessed with salient environmental issues. The urban and semi-urban areas where the illegal settlements and fisherman’s colonies encroached upon the sea-side areas, especially the areas which were supposed to be the protected areas under coastal regulatory zone (CRZ), witnessed considerable loss of life and habitats and damage to the livelihoods of the communities (Shaw 2006). Moreover, many of the areas were water logged after the tsunami. Water has not receded from these areas, and most of these land areas are agricultural land. Also, some of the land areas are continuing to face problems with water logging during high tides.

Debris, which often resulted from the destruction of earthquake, tsunami, or floods pose an enormous problem for effective management. Also, tsunami waves, storms, or floods brought timber and wood materials, that were deposited on the agriculture land, which also made the land unusable. In general, different types of disasters have different types of impacts on the environment, and vice versa, are exacerbated by different factors of the environment. The following table provides an overview of the various impacts and factors.

Table 1: Samples of environment and disaster linkages

Earthquake	
Potential environmental impacts	Natural gas leaks, household and industrial chemical releases from damaged containers. Damage to industrial facilities resulting in toxic release. Building waste debris, and potential mix of hazardous materials
Exacerbating environmental factors	Topography and land cover Building codes and urban planning/urbanization processes

Flood, storms, hurricanes, typhoons, cyclones	
Potential environmental impacts	Sewage overflow and chemical releases from roads, farms and factories; Hazardous debris, chemicals, medical and other materials as disaster debris; water-damaged household chemicals (paint, pesticides, solvents); unsafe water supplies Ground and surface water contamination Loss of topsoil due to rapid drainage or surface runoff.
Exacerbating environmental factors	Habitat and ecosystem destruction (e.g. coral reefs and mangroves) Deforestation and water siltation Urbanization and land use/land cover changes
Forest fires	
Potential environmental impacts	Loss of biodiversity and ecologically sensitive habitats. Air pollution from smoke and haze
Exacerbating environmental factors	Climate change Deforestation and land use/land cover changes
Droughts	
Potential environmental impacts	Habitat and crop destruction Water scarcity
Exacerbating environmental factors	Urbanization and unsustainable resource consumption Deforestation and land use/land cover changes
Landslides	
Potential environmental impacts	Damage/deterioration of habitat ecosystems Land use functions, including agriculture Ground and surface water contamination
Exacerbating environmental factors	Deforestation Land use/land cover changes

Source: Srinivas and Nakagawa 2008

As exemplified above, it is of utmost importance to incorporate the environmental issues both natural and social aspects in disaster management. Thus, there is a strong need to make a synergy of environment and disaster issues.

Disaster and development linkages

Impacts of disasters on Millennium Development Goals

Disasters do not occur randomly. In most cases, they are the consequence of the interaction between a hazard and a situation that is highly vulnerable to the hazard. Disasters reveal the underlying problems both in society and environment. Unfortunately, they often contribute to worsening many of these problems.

It is no secret that disasters are eroding decades of effort in development, in terms of political progress, social and educational issues and infrastructure and technological development (ISDR 2007). Take the case of the Sri Lanka following the 2004 Indian Ocean tsunami: disagreement over whether the rebel-held northern and eastern parts of the country should receive aid money for reconstruction led to reigniting the dormant civil war for which a ceasefire was agreed in 2002. The country is now at the brink of another war. It is for this reason that the Inter-American Development Bank (IADB) says that disasters are “clearly a development problem” (IADB, 2000: 1). Several studies have highlighted the painful truth that money invested in development is wasted unless precautionary action is taken toward reducing disaster risk (DfID, 2004, UNDP, 2004; IADB, 2000). So why do such investments continue to take place without reliable risk management frameworks in place? While many development agencies have disaster response units, only very few consider the need to integrate a precautionary vision into design and management of projects (Comfort *et al.*, 1999). The more money invested in development without risk awareness, the more money is lost when a disaster occurs. But many of the poorest are the most vulnerable to being affected by disasters, because of their unfavorable position in society, which often pushes them to settle on the most marginal lands. And development investments are needed to raise these individuals out of poverty. Yet disasters often push people into poverty – how can this vicious cycle be broken?

There is another component to the cycle: the state of the environment. Environmental degradation is directly related to poverty (DfID *et al.*, 2002; Mainka *et al.*, 2005), particularly in developing countries and heavily populated coastal areas. People who live in environmentally degraded areas, for example where soil erosion has been heavy leading to loss of soil fertility, like in northern Ethiopia, struggle on a daily basis to survive. When ecosystems are not healthy, ecosystem services that all humans rely on cannot take place.

Environmental degradation is also a consequence of development along an unsustainable trajectory. Development problems caused by urbanization, industrialization and conflict are accompanied by growing risk of acute environmental emergencies. In many places around the world, people have been forced to deplete natural resources to a point of complete degradation simply because there are no other livelihood alternatives. The process of development also carries with it environmentally damaging activities, such as land clearing for settlement or agricultural expansion, redirecting of rivers for agricultural, domestic or industrial purposes, and pollution – including greenhouse gas emissions. The trade-offs between development and environment were recognized by the World Commission on Environment and Development, and since the early 1980s, the concept ‘sustainable development’ has attempted to encourage environmentally, socially and economically sound development.

Disasters adversely affect economic growth, sustainable development, and intensifying poverty. For example, in Vietnam, when disasters happen they clearly negate many achievements of the national socio-economic development process. Only in the last 5 years of the 90s (1996-2000), disasters caused damages and loss of US\$ 2.3 billion, and killed on average 2117 people (CCFSC, 2006). Moreover, disasters have displaced families who become refugees as they are forced to migrate elsewhere. In Vietnam, flood disasters and their aftermath also significantly impact on social systems, both within the household and within the community at large. According to Tran *et al.* (2007), in central Vietnam after severe flooding, the community cohesion was stronger at first, but then broke down due to the pressure of the flooding and the recovery process. Furthermore, there was a high rate of out-migration, particularly during the flood season when the main laborers migrated to cities in search of jobs. This left the people at home living more ‘at risk’, especially the infirm and elderly, and the communes remained without adequate human resources for flood response and recovery. In addition, annual flood prevents many children from going to school during the flood season. This might cause a large number of children to permanently drop out of school (Tran *et al.* 2007).

Disasters intensify the poverty gap in the population and rapidly increase the poverty rate, especially in disaster-prone areas. In fact, poverty and vulnerability to disasters are integrally linked and mutually reinforcing (Wisner *et al.* 2004). The poor are forced to exploit environmental resources for survival, thereby increasing both the risk and exposure to disasters, in particular those triggered by floods, drought and landslides. Deforestation and agriculture on marginal land, or destruction of forests for firewood collection, are often induced, or at least exacerbated, by poverty. These practices directly affect the natural environment, and may hurt the very resource base that these poor people are depending on. Indeed, the rural communities, which depend on resource-based activities, are the worst sufferers of the disaster impacts (Shaw 2006). Furthermore, disasters also have negative impacts on the Eight Millennium Development Goals (Schipper and Pelling, 2006; DFID 2004).

MDG1: Eradicating extreme poverty and hunger

It is proven that human vulnerability to natural hazards and income poverty are closely linked. At the national level, reducing disaster risk is often contingent upon alleviating poverty and vice versa. Exposure to hazards can play a critical role in places where poverty expresses itself as a lack of entitlements to basic nutritional needs. Hunger reduces individual capacity to cope with disaster stress and shock and disasters can destroy assets leading to hunger. The economic and political underpinnings of hunger, particularly within complex political emergencies, are well documented.

MDG2: Achieving universal primary education

Lack of education is an important determinant of human vulnerability and marginalisation. Basic literacy and numeric skills enable individuals to become more engaged in their society. Broadening participation in development decision-making is a central tenet of disaster risk reduction. The destruction of schools or use of schools as shelters during and after a disaster are direct ways in which disasters can inhibit educational attainment, but perhaps more important is the drain on household resources that slow and sudden-onset disasters inflict. Households frequently have to make difficult decisions on expending resources on survival and coping with poverty, or on investments (such as education and health care) to alleviate human vulnerability and enhance longer-term development prospects. Unfortunately, for the poorest, there is little choice and human vulnerability deepens as resources are targeted towards survival.

MDG3: Promoting gender equality and empowering women

Facilitating the participation of women and girls in the development process, including efforts to reduce disaster risk, is a key priority. Women across the world play critical roles in the shaping of risks in development. In some contexts, women may be more vulnerable to hazards.

For example, those with responsibilities in the household may be more exposed to risk due to unsafe building and from local hazards stemming from inadequate basic services or exposure to smoke from cooking fuel. At the same time, women are often more likely than men to participate in communal actions to reduce risk and enhance development. Orienting disaster risk policy so that it builds on the social capital represented by women can enable a more informed development policy. As criticisms of participatory development indicate, achieving such a model will not be easy, but best practice does exist to point the way.

When women face barriers in participating at higher levels of decision-making, this severely affects the skills and knowledge available for sustainable development and risk reduction. Overcoming disparities in access to education is a fundamental component of the disaster risk reduction agenda.

MDG4: Reducing child mortality

Children under five years of age are particularly vulnerable to the impacts of environmental hazards ranging from the everyday risks of inadequate sanitation and drinking water to death and injury following catastrophic events and their aftermath. The loss of care givers and household income earners and the stress of displacement can lead to heavy toll on the psychological and physical health of children under five years of age. Policies aiming to support sustainable development paths by reducing child mortality need to build in strategies to limit or reduce disaster risk.

MDG5: Improving maternal health

As environmental hazard stress or shock erodes the savings and capacities of households and families, marginal people within these social groups are most at risk. In many cases it is women and girls or the aged who have least entitlement to household or family assets. Maternal health is a strategic indicator of intra- and inter-household equality. Reducing drains on household assets through risk reduction will contribute to enhancing maternal health. More direct measures through investment in education and health will similarly contribute to household resilience as maternal health indicators improve. Children have already been identified as a high-risk group and maternal health plays a part in shaping the care received by young children.

MDG6: Combating HIV/AIDS, malaria and other diseases

The interactions between epidemiological status and human vulnerability to subsequent stresses and shocks are well documented. For example, rural populations affected by HIV/AIDS are less able to cope with the stress of drought because of a shortage of labor. Individuals living with chronic terminal diseases are more susceptible to the physiological stress of hunger. For diseases transmitted through vectors, there

is a risk of epidemic following floods or drought, similarly the destruction of drinking water, sanitation and health care infrastructure in catastrophic events can increase the risk of disease.

MDG7: Ensuring environmental sustainability

Major disasters, or the accumulation of risk from regular and persistent but smaller events, can wipe out any hope of sustainable urban or rural environments. Again, the equation works both ways. Increasing destruction due to landslides, floods and other disasters related to environmental and land-use patterns are a clear signal that massive challenges remain in achieving this Goal. The target of achieving a significant improvement in the lives of at least 100 million slum dwellers by the year 2020 will be impossible without developing policies to address their vulnerabilities to earthquakes, tropical cyclones, floods and droughts.

MDG8: Developing a global partnership for development

Efforts to enhance sustainable development and reduce human vulnerability to natural hazards are hampered by national debt burdens, terms of international trade, the high price of key pharmaceutical drugs, lack of access to new technology and new hazards associated with global climate change. Difficulties in reaching international agreement on a range of issues, for example at the WSSD in Johannesburg in 2002 and the World Trade Organization meeting at Cancun in 2003, highlight the scale of efforts needed to build a global partnership for development that might contribute to disaster risk reduction. Examples of progress at the international level include cooperation between states at high risk from disaster that has increased their negotiating power. In the case of small island developing states, the Alliance of Small Island States has been active in climate change talks. Within the machinery of international organizations, the ISDR Task-Force can be considered a good example of global partnership for development and disaster risk reduction.

The Millennium Declaration recognizes the risk to development stemming from disasters in Section IV, entitled “Protecting Our Common Future” with the objective to “intensify our collective efforts to reduce the number and effects of natural and man-made disasters.”

But since vulnerability and hazard, which leads to disasters, are conditioned by human activities, reducing the number and effects of disasters means tackling the development challenges. Although every development initiative is a step towards achievement of the respective goals, the process adopted determines the extent to which disaster risk is reduced. Thus, unless disaster risk considerations are factored into all development related to the MDGs, well-meaning efforts to increase social and economic development might inadvertently increase disaster risk (UNDP, 2004)

At the half-way point in the MDG target period, much remains to be achieved in the remaining time in order to attain the goals. Countries cannot consequently afford to set back their development because of disaster risk. This calls for strategies for action to achieve MDGs without accumulation of disaster risk.

Impacts of development activities on frequency and severity of disasters

‘Rarely do disasters just happen- they often result from failures of development which increase vulnerability’

(Secretary of State of International Development, DFID).

Sometimes development-related activities are the basis for exacerbating existing vulnerability or causing vulnerability where there was none before. Though not intentional, these pose serious challenges to poverty reduction and achieving other MDGs. For example, a common practice among road designers is to make the road higher than the expected design flood level, thereby ensuring uninterrupted access while floods are in full flush. Sometimes this creates a dilemma because the road embankment itself creates higher flood levels on the uphill side of the road and which can exacerbate flooding of homes and other infrastructure.

Rapid urban growth is one of the key reasons for the increase in disaster risk. With a steady growth in the economy, the countries of the Asia-Pacific region are challenged with growing rural-urban migration. This

has resulted in higher population densities in the urban areas, unplanned development of complex infrastructure and poor governance; all leading to an increase in vulnerability to natural hazards. In particular, people in lower-income communities with fewer resources are compelled to gravitate to marginal lands such as floodplains and riverbanks and which are highly vulnerable to flooding.

Thus these urban centers often form hotspots where the probability of occurrence of large-scale disasters involving significant mortality, economic loss or both is very high.

Though urbanization diversifies economies and improves living standards for many. However, experiences from the Pacific indicate that urbanization displays ‘a lack of vision of the kind of economic, social and physical environment desired by town dwellers...an absence of appropriate policies, and poor urban management and service delivery’ (*World Bank*), all of which may contribute to increasing disaster risk. As a result of the migration, younger generations often lack strong links with their traditional village communities and thus the safety nets which have been developed by Pacific Island societies over hundreds of years are weakening. There are an increasing number of people living below the poverty line in urban areas, and squatter and informal settlements and increasing unemployment are all increasing vulnerability to hazards. This also has direct links to the urban infrastructure issues like water supply, sanitation, waste disposal, etc. In particular, the waste disposal municipal garbage dumps are usually located on or near coastal areas. They are inadequately sealed for flooding or sea water infiltration, creating a potential environmental hazard.

Examples of unplanned industrialization resulting in environmental degradation are also seen in many countries in the Asia-Pacific region. For example, 1996 witnessed a fish kill in Manila Bay where 30,000 kilos of dead fish were found floating in the bay’s shallow shores. The investigation revealed that the fish died of low oxygen levels and internal bleeding when their internal organs absorbed toxic chemical which could be traced to the industrial refuse from the various factories located in Manila Bay. The fish kill disrupted the livelihoods of thousands of fishing families and thus impacted on the economy of the region.

With such obvious anticipated results the question could be raised: why does development overlook disaster risk? Perhaps the reason is that incentives are stacked against disaster risk reduction. It is a long-term, low-visibility process, with no guarantee of tangible rewards in the short term, neither for politicians in affected countries nor for donors. Another reason could be the mismatch between the temporal scale of the problem and the standpoint from which policymakers make key decisions. Therefore dealing with it provides little incentive for most elected policymakers, given more tangible and politically pressing concerns.

It is essential is to make sure the message that disaster risk reduction is everybody’s business reaches the decision makers and other stakeholders in a language they understand. Officials from planning and finance agencies should be provided with simple cost-benefit analyses. Finally, the benefits of disaster risk reduction should be demonstrated through high-visibility projects, which can be later up scaled.

Disaster risk reduction and environment

The Asia-Pacific Region is characteristically heterogeneous in terms of culture, society, political ideology and natural resources and ecosystems, and it thus becomes difficult to find a one-size-fits-all solution. Yet, there is a clear shift towards identifying and addressing disaster risks. People involved in wider issues of development are emerging as potential collaborators in reducing disaster risk. These include policy makers involved in environmental management, climate variability and change, natural resource utilization, regional planning, and the construction or protection infrastructure, education, communications and public administration. Following are some of the environmental strategies, plans and platforms that try to address the issues of environmental management as a tool for disaster risk reduction.

Environmental strategies and plans related to disaster risk reduction

1.1.1 Global environmental vulnerability index

The global environmental vulnerability index developed by South Pacific Applied Geosciences Commission (SOPAC) is a research tool to understand the effects of environmental processes and vulnerabilities, as well as the linkages between environmental vulnerability and human welfare. More information can be found at: <http://www.vulnerabilityindex.net/>

1.1.2 Vietnam's national plan for environment and sustainable development

The Vietnamese plan for the environment and sustainable development provides a good example of a comprehensive framework to address environmental planning and management that integrates disaster planning and mitigation. It has a wide variety of components including appropriate organizational structures, well-integrated environmental policies at the sectoral level and environmental legislation. Priority projects and programs address improved methods of data collection and management, environmental impact assessment procedures and monitoring systems. The mandate of the central environmental authority includes coordination of disaster management. The plan also identifies opportunities for regional cooperation in environmental management for sustainable development that include disaster reduction, combating the effects of climate change and anticipated sea-level rise, integrated management of watersheds, catchment areas and floodplains through forest management, and soil and water conservation.

1.1.3 The National Adaptation Programme of Action (NAPA) of Bangladesh

The Bangladesh NAPA, prepared by Ministry of Environment and Forest, Government of the People's Republic of Bangladesh, in November 2005, has identified disasters as one of the key environmental stresses. The Report has a separate section on disaster and its impacts. The report also lists down priority activities and some of the projects under it identify the implementing agency as Ministry of Environmental and Disaster Management Bureau.

Like most state of environment reports, the Bangladesh 2001 State of Environment report is prepared with the support of UNEP, and has a well-developed and detailed section on disasters. The report describes in detail the disaster management bodies, their main function and responsibilities in mitigating the impacts of disasters. It includes the following information:

- General introduction on the types of disaster affecting the country;
- Pressures on the environment that exacerbate disasters including geographical settings, physical, hydrological and other environmental pressures;
- State of disaster: floods, cyclones, droughts, abnormal rainfall, hailstorms, electrical storms, tornadoes, earthquakes and erosion;
- Impact of disasters: climate change, agriculture, salinity intrusion, fisheries, ecosystems and biodiversity; and
- Present and future mitigation responses.

Though the report describes in detail the disaster trends in the country, there is no analysis illustrating the correlation between environmental change and disaster risk.

1.1.4 National Environmental Management Action Plan of Bangladesh

NEMAP (National Environmental Management Action Plan) of Bangladesh has incorporated disaster risk reduction as an important issue to be addressed. The National Environment Management Action Plan (NEMAP) is a plan of the Government of Bangladesh prepared by the Ministry of Environment and Forest (MOEF, 1995) in consultation with a wide range of stakeholders and published in 1995. Development of NEMAP was undertaken with the objectives of identifying key environmental issues, conserving nature, reducing environmental degradation, promoting sustainable development and

generally raising the quality of human life. It was developed in three phases over the period 1992-1994. All actions as outlined in the plan have been grouped under the following categories:

- Institutional
- Sectoral
- Location Specific
- Long-term Issues

The NEMAP has identified the key environmental issues in various sectors including water resources. Inadequate planning of the Flood Control, Drainage and Irrigation (FCDI) projects and failure to consider their wider impacts has, in some cases, led to environmental degradation; poor drainage of wetlands, flooding, water logging, siltation and salinization (MOEF, 1995). Some of the suggested solutions include excavation of water bodies, provision for adequate culverts and bridges for the flow of flood water, adopting flood proofing measures, and providing compensation for project-affected people. It has suggested a design review of FCDI projects taking environmental concerns into consideration. It also emphasizes that consideration of cross-sectoral environmental issues should be ensured, and recommends developing institutional capacity within Planning Cells to incorporate environmental concerns with an on-going coordination role with MOEF. The Department of Environment (DOE), as the technical agency of the MOEF, looks after environmental planning, management, monitoring and enforcement.

1.1.5 Regulation of Environmental Clearances for Port Project of India

In India, the regulation of environmental clearances for port projects requires an EIA report, an environmental management plan. The regulation specifies that the disaster management plan should be prepared on the basis of a risk analysis considering worst case scenarios with respect to specific case such as oil or chemical spillage, fire, explosions, sabotage and floods.

Disaster risk reduction strategies and plans

In Asia-Pacific region, most national governments promulgate their disaster risk reduction policies through disaster management plans. These plans are developed by the countries at the national and sub-national levels. For example, in Vietnam does not have National Disaster Management Law but addresses risk reduction through sectoral laws, such as the Land Use Law, which regulates residential development to avoid construction in disaster prone areas and Law on Forest Protection which includes policy on afforestation and on forest protection, fire prevention and fighting.

In 2006 the Government of Indonesia issued the National Action Plan for Disaster Reduction (2006-2009). It is a joint undertaking of the National Development Planning Agency (BAPPENAS) and the National Coordinating Body for Disaster Management (BAKORNAS PB) with support from UNDP. The plan maps the planned programs of the different stakeholders to allow easier coordination. It provides national guidelines for platform priorities, an institutional framework for disaster risk reduction and information that will allow decision makers to pledge and channel commitments towards disaster risk reduction activities. It is planned that in the immediate future BAPPENAS will continue to refine the plan and ensure that all priority actions are included in the agenda and implemented accordingly to make an appropriate disaster risk reduction program. It is also expected that Local Governments, as a follow-up to this national action plan, will develop their own Local Action Plans for Disaster Risk Reduction, at the provincial and district/city levels. The five priorities of the National Action Plan are aligned to the Priorities of Action of the HFA.

Table 2 provides examples of national DM plans from selected countries in the Asia-Pacific region:

Table 2

Country	National DM Plans
Bangladesh	
Cambodia	Strategic National Action Plan (Currently being developed)
China	National Natural Disaster Reduction Plan (1998-2010)
Indonesia	National Action Plan, 2006
Japan	
Nepal	

Philippines	National Calamities and Disaster Preparedness Plans
Vietnam	Second Strategy and Action Plan (2001-2020)

Based on the priorities identified in the plans, many countries have also developed and implemented national DM programs and projects. For example, in the Pacific Islands national DM programs are being implemented in Samoa, Tonga, Niue, Fiji, Vanuatu and Kiribati.

Despite this, the focus of the programs is not always the same. The national program of Samoa focuses on the enabling environment, mainstreaming and (early) implementation. In Kiribati, the program focuses on early efforts on decision support and is mainstreaming and strengthening the enabling environment. The Federated States of Micronesia and Cook Islands have pilot programs that are focused on mainstreaming and support to decision making.

There are nevertheless a number of success stories from small-scale disaster risk reduction projects implemented in countries in the region. Most of these initiatives are usually pilots, have focused on a particular geographical area, pocket of vulnerable population or single hazard. Limitation of sustained funding over a long period of time hampers the possibility for these successes to reach all populations at risk, or up-scaling of activities over wider geographical areas and in more comprehensive manner.

Regional development-oriented disaster risk reduction platforms highlighting the environmental dimension

1.1.6 Asian Ministerial Conference on Disaster Risk Reduction

The First Asian Ministerial Conference on disaster risk reduction was held in Beijing, China, September 2005, and the Second Asian Ministerial Conference on disaster risk reduction was held in New Delhi, India, in November 2007. The Adoption of the Beijing Action for disaster risk reduction and the Delhi Declaration on disaster risk reduction serve as a guide for action in Asia focusing on regional priorities for implementation of the HFA. The Delhi Declaration established the Ministerial Conferences as the Regional Platform for disaster risk reduction for Asia to serve as an effective link between the National and Global Platform.

1.1.7 International Recovery Platform

Shared interest in the UN approach and processes for post-disaster recovery set out by the 2005 World Conference on Disaster Reduction have resulted in the formulation of a joint initiative named “International Recovery Platform (IRP)” by the UN System and partners, with the encouragement and support of the Government of Japan, Hyogo Prefectural Government, Asian Disaster Reduction Center (ADRC) and other countries. The IRP was opened on 11 May 2005 in Kobe, Japan, in order to support a more coordinated UN system approach and methodologies so that the recovery process helps transform disasters into opportunities for sustainable development. More information at: <http://www.recoveryplatform.org/top.html>

1.1.8 Regional Consultative Committee

The Regional Consultative Committee on Disaster Management (RCC) is a regional mechanism initiated by ADPC with membership from heads of the National Disaster Management Offices of 26 countries from Asia- Pacific. Since 2004, the RCC has implemented a program on “Mainstreaming disaster risk reduction into development policy, planning and implementation”. One of the priorities identified by the program is to mainstream disaster risk reduction into environmental policy, planning and programs. Within environment the RCC has prioritized initiating mainstreaming into environmental impact assessments in RCC Member countries and advocating for integrating of disaster risk reduction into NAPA. More information at <http://www.adpc.net>

1.1.9 Asian Disaster Risk Reduction Network

In February 2002, the Asia Disaster Reduction Centre (ADRC) in Kobe and the UN Office for Coordination of Humanitarian Affairs (OCHA) in Kobe with the assistance of the ASEAN Foundation brought together more than 30 NGOs from all over Asia to discuss the need for a network of NGOs for disaster reduction and response in Asia. As a result, the Asian Disaster Reduction & Response Network (ADRRN) was formed. This loose body of NGOs was consolidated in December 2003 and in June 2004, the structure, content and direction of the ADRRN was clearly formulated and implemented. The mission of ADRRN is to “promote coordination, information sharing and collaboration among NGOs and other stakeholders for effective and efficient disaster reduction and response in the Asia-Pacific region”. More information at: <http://www.adrrn.net/index.asp>

1.1.10 ASEAN Committee on Disaster Management

The ASEAN Committee on Disaster Management is another regional institution that has linked disaster risk issues with other program interests. The ASEAN Secretariat and member countries have reached an advanced stage of planning for disaster management. With the technical support from ADPC and additional assistance from the European Union they have developed the ASEAN Regional program on Disaster Management to guide cooperative action among the member countries in the following areas. The program identifies five major components: establishment of ASEAN Regional Disaster Management Framework; capacity building; sharing of information and resources; promoting collaboration; and strengthening partnership and public education, awareness and advocacy. The framework is also used as a platform for cooperation and collaboration with ASEAN partners and international organizations. So too the ASEAN Environment Ministers and ASEAN Senior Officials of Environment established a Haze Technical Task Force to implement their Regional Haze Action Plan. In 2002 a path-breaking ASEAN Agreement on Transboundary Haze Pollution Control was signed by all ten ASEAN Countries.

1.1.11 ASEAN Regional Forum

The ASEAN Regional Forum (ARF) is another platform comprising of ASEAN countries and 13 additional dialogue partners: Australia, Canada, China, EU, India, Japan, Republic of Korea, Mongolia, New Zealand, Papua New Guinea, Russian Federation and the United States. Achievements of the ARF include a series of training activities, developing a matrix of past cooperation in disaster relief among member countries, conducting an inventory of early warning systems and drafting guidelines for post-disaster responsibilities. Annual meetings have been held since 1997 and by drawing participants from senior levels of ministries of foreign affairs, defense, disaster management and others they have provided a unique platform to consider multiple aspects of disaster management.

1.1.12 South Asia Association for Regional Cooperation

The South Asia Association for Regional Cooperation (SAARC) consists of eight member countries: Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka. Disaster management has been recognized by the SAARC as a priority, but linked as a component of environmental management. The Third SAARC Summit in 1987 recognized the susceptibility of the region to various types of disasters, and decided on regional cooperation with a view to strengthen disaster management capacities. It commissioned a study for the protection and preservation of the environment and on the consequences of disasters in a well-planned and comprehensive framework, the results of which were endorsed in the Sixth SAARC Summit in 1991. This study is still a landmark in reviewing the impact and challenges of disasters, linking it to environmental degradation and identifying ways forward for joint action. With the threat from global sea-level rise and its effect on South Asian countries, in 1992 another study was undertaken on the climate change and its impact on the region. With this high agenda on environment, the *SAARC Meteorological Research Center* was set up in Dhaka in 1995, the *Coastal Zone Management Center* in Male in 2004, and a workshop on Natural Disaster Reduction held in 1994, to prepare a regional approach and report for the Yokohama Conference on Natural Disaster Reduction. Similarly, the Male Declaration was adopted at the special session of the SAARC Environment Ministers in June 2005, which reiterated the need to formulate a Comprehensive Framework on Early Warning, Disaster Management and Disaster Prevention followed by the establishment of SAARC Disaster

Management Centre in 2005 and adoption of the *SAARC Framework for Regional Cooperation in Disaster Management* in 2006.

1.1.13 Asia Flood Network

AFN, focused on flood mitigation in Asia, is jointly implemented by US Agency for International Development/Office of US Foreign Disaster Assistance (USAID/OFDA), the National Oceanic and Atmospheric Administration (NOAA), and the US Geological Survey (USGS), in collaboration with regional partners in Asia. Since 2001, USAID/OFDA has supported AFN to strengthen the capacity of regional and national institutions in climate, weather and hydrological forecasting. Through AFN, the AFN partners directly focus on reducing the vulnerability of high-risk communities to hydro-meteorological hazards by promoting information sharing of hydro meteorological data and information on transboundary river basins. From the Asia-Pacific region, targeting the flood-prone Mekong river basin, the partners provide 24-hour satellite estimates and short-term forecasts of rainfall over the region. They also work towards advancing the hydro-meteorological modeling of watershed and river deltas where data are scarce. Improving the dissemination of forecast and warning information to users and at-risk populations is also a key objective.

1.1.14 Mekong River Commission

Another example of a good regional institution to link environment and disaster risk reduction is the Mekong River Commission (MRC). The MRC has developed a long-term flood management program that was given impetus by the devastating floods in 2000 in the Mekong Delta. The program of MRC reflects the priorities identified by MRC member countries and is being implemented by them between 2002-2008, in association with their respective national disaster management agencies and NGOs active in the region. Activities include flood emergency management and mitigation projects, land-use management, transboundary flood issues, and the dissemination of early warning.

1.1.15 Asian Zone Environment and Emergency Co-operation Network (AZEECON)

AZEECON comprises of the four Asian field programs of the Lutheran World Federation/ World Services working in India, Nepal, Bangladesh and Cambodia. It is primarily a capacity building and quality improvement circle rather than a co-ordination network as such. One of its primary goals is to improve the sustainability of rural livelihoods and to conserve the natural resource base by strengthening the awareness and capacity of the local community to adopt appropriate environmental activities.

Regional environmental platforms of action related to development and disaster risk reduction

1.1.16 Asia-Pacific Forum on Environment and Development (APFED)

The Asia-Pacific Forum on Environment and Development (APFED) is a regional group of eminent experts that aims to address critical issues facing Asia and the Pacific region and to propose new models for equitable and sustainable development of the region.

APFED II activities consist of three programme pillars, namely (i) Policy Dialogues, (ii) Knowledge Initiatives, and (iii) Showcase Programme. Policy dialogues on education, climate change, CSR and access to information. Knowledge Initiatives includes Ryutaro Hashimoto APFED Awards for Good Practices (since 2006), and a database on good practices in environmental management.

In 2005, programmes were agreed on basis of policies, measures and actions recommended in APFED's final report. The final report was presented to the Fifth Ministerial Conference on Environment and Development in Asia and the Pacific (MCED) in March 2005.

1.1.17 Asia-Pacific Network

The Asia-Pacific Network for Global Change Research (APN) based in Kobe, Japan, is another intergovernmental network dedicated to greater collaboration in the shared interests of developed and developing countries in matters related to global change. Its primary purposes are to foster global environmental change research in the Asia-Pacific region, increase the participation of developing countries in research, and strengthen links between the science community and policy makers in matters of global change.

Also, APN aims to facilitate policy dialogues and consultations, enhance access to climate-change-related information, and promote information exchange on climate-change-related programs and projects within the Asia-Pacific region. To improve regional capacity for implementing the UNFCCC and the Kyoto Protocol, as a knowledge-based on-line clearinghouse for the Asia-Pacific region. A Asia-Pacific Seminar on Climate Change is held on a regular basis.

APN activities are decided by an annual intergovernmental meeting, and are supported by a steering group and a scientific planning group. APN member countries include Australia, Bangladesh, Cambodia, China, Fiji, India, Indonesia, Japan, Lao People's Democratic Republic, Malaysia, Mongolia, Nepal, New Zealand, Pakistan, Philippines, Republic of Korea, Russian Federation, Sri Lanka, Thailand, United States and Vietnam.

1.1.18 Asia-Pacific Network on Climate Change (AP-net)

Sponsored by the Japanese Ministry of the Environment, AP-Net was established as a result of the Eighth Asia-Pacific Seminar on Climate Change (Asia-Pacific-Seminar, 22-25 June 1998, Phuket, Thailand): to facilitate policy dialogues and consultations, enhance access to climate change-related information, and promote information exchange on climate change-related programs and projects within the Asia-Pacific region. In 2002-2003, AP-Net was further developed into a WSSD (WSSD) Type 2 partnership initiative, as an outcome of the 12th Asia-Pacific-Seminar, held in Bangkok, Thailand, in July-August 2002. "Enhancement of regional strategy on climate change through AP-Net" was jointly proposed as a Type 2 partnership by the Ministry of Environment of Japan and UNESCAP, and was signed by 29 parties including national governments, international organizations, and NGOs. The latest revision of the website aims at improving regional capacity for implementing the UNFCCC and the Kyoto Protocol, as a knowledge-based on-line clearinghouse for the Asia-Pacific region, with particular interest in the Clean Development Mechanism (CDM), which reduces information/data collection and analysis costs to all prospective stakeholders.

1.1.19 ASEAN Agreement on Transboundary Haze Pollution, and ASEAN Haze Technical Task Force (HTTF)

The ASEAN Agreement on Transboundary Haze Pollution aims to prevent and monitor transboundary haze pollution as a result of land and/or forest fires which should be mitigated, through concerted national efforts and international cooperation.

An ASEAN Transboundary Haze Pollution Control Fund has been established to implement the Agreement. The Regional Haze Action Plan aims to:

- prevent land and forest fires through better management policies and enforcement;
- establish operational mechanisms to monitor land and forest fires;
- strengthen regional land and forest fire-fighting capability and other mitigating measures.

1.1.20 ASEAN Center for Biodiversity (ACB)

Launched in 2005, the ACB aims to create, promote, and develop links with the public, private sector, civil society, international development institutions, and donor community for the sustainable use of biodiversity.

1.1.21 Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation (BIMSTEC)

BIMSTEC was initiated with the goal to combine the 'Look West' policy of Thailand and ASEAN with the 'Look East' policy of India and South Asia, *i.e.* a link between ASEAN and SARRC. The BIMSTEC Center is located in Bangkok (until 2009). Priority Sectors (13) include Environment and Disaster Management, Energy and Public Health.

The purpose is to create an enabling environment for rapid economic development, accelerate social progress in the sub-region, promote active collaboration and mutual assistance on matters of common interest, provide assistance to each other in the form of training and research facilities, cooperate more effectively in joint efforts that are supportive of, and complementary to national development plans of member states, maintain close and beneficial cooperation with existing international and regional organizations, and cooperate in projects that can be dealt with most productively on a sub-regional basis and which make best use of available synergies.

1.1.22 BIMP-EAGA Regional Environmental Program (REP)

The Brunei Indonesia Malaysia Philippines East Asian Growth Area (BIMP-EAGA) provides an institutional framework for development of the Regional Environment Program (REP), which is a key strategy for improved management of shared natural resources. Plans and activities are focused on and will be synchronised with key regional initiatives:

Heart of Borneo (Brunei Darussalam, Indonesia, Malaysia, 2007)

Sulu-Sulawesi Marine Eco-region (SSME) (Indonesia, Malaysia, and Philippines, 2004)

Coral Triangle Initiative on Coral Reefs, Fisheries and Food Security (1997)

ASEAN agreement on Trans-boundary Haze Pollution (1999)

1.1.23 Capacity 2015: a Capacity Development Platform

Capacity2015 Asia provides a regional platform for partnering and sharing experience in addressing cross-cutting aspects around capacity development and sustainability that are critical for goal realization. As a programme, Cap2015 Asia supports the region and countries in identifying operational strategies and making interventions for meeting the MDGs, at national, local government and at community levels. Capacity 2015 is based out of and works closely with UNDP's Bangkok Regional Centre.

The Information Learning Network (ILN): Asia has been established to support existing and emerging networks develop the capacities to realize the MDGs. It also hosts a range of online discussions and works to leverage existing resources in the region.

1.1.24 Core Environment Program (CEP), Greater Mekong Subregion (GMS)

The Asian Development Bank (ADB) is supporting improved environmental management in the Greater Mekong Subregion (GMS) through the Core Environment Program (CEP), a 10-year environmental sector program.

The CEP has five components to be implemented in three phases from 2006 running up to 2015:

1. environmental assessments of economic sector strategies and corridors;
2. biodiversity conservation and Biodiversity Conservation Corridors Initiative (BCI) implementation;
3. environmental performance assessments and sustainable development planning;
4. enhancing and institutionalizing environmental management in the GMS;
5. program development, delivery and sustainable financing.

Current plans include:

- strengthening planning and monitoring capacity at the central/provincial levels in agriculture and natural resource, transport, energy and tourism sectors;
- addressing climate change risks and vulnerabilities for GMS;
- carbon neutral transport corridors;
- capacity building in multi-criteria planning for transport and energy sectors;
- capacity building for resource use efficiency assessments;
- conduct of a conference on GMS environmental sustainability and economic competitiveness by 2009;
- developing protocols and codes of practice;
- private sector funding for environmental technologies;
- coming up with a second edition of the GMS Atlas of the Environment.
- Discussion

Finally, a sub-regional protocol on environment or transboundary biodiversity landscape management is envisaged.

1.1.25 Ministerial Conference on Environment and Development in Asia and the Pacific

The 2005 MCED was the first environmental meeting in the region that focused on the synergy between environmental sustainability and economic growth. The meeting approved a comprehensive work plan for environment and development for the next five years in the region, as presented in three documents: the Ministerial Declaration on Environment and Development; the Regional Implementation Plan for Sustainable Development in Asia and the Pacific, 2006-2010; and the Seoul Initiative on Environmentally Sustainable Economic Growth (Green Growth). The International Council of Women and International Alliance of Women suggested references to gender equality and women's role in disaster management; in the ministerial statement.

The 500 participants included delegates from 52 member and associate member states of ESCAP, as well as representatives of UN agencies, international organizations, academia, non-governmental organizations and business and industry.

1.1.26 Environment Congress for Asia and the Pacific (ECO ASIA)

ECO ASIA is one of the leading forums for environmental policy dialogue in the region, established to promote regional cooperation on environmental issues. The Long-term Perspective Project aimed to provide decision-makers in the region with a scientific basis for policy formulation to support the process of sustainable development. The congress consists of high-level government officials, experts from international organizations and private organizations and environment researchers in the region. In 2007, the 15th Environment Congress for Asia and the Pacific was held in Japan.

1.1.27 Institute for Global Environmental Strategies e-Learning system

The Institute for Global Environmental Strategies (IGES) e-Learning system connects decision makers with researchers to make research outputs on sustainable development timely and easily applicable for policy development and implementation. IGES has introduced action-oriented e-Courses, which blend e-Learning with traditional delivery mechanisms such as face-to-face training workshops, community-based learning and report publishing to create an optimal learning experience. IGES has sought wide participation by experts in designing the e-Courses on climate change issues, and encourages participants to join efforts to create inter-linkages among capacity development networks on climate change.

1.1.28 International Centre for Integrated Mountain Development

The International Centre for Integrated Mountain Development (ICIMOD) is an international independent mountain learning and knowledge centre committed to improving the sustainable livelihoods of mountain peoples in the extended Himalayan region. ICIMOD serves eight regional member countries of the Hindu Kush-Himalayan area – Afghanistan, Bangladesh, Bhutan, China, India, Myanmar, Nepal, and Pakistan – and the global mountain community. Founded in 1983, ICIMOD is based in Kathmandu, Nepal, and brings together a partnership of its regional member countries, partner institutions, and donors with a commitment for development action to secure a better future for the people and environment of the extended Himalayan region. ICIMOD's mission is to develop and provide integrated and innovative solutions, in cooperation with national, regional, and international partners, which foster action and change for overcoming mountain people's economic, social, and physical vulnerability. More information at: <http://www.icimod.org/home/>.

1.1.29 Mangroves for the Future, Regional Steering Committee

The Mangroves for the Future (MFF) initiative has two objectives: to strengthen the environmental sustainability of coastal development; and to promote the investment in coastal ecosystem management.

At a regional level, the implementation of the work programmes is monitored by the Regional Steering Committee (RSC), which is co-chaired by IUCN and UNDP with national government representatives and institutional partners as its members. RSC members are CARE, FAO, IUCN, UNDP, UNEP and Wetlands International. The RSC provided key inputs into both the strategy and plan for action, and many other partners in the initiative also contributed comments, feedback and suggestions.

During the course of the MFF consultations, a number of agencies expressed an interest in collaborating as partners in the implementation of this program of work. This includes interests in developing and partnering in new projects, as well as the existence of ongoing or planned projects and programs, which contribute towards MFF results and objectives.

At the country level, the regional, national and local consultations identified a wide range of community-based organizations (CBO), NGOs and government departments with a proven track record and interest in partnering in projects which contribute towards the actions and outputs for this program of work.

At the regional and international level, the IUCN Species Survival Commission, Green Coast Project, International Water Management Institute (IWMI), World Agroforestry Centre, FAO, UNEP-WCMC, UNEP GPA and WorldFish Center expressed an interest in participating in this program of work. The RSC will work with these potential implementing partners during the early part of 2007 to foster linkages between project partners, and develop detailed project proposals to be funded under MFF.

1.1.30 NetRes

NetRes is a regional network of policy research institutes for environmental management and sustainable development aimed at promoting collaboration among research institutes to provide strategic advice, support and recommendations to facilitate the development and implementation of policies, programmes and activities in pursuit of environmental management and sustainable development. NetRes serves as a supporting institutional mechanism for APFED II activities. The first meeting was held in 2006, Japan.

1.1.31 Northeast Asian Subregional Programme on Environmental Cooperation (NEASPEC)

Initiated by ESCAP, this programme is a comprehensive intergovernmental cooperation mechanism where members strive to make concerted efforts to address environmental challenges in this sub-region. It focuses on capacity building and environmental monitoring, and has programmes on mitigation of air pollution from coal-fired power plants, nature conservation and eco-efficiency.

The Meeting of Senior Officials on Environmental Cooperation in North-East Asia (SOM) is held annually, and on a rotational basis with decisions made by consensus. It functions as the governing body and principal vehicle for the evolution of NEASPEC with UNESCAP providing interim Secretariat

services. The 12th SOM was held in 2006, and the first NEASPEC environment ministers meeting was held during MCED 2005.

1.1.32 Phnom Penh Regional Platform on Sustainable Development

This platform was one of five major regional preparatory meetings held prior to the 2002 WSSD that produced a ministerial statement and platform on sustainable development, regional assessments of Agenda 21 implementation. It outlined key policy issues and priorities, described needed follow-up actions for the next decade, and reflected views and concerns of governments, civil society organizations and other stakeholders.

It was the only regional platform that has formulated and proposed concrete regional initiatives: capacity building, poverty reduction, cleaner production and sustainable energy, land management and biodiversity conservation, freshwater resources, oceans, coastal and marine resources, and atmosphere and climate change. Progress was reviewed during the Fourth MCED.

1.1.33 Regional Review of the Economics of Climate Change in Southeast Asia (RRECCS)

As per the First Regional Consultation in April 2008, the review will:

contribute to regional debate on economic costs and benefits of unilateral and regional actions on mitigation and adaptation;

raise awareness about the urgency of climate change challenges and their potential socio-economic impact on the participating countries, while informing other stakeholders of the same; and

indirectly support government and private sector actions in the region to mitigate and adapt to climate change.

Three phases of the RRECCS will undergo scoping and literature review by the National Climate Expert (NCE), regional and national consultations, climate change profiling/data analysis, climate change modeling, pilot adaptation case studies and policy formulation.

1.1.34 South Asia Cooperative Environment Programme (SACEP)

SACEP is an inter-governmental organization established by the governments of South Asia to promote and support protection, management and enhancement of the environment in the region. The South Asian Regional Seas Programme (1995) which is a major achievement supported by the SACEP. Its action plan includes integrated coastal zone management as response to climate change. Additional resources include the South Asia Environment and Natural Resources Information Centre (SENRIC), and the South Asia Biodiversity Clearing House Mechanism.

1.1.35 South Asia Youth Environment Network (SAYEN)

The Center for Environmental Education (CEE) hosts the Secretariat for SAYEN, which has membership from all the SAARC countries.

Activities include networking, capacity building, involving youth in documenting best practices, developing resource materials for youth. Its 2007 regional meeting identified natural disasters as among five key environmental challenges, and outlined initiatives involving youth in disaster management.

1.1.36 Sub-regional Environmental Policy Dialogue (SEPD)

UNEP is the Secretariat to the dialogue, which was established in response to the need for the region to reach a common position through policy dialogue to emphasize regional implementation through partnerships between governments and civil society.

The main purpose is to:

Provide a forum for consolidated Asia-Pacific views on global issues

Provide regional inputs to global events, such as UNEP's Governing Council/Global Ministerial Environmental Forum (GMEF), Multilateral Environment Agreements, etc.

Advise UNEP on critical emerging environmental issues

Provide policy guidance for the effective implementation of UNEP's programmes in Asia Pacific.

Its first meeting was held in September 2003 in Beijing, China. Actions have been taken to implement WSSD decisions on forming partnerships for sustainable development.

1.1.37 Tripartite Environment Ministers Meeting (TEMM)

Established as basis for substantial cooperation, its regional projects include NEASPEC and Tumen Net. In 2007, the 9th Meeting focused on climate change, trans-boundary movement of toxic and hazardous waste, and dust and sandstorms (DSS). A desire for closer links to ASEAN+3 and East Asia Summit was expressed. The 10th Meeting will be held in Korea in 2008.

1.1.38 UNEP Global Ministerial Environment Forum (GMEF): regional consultations

Regional consultations are held to ensure that the GMEF addresses policy issues of relevance to the regions and that substantive discussion takes place at the GMEF, leading to a strong and consolidated response by the environmental ministers to key and emerging policy issues. In 2008, the 10th Special Session of the Governing Council / Global Ministerial Environment Forum adopted a medium-term strategy (MTS) for 2010-2013 with six cross-cutting thematic priorities: climate change, disasters and conflicts, ecosystem management, environmental governance, harmful substances and hazardous waste, and resource efficiency.

1.1.39 Environment Operations Center (EOC)

The EOC is the Secretariat to the Working Group on Environment (WGE) in the Greater Mekong Subregion (GMS), and is responsible to both the WGE and core members.

The EOC is responsible for (i) preparing the agenda of WGE meetings in consultation with the WGE focal points and co-chairs of the meeting; (ii) facilitating the organization and conduct of the WGE meetings in the GMS countries; (iii) regularly updating WGE members, implementing partner agencies, and the ADB of CEP implementation and events and (iv) coordinating and facilitating participation from GMS countries in CEP implementation.

In 2008, the 2nd GMS Environment Ministers' Meeting (EMM-2) produced a Joint Ministerial Statement that asserts the Biodiversity Conservation Corridors Initiative (BCI) as the main vehicle to assist in promoting sound environmental management, generating income and reducing livelihood vulnerabilities. The BCI program is the aspect of the CEP that is the most advanced and promoted. Regional joint environment and disaster risk reduction platforms

This section describes the regional organizations, which bring together various stakeholders on disaster management, have made efforts to include environmental authorities a part of their various forums and activities.

1.1.40 Working Group on Environment and Disaster Risk Reduction

It is important to mention that the ISDR Working Group on Environment and Disaster Risk Reduction (EDWG) at the global level. The EDWG was established in 2005 to further the implementation of the HFA's recommendation on environmental management and disaster risk reduction. The EDWG chaired by UNEP has prepared an issues paper to collect and communicate key topics, needs, and opportunities.

This paper introduces the connections between environment and disaster risk and identifies fields of action where disaster managers can make better use of environmental management to reduce disaster risk (Is this the booklet that came out in 2007?)

EDWG comprises African Union Commission, ADPC, ADRC, Council of Europe, FAO, Global Fire Monitoring Center, IFRC, IUCN, Conservation Union, Red Cross/Red Crescent Climate Centre, Pacific Disaster Center (PDC), ProVention Consortium, UN University Institute for Environment and Human Security (UNU-EHS), UN Center for Regional Development (UNCRD), UNDP, World Food Program (WFP) and World Meteorological Organization (WMO).

1.1.41 Disaster Environment Working Group for Asia (DEWGA)

Recognising that disaster risk reduction and environmental management are closely linked and the essential need to systematically cross-integrate environmental management into disaster risk reduction framework, the Disaster Environment Working Group for Asia (DEWGA) was founded in 2007 by six key agencies in the fields of interest: the Asian Disaster Preparedness Center (ADPC), CARE, International Environment and Disaster Management, Kyoto University (IEDM/ KU), IUCN, Stockholm Environment Institute (SEI) and WWF. The UNEP and UN/ ISDR subsequently joined as key support agencies.

DEWGA is committed to increase synergy between the two sectors and promote effective cross-integration of environmental management concerns into disaster risk reduction programmes. As a semi-formal, open-ended and action-oriented partnership, DEWGA seeks to explore venues through which the partners are able to work with each other to minimise 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 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 discrete interventions on the ground or long-term strategies.

1.1.42 Other government platforms at national level

The countries of the region have been developing a strong institutional base for disaster risk reduction. These institutions are usually multi-layered and provide for inter-ministerial, inter-departmental arrangements. Government is the main focal point of these institutions but equal important roles should be assigned to other stakeholders. Table 3 provides a list of focal points for disaster management in Asia-Pacific countries.

Table 3: Focal agency for disaster management

Country	Focal agency for Disaster Management
Bangladesh	
Cambodia	National Committee for Disaster Management (NCDM)
China	Department of Disaster and Social Relief, Ministry of Civil Affairs
Indonesia	National Coordinating Board for Disaster Management (Bakornas PB)
Japan	
Nepal	
Philippines	National Disaster Coordinating Council, Office of Civil Defense
Vietnam	Central Committee for Flood and Storm Control, Ministry of Agriculture and Rural Development

One of the most important issues revolving around the disaster management institutional framework is the devolution of responsibility and executive capacity at the sub-national level. There are examples in regions like in the case of the Philippines, where Local Disaster Coordinating Councils at the city/municipal and barangay level exist, and in Cambodia with the Provincial/District and Commune committee for Disaster Management. Similarly the National Disaster Management Office of Vanuatu requires each provincial council and the municipal council within that province to form a Provincial Disaster Committee and prepare a Provincial Disaster Plan, which is consistent with the National Disaster Plan.

Nonetheless, the challenge remains in the effectiveness of these institutions at all levels, which depends on a large number of factors, including the position of the authority/agency in the overall structure of the national government, the composition of the institutions and the level of engagement of stakeholders. Positioning of the authority/agency is also related to the political support it receives.

The countries also realize the need for multi-stakeholder involvement in addressing disaster risk. Hence, endorsing a national platform for disaster risk reduction with participation from various stakeholders, countries of the region are either forming new platforms or strengthening existing partnerships and forum to act as a stronger national platform.

Box 1: National Disaster Management Partnership, Vietnam

A multi-donor funded partnership to mitigate natural hazards in central Vietnam brings government agencies together with international and regional NGOs to address the issues of disaster risks at both national and district levels. The partnership tackles such concerns as disaster preparedness, water resource management, community relocation and rehabilitation, environmental management and livelihood issues of vulnerable communities through specific projects

Successful integration of disaster risk reduction, environmental management and development is not something that can be achieved by the addition of a new program, a new policy document or even a new department. Rather, it is a shift in approach towards supporting more risk reducing forms of environmental management and development. Similarly, it is an approach that will need to pervade all operations, programs and departments. Therefore, the sustainable disaster risk reduction and environmental management should be broadened to focus on the convergence areas of three sectors:

- Development;
- Environmental management; and
- Disaster risk management.

Measures can be carried out within the interfaces between these three areas:

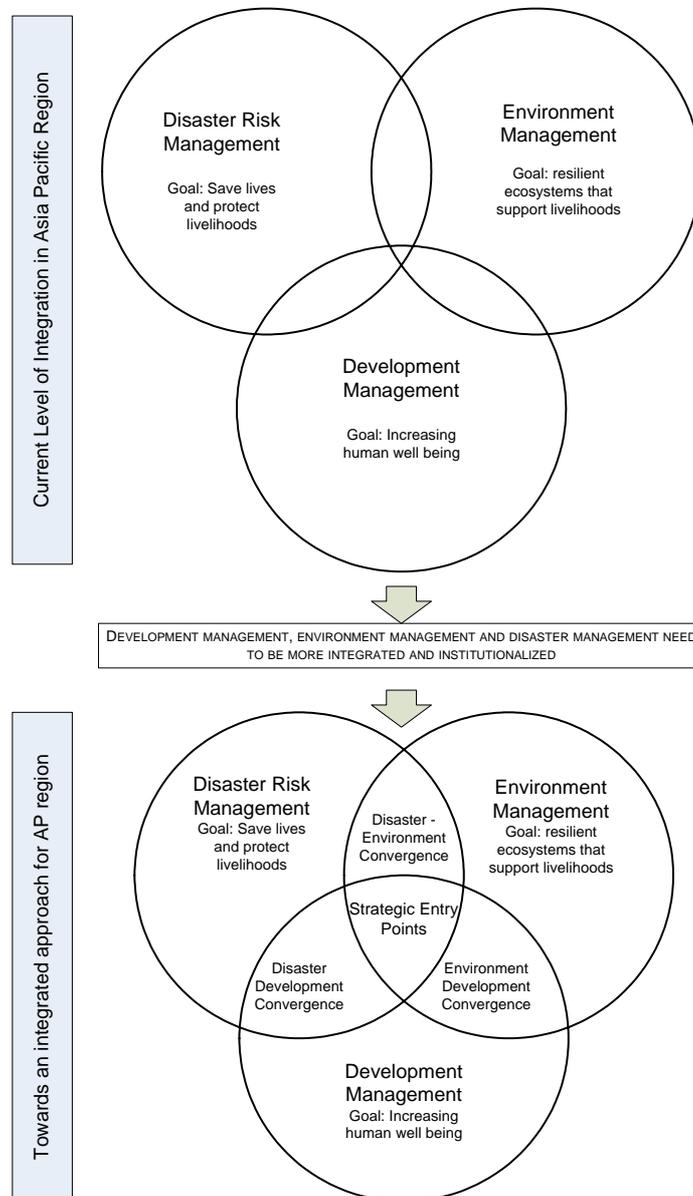
- Disaster-Environment convergence;
- Environment-Development convergence; and
- Development-Disaster convergence.

Error! Reference source not found. illustrates the current level of the integration of three sectors and **Error! Reference source not found.** shows the strategic entry points for the integration to be taken in the Asia-Pacific region.

Table 4: Three zones of convergence

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

Figure 1: Strategic Entry Points for Integration



Opportunities for integrating environmental management and disaster risk reduction

Environment and Vulnerability: Emerging Perspectives (ISDR 2007) outlines opportunities to integrate environmental and disaster risk reduction strategies. This suggests to:

- Engage environmental managers in national disaster risk management mechanisms (and disaster managers in environmental management mechanisms).
- Include risk reduction criteria in environmental regulatory frameworks.
- Assess environmental change as a parameter of risk.
- Utilize local knowledge in community-based disaster risk management.
- Engage the scientific community to promote environmental research and innovation.
- Protect and value ecosystem services.
- Consider environmental technologies and designs for structural defenses.
- Integrate environmental and disaster risk considerations in spatial planning.
- Prepare for environmental emergencies.
- Strengthen capacities for environmental recovery.

There are a number of areas where environmental management and disaster management can and should interact more positively for mutual benefit and support. Both fields would benefit from continuing and supporting the current movement in the disaster community from “reactive” disaster response to active risk management and from iterative recovery to pro-active mitigation and prevention. Parallel efforts would transition the environmental field from contaminant clean up to risk reduction and pollution prevention, from discrete issues management to environmental management systems, and from flood control to floodplain management (Philippi, 1996).

Integration of sustainability considerations into disaster mitigation and recovery can exploit the considerable overlap between environmental management and disaster management. Planners and practitioners in both fields must recognize that the overall objectives of these fields implicitly promote sustainable communities. Sustainability should be considered both prospectively (in sustainable development planning and mitigation) and retrospectively (in response and recovery). This integration would incorporate and enhance current trends toward “holistic disaster recovery” (also “sustainable recovery”) that emphasize welfare of the entire community, including environmental improvement and enhancement, through the recovery process (*Holistic Disaster Recovery* 2001). *Living with Risk* (2004: 302) is even more direct:

Disaster reduction specialists should be encouraged to anticipate environmental requirements under applicable laws and to design projects that address these requirements, coordinating closely with environmental institutions.

Environmental management professionals can make considerable contributions during the mitigation and recovery phases of disaster management. They can identify possible improvements and enhancements as well as things to avoid. More importantly, after enhancements or improvements are in place, they can monitor and assess environmental performance indicators to ensure that goals are met. Environmental assessments should be integrated into emergency planning processes. Environmental impact statements should (but currently do not) specifically include disaster-hazard considerations. Rapid environmental assessments should be conducted as part of disaster damage assessment and should be an integral part of response/recovery considerations (Kelly 2001).

Both environmental managers and disaster managers must be cognizant of the importance of environmental justice/equity issues in the context of hazard and vulnerability. Hazards of any type have a disproportionate impact on the poor and disadvantaged. A number of thorny equity issues are coming to a head in the environmental management world, among them: industrial plant and landfill siting; development in industrial or depressed areas; residential settlement on slopes or in other marginal areas; higher population density; immigrants and language differences; differential access to social services and information sources. Most of these issues have not yet been adequately addressed in emergency management planning or community dialogue.

There are a number of key tools or entry points which offer opportunities for integrating disaster and environmental management. Below are some key programs and tools for integration.

1.1.43 National Adaptation Programmes of Action (NAPA)

The preparation of NAPAs is a new element among the agreements and initiatives established under the United Nations Framework Convention on Climate Change (UNFCCC). Guidelines were set out in 2001 for the development of plans that enable low-income countries to communicate proposed programs of priority action to address the potential impacts of climate change. An emerging principle is that they should concentrate on actions designed to combat urgent problems already caused by present-day climate variability and extremes – problems that may become more acute under future climate change unless remedial action is taken. Key among these is the impacts of extreme climatic events associated with disasters such as flooding, drought and tropical storms. Preparation of the plans is financed by the UNFCCC's Least Developed Countries Fund, and the same source may also be a vehicle for funding subsequent implementation of the priority actions.

1.1.44 Integrating disaster risk reduction concerns into Environmental Assessments for new developing projects

Though environmental assessments – primarily environmental impact assessments – (EIAs) have become mandatory in most of the countries in Asia for project appraisal, much needs to be done to integrate disaster risk reduction concerns into such assessments. Also efforts need to be taken on adopting environmental assessments *a priori* (for example the Strategic Environmental Assessment) so that concerns of environment and disaster risk are addressed at the policy and plan level and need not wait till the formulation of the particular projects. It is important to integrate disaster risk reduction concerns into all environmental tools. However, there are two important tools that need to be prioritized.

Environmental assessments (primarily EIA) are an absolute requirement for the appraisal process of all new projects. The basic purpose is to examine the potential environmental consequences, both beneficial and adverse, of the proposed project's design. A guidance note prepared by ProVention Consortium on the use of EIA methodologies as a tool for mainstreaming disaster risk reduction identifies three essential actions as part of the EIA process:

- The environmental assessment process should include collation of data on natural hazard-related risks as a fundamental first step in broader project scoping.
- Systematic analysis of natural hazards and related vulnerability should be undertaken as a central component of the environmental assessment in areas of risk of natural hazards.
- A full impact assessment should be required for certain types of projects in high-risk areas.

In this regard, The “Tools for Mainstreaming disaster risk reduction: Guidance Notes for Development Organizations” developed by the ProVention Consortium provides detailed guidance on how to mainstream disaster risk reduction into the EIA process. The document could be downloaded at <http://www.proventionconsortium.org>.

Box 2 provides examples from Asia where disaster risk reduction has been integrated in environmental assessments.

Box 2: Integrating disaster risk reduction in Environmental Assessment

Integrating disaster risk reduction in Country Environmental Assessment

ADB's CEA for Tajikistan, identifies natural hazards, including drought, landslides and earthquakes, as one of the country's key environmental problems and highlights a related reduction in vulnerability as a major element in promoting environmental interventions to reduce poverty. In order to enhance resilience, it recommends support for activities that contribute to greater physical stability (e.g., prevention of soil erosion); the exploitation of opportunities for simultaneously reducing vulnerability and supporting livelihoods (e.g., drainage of lands prone to mudslides and use of the water collected for irrigation); careful attention to zoning of economic activities; and, more generally, a policy that favors risk reduction over emergency response and reconstruction. (*Source: ADB CEA, 2004*)

Integrating disaster risk reduction in Strategic Environmental Assessment

Environmental analysis by the ADB of some specific interventions to support the development of irrigation infrastructure in Cambodia found that these interventions could not be considered in isolation from other proposed government and donor irrigation projects and the potential cumulative environmental impacts collectively associated with these schemes. These impacts included those relating to the implications of large irrigation schemes and water withdrawal for the system of flooding (used to economic advantage in Cambodia in normal years) and water flows. In consequence it was proposed that future ADB investments in the irrigation sector should be conditional on integrated basin development planning, which was currently absent in many parts of Cambodia. (*Source: "Tools for Mainstreaming disaster risk reduction: Guidance Notes for Development Organizations", ProVention Consortium, 2007*)

1.1.45 Environmental Risk Assessment, and Environmental Assessment Strategies

As a disaster *preparedness* measure, a range of policy and strategy tools can be used to reduce the risk and vulnerability of local communities. Of particular significance are tools such as environmental risk assessment (ERA) and EMS. EMS is a relatively new approach, based on the ISO 14001 standard, which when adopted for disaster management, enables the systematic identification and assessment of significant environmental aspects that impact on disasters and setting of measurable targets. It also includes the monitoring and checking of steps taken to achieve these targets. SEAs can also be integrated into local disaster plans. Vulnerability and environmental hazard mapping of local communities will have to be combined with early warning systems that regularly monitor and evaluate the situation.

Environmental codes and standards, and their proper enforcement and monitoring, will go a long way when they are used for disaster preparedness and response purposes. For example, a well-maintained inventory of chemicals and hazardous substances used by local industries, and their proper labeling, will ensure that, during a disaster event, the risks that such materials pose to communities living nearby can be mitigated by proper isolation, handling, and segregation.

Clearly then, the above environmental tools for pre-disaster preparedness should focus on the development of policies and strategies, and in strengthening the capacities of local communities and government bodies. Specialized arms of the local government looking at environmental aspects, for example the BAPPENAS in Indonesia, should build capacities to be able to look at the environmental dimensions of their preparedness plans.

For post-disaster *recovery and reconstruction*, similar strategies and tools can be identified, which will not only aid the recovery process, but will also assist in strengthening future preparedness. Of particular significance here are Rapid Environmental Impact Assessment (REA) and EIA tools. These tools are particularly focused on the assessment and implementation of recovery and reconstruction projects, ensuring that programs and projects not only help affected communities to recover their livelihoods, but also restore the local environment. For example, a set of criteria included informs for approval of projects in the Aceh area of Indonesia were those related to the potential environmental impacts of proposed projects.

1.1.46 Rapid Environmental Impact Assessment

In normal, non-disaster, situations an EIA can be used to identify possible environmental impacts and mitigation measures. However, as indicated in

Table 5, a disaster is radically different from normal conditions, making an EIA inappropriate. Most governments and humanitarian assistance organizations specifically allow for not doing an EIA in emergencies, recognizing that a full EIA would considerably slow emergency assistance.

These guidelines for an REA fill a gap in the range of tools available to assess environmental impacts during disasters. The REA is designed to provide input on environmental conditions in disaster situations in a way that is convenient for the fast moving, time compressed operational environment faced in responding to a disaster.

The REA is one of several initiatives to improve the linkages between sustainable environmental management and disaster response. Leaders in this area include UNEP, CARE International, UN High Commission for Refugees, WWF and the Benfield Hazard Research Centre. These organizations have not only focused on their own needs, but seek to develop means and methods to assist all interested organizations and communities to better deal with environmental issues before, during and after disasters.

The REA was developed as a collaborative effort of the Benfield Hazard Research Centre, University College London and CARE International. Funding for this collaboration has come from UNEP, the Royal Norwegian Ministry of Foreign Affairs, USAID/OFDA and CARE International. The REA development is guided by an international advisory board and in collaboration with over twenty NGOs and international organizations (IOs)

Table 5

Contextual Differences: Normal & Disaster Environmental Assessments	
Normal Conditions	Disasters
Considerable lead time	Sudden onset
Legal requirement often exists (country &/or donor)	Rarely a legal requirement but some donor may ask for it
Deliberate & pro-active	Reactive
Will take time, be thorough & extensive: comprehensive data collection	May need to be partial in coverage
"No project" option is a possible outcome	"No project" outcome is not an option
Location chosen	Unpredictable location
Duration planned	Uncertain duration
Beneficiary population identifiable & static	Beneficiary population heterogeneous & dynamic
Environmental goals may be made compatible with socio-economic ones	Priority given to "life saving" activities sometime difficult to reconcile with environmental goals

Opportunities for integrating development, environment and disaster risk reduction

There are a number of key tools or entry points which offer opportunities for putting disaster risk reduction onto international and national development agendas and setting goals and priorities. These are briefly outlined here and include PRSPs, UNDAFs, donor country assistance strategies/plans, national sustainable development strategies, NAPAs for climate change, tools such as program and project appraisal and early warning systems. There are also many relevant regional initiatives and policy forums, such as the RCC.

1.1.47 Poverty Reduction Strategy Papers (PRSPs)

PRSPs provide the basis of all World Bank and IMF concessional lending and for debt relief under the enhanced Heavily Indebted Poor Countries (HIPC) Initiative. They are also increasingly used by many other donors as a basis for their bilateral support. PRSPs describe a country's macroeconomic, structural and social policies and programs to promote growth and reduce poverty, as well as associated external financing needs, and are in principle prepared and 'owned' by governments through a consultative process involving civil society and development partners.

Given the pre-eminence of PRSPs in HIPC governments' efforts to address poverty and its cross-sectoral approach, they provide an important opportunity for setting out ways in which disaster risk reduction

concerns can be integrated into national poverty-focused development and associated development assistance. The poverty reduction strategies (PRS) process provides an entry point for bilateral donors to promote a risk reduction agenda in at least three ways:

- Collaborating with the World Bank's Hazard Management Unit, they can seek to influence the Bank's support for the PRS process in the direction of encouraging governments to integrate risk reduction considerations into key PRSP components. Guidelines might, for example, include a recommendation for a national working group to compile hazard and vulnerability profiles and consider how appropriate risk reduction strategies can be incorporated into the PRSP.
- At country level, they can offer targeted support and advice to governments in the preparation of PRSPs, highlighting opportunities for integrating risk reduction concerns into sectoral strategies and indicating willingness to support those areas in which these concerns are addressed.
- They can ensure that funding is available for implementation of risk reducing activities that are included in PRSPs. While the shift from project-based aid to general or sector budget support means that the scope for earmarking funds for specific activities is reduced, donors can nevertheless ensure that risk reduction principles are highlighted in funding agreements and in systems for ensuring accountability. There is also scope for supporting specific activities outside the framework of direct budget support, including through UN agencies and NGOs.

Box 3 provides some of the various ways disaster risk reduction is addressed in the PRSPs in Asia-Pacific region.

Box 3: Addressing disaster risk reduction in Poverty Reduction Strategies (PRS)

PRS identifies disaster risk reduction as sectoral sub priority:

- Lao PDR: disaster risk reduction has been included as part of sectoral sub-priorities under Agriculture

PRS set specific disaster related outcome and impact indicators:

- Vietnam: The 2002 PRSP, aims to halve the number of people falling back into poverty due to calamities and other risks by 2010.

PRS measuring the achievement of disaster risk reduction indirectly through other output indicators:

- Cambodia: The 2002 PRSP, aims to reduce the area of agricultural land damaged by floods and droughts, the monetary value of flood losses and the number of people affected by drought.

PRS seeking to integrate disaster risk reduction into broad development activities:

- Bangladesh: disaster risk reduction is not explicitly included as part of the four strategic blocks or four supporting strategies on which the PRS is based. However, the extent to which the PRS ensures comprehensive disaster risk management, environmental sustainability and mainstreaming of these concerns into the national development process is identified as one of ten key goals on which the success of the PRS will be judged. (Source: Adopted from "Tools for Mainstreaming disaster risk reduction: Guidance Notes for Development Organizations", ProVention Consortium, 2007)

1.1.48 Country programming framework

Like the PRS, country programming forms another important window for integrating disaster risk reduction. Programming frameworks are developed and applied by all international development organizations. These frameworks are usually applied at a national level with a typical timeframe of 3-5 years. If the program does not identify particular focus areas, then usually no related projects can be undertaken in that country on that particular focus area by international financial institutions. The exception is post-disaster response.

Box 4: The fourth five-year plan of Bangladesh

The Planning Commission of the Government of Bangladesh draws up five-year plans providing guidelines for all development sectors including water resources sectors. The first five-year plan (1973-78) was formulated in 1973 and the fourth five-year plan (1990-95) was formulated in 1990. The plans have two important components: the macro-economic framework, and the sectoral framework that sets the sectoral targets and policies.

For the first time, the fourth five-year plan (1990-95) placed emphasis on environmentally desirable integrated development and full accounting of externalities of flood control measures. The plan noted that, in the past, the planning and construction of embankments has sometimes proceeded without taking adequate account of agriculture, fisheries, land use and other environmental and socio-economic considerations. The fourth five-year plan proposed to focus attention on these aspects in the planning and implementation of future embankments and other flood control and drainage programs through coordinated planning involving all concerned agencies of the Government as well as the local people. The identification, analysis, assessment and monitoring of such environmental and other impacts and the inclusion of adequate corrective and compensatory measures, would form an essential component of the flood control, drainage and irrigation projects during the plan.

1.1.49 Sectoral integration

Disaster risk reduction should also be integrated at the *sectoral* level into policies, budgets and plans and programs. Though the sectoral ministries like health, public works, education are often a member of the national disaster management offices, their involvement should be more encouraged from a development point of view and not preparedness and response alone. In this regard, equal importance should be placed on building capacity and awareness of officials from sectoral agencies at both national and sub-national level. When programs are to be designed to address these priorities, they should be aligned to the sectoral ministries and tied to their budget.

Box 5 provides key themes for mainstreaming of disaster risk reduction into priority sectors and has been developed by the Regional Consultative Committee on Disaster Management's (RCC) Program on Mainstreaming Disaster Risk Reduction into Development (MDRD).

Box 5: Themes for mainstreaming disaster risk reduction into priority sectors

Agriculture

Promoting programs of contingency crop planning; crop diversification;

Supplementary income generation from off-farm and non-farm activities;

Effective insurance and credit schemes to compensate for crop damage and loss to livelihood;

Urban Planning and Infrastructure

Introducing Disaster Risk Impact Assessments into the construction of new roads and bridges;

Promoting the use of hazard risk information in land-use planning and zoning programs;

Health

Vulnerability assessment of hospitals in hazard-prone areas;

Promoting hazard resilient construction of new hospitals;

Implementing of disaster preparedness plans for hospitals;

Education

Introducing DRM modules into the school curriculum;

Promoting hazard resilient construction of new schools;

Introducing features into schools for their use as emergency shelters;

Housing

Promoting the increased use of hazard-resilient designs in rural housing in hazard-prone areas;

Utilization of national building codes; and the compliance and enforcement of local building laws in urban hazard-prone areas.

(Source: RCC Program on Mainstreaming disaster risk reduction into Development Policy, Planning and Implementation in Asia)

1.1.50 UN Development Assistance Frameworks (UNDAFs)

A noteworthy outcome of the UN Secretary General's efforts to improve coordination across the UN system at country level has been the Common Country Assessment (CCA) and UN Development Assistance Framework (UNDAF), designed to enhance the UN country teams' collective analysis and programming respectively in support of national goals and priorities, including the MDGs and PRSPs. In principle, the CCA/UNDAF process, supported by the office of the UN Development Group (UNDG), provides an entry point for "a contribution to developing measures and building capacity for crisis prevention and disaster preparedness; and where applicable to mitigation plans, post-conflict/disaster recovery and rehabilitation, and planning the transition from relief to development" and for establishing the necessary partnerships (including with donors) for this purpose. In parallel the UNDG has also established a Joint Working Group on Transitions with the UN Executive Committee on Humanitarian Assistance (ECHA) to consider relief-development transition issues in disasters and complex emergencies, including how the UN Consolidated Appeals Process for emergencies relates to the UNDAF. So far these initiatives have yet to translate into a systematic incorporation of disaster risk reduction concerns into the UN development planning process, but this could change if more substantial donor support were to be targeted to this area.

1.1.51 National Adaptation Programmes of Action (NAPA)

NAPAs need to be fully integrated with national development and poverty reduction strategies. They must focus not just on technical responses, but also on wider societal and institutional adaptation that

enhances resilience to shocks, including poverty reduction and improved resource management. The extent to which NAPAs can actually promote these linkages under the current funding processes remains to be seen. Almost all least developed countries have now submitted NAPAs. Integrating climate change adaptation with broader concerns places special demands on sectoral coordination and policy-making practices. According to UNFCCC, efforts should be made to create a more enabling environment within countries through: education and awareness-raising on climate change and its impacts; development of skills necessary for implementing adaptation strategies; promoting cross-sectoral approach to policy-making; and developing policy and planning frameworks that can accommodate climate change concerns.

1.1.52 Program and project appraisal guidelines

Donors provide guidance on submitting and assessing funding applications for projects and programs. These mention assessment of risks to achieving objectives of proposed activities and environmental impact, for example as a component of logical frameworks, in a 'Risks and undertakings' section or an environmental issues annex for project submissions. However, the guidelines do not at present give explicit attention to assessing ways in which activities might be threatened by or – just as important – might influence disaster risks.

1.1.53 Early warning and information systems

Early warning and information systems are key tools for mitigating disaster impacts. In the past 20 years considerable progress has been made in improving systems for providing short-term advance information on extreme weather events, flood surges, volcanic eruptions and food crises which allow timely action to be taken in the realm of disaster management. Yet there is also a need for information systems to support longer-term risk assessment and monitoring, focusing on vulnerability as well as hazards, as a basis for disaster risk reduction initiatives within a development framework.

Overall, early warning and information systems, often with substantial donor assistance, have significantly improved in terms both of information reliability/timeliness and linkages to early response, saving many lives in disasters. Common shortcomings, however, are that while they establish the means to generate or acquire large volumes of data, including remote sensing data, they are weak at analysis and interpretation and sometimes weaker still at communicating their findings to stakeholders in a useful form leading to action. In many cases their approach is technical, short-term and oriented towards needs for humanitarian assistance. They are far less attuned to generating knowledge that would improve understanding of longer-term socio-economic and political processes responsible for vulnerability (including conflict), or fostering action to reduce that vulnerability.

Better analysis of this latter kind could provide a solid foundation for designing strategies to integrate risk reduction into development processes at national and sub-national levels. This will require appropriate levels of investment in expertise, adequate resourcing of system operation, and a commitment to intersectoral collaboration to strengthen information action links.

1.1.54 Risk transfer mechanisms

An emerging area of interest is the potential for financial instruments of risk management in developing countries. The World Bank, for example, is exploring the scope for promoting a range of instruments including public-private partnerships, perhaps linked to corporate social responsibility initiatives, to offer affordable insurance services that would spread the burden of disaster risks for individuals or for governments. A number of international donor agencies are supporting risk transfer mechanisms in the form of micro-insurance for communities affected by disasters as both ex-ante and ex-post measures.

1.1.55 International initiatives and policy forums

There are numerous international policy forums at which bilateral donors can highlight and promote disaster risk reduction concerns, including world conferences and summits on related issues (e.g. economic and social development, sustainable development, climate change, food, trade etc.). One of these is the intergovernmental 2005 World Conference on Disaster Reduction (WCDR) , for which

preparatory conferences were held in May and October 2004. These revealed a significant improvement in international awareness of relevant issues since the beginning of the IDNDR, though there was a reluctance to include technological hazards or quantifiable targets on the part of some of the bigger players.

The importance of mainstreaming disaster risk reduction is recognized by the countries of the Asia-Pacific region and slowly the countries are picking up the momentum to address disaster risk reduction into development.

Regional level

The Flood Management and Mitigation Programme of the Mekong River Commission has five components:

- Establishment of a regional flood management and mitigation center
- Structural and flood proofing measures
- Mediation of transboundary flood issues
- Flood emergency management strengthening
- Land use management

(For more details, see <http://www.mrcmekong.org>)

National Level

Climate-proofing the Strategic Development Plan in the Federated States of Micronesia

Mainstreaming disaster risk reduction into the National Development Strategy of Kiribati

Sectoral Level

Mainstreaming disaster risk reduction into Land use Planning in Philippines by National Economic Development Authority and UNDP (Ongoing)

Priority Implementation Projects (PIPs) on Mainstreaming disaster risk reduction into Road Sector in Philippines by DPWH, National Disaster Coordinating Council with support from ADPC, ISDR and Sida (Phase I completed) (Implemented under RCC MDRD Program)

Mainstreaming disaster risk reduction into Education Sector in Cambodia, Lao PDR and Philippines by Ministry of Education, National Disaster Management Offices (NDMOs) with support from ADPC, UNDP and ECHO (Ongoing) (Implemented under RCC MDRD Program)

Conclusions and recommendations for integration

Both the HFA and Millennium Development Goals emphasize *environmental and natural resource management*. They also encourage sustainable use and management of ecosystems, including better land-use planning and development activities to reduce risk and vulnerabilities. They call for the implementation of integrated environmental and natural resource management approaches that incorporate disaster risk reduction. Existing programs relating to the convergence area of three sectors mentioned above could be the starting points for the integration. In this light, this scoping study found that there are five areas that should be focused for integration in the Asia-Pacific region:

- Local integration strategies (entry point for all types of disasters);
- Climate change adaptation strategies (particularly for hydro-meteorology related disasters such as flood, typhoon, drought);
- Natural resource management: mangroves, coral reefs, water catchments, forests (particularly for landslide, flood, typhoon, drought);
- Coastal zone management (particularly for tsunami, storm surge, flood, beach erosion); and
- Urban management (particularly for flood, storm).

Local integration strategies

THIS SECTION IS VERY DIFFICULT TO UNDERSTAND

Key entry points

- Piloting initiatives
- Advocacy at the highest level
- Skilled policy analysts to translate technical solutions into pro-active government policy and programs
- Trained staff at all levels of the government
- Appropriate institutional set up
- High visibility investments
- Outcome indicators to monitor progress
- Budget from both national and other sources (private sector, external)

Suggested starting points

The starting point for integrating activities to reduce environmental degradation and disaster risk could be advocacy and policy dialogue on the integration among stakeholders. Especially if the disasters have negative impacts on environment, and disasters are setting back development or the development process is unwittingly creating new forms of vulnerability and exacerbating existing ones, there is a need to bring this to the attention of the policy makers who are responsible for decisions related to development. Advocacy needs to be supported by implementation of highly visible demonstrable projects, with clearly defined outcome indicators. This would help in convincing the policy makers about the value of investing in risk reduction measures.

BOX??

At the regional level, the ASEAN Regional Program on Disaster Management (ARPD; 2004-2010) was launched by the ASEAN Committee for Disaster Management in May 2004. Under program component 5 (public awareness, education and advocacy), the ARPD identifies as one of its sub-components mainstreaming disaster management into development plans of ASEAN Member Countries (Sub-component 5.4). The objective of the sub-component is to promote increased awareness of losses from disasters, and advocacy of disaster reduction as an integral part of development planning, especially among decision makers in planning and development ministries in ASEAN Member Countries. The expected outcome of the sub-component is to increase awareness on benefits of disaster mitigation and risk reduction and undertake pilot adoption of disaster risk assessment and reduction in development plans of ASEAN Member Countries. (*For more detail www.aseansec.org*)

It would be desirable to carry out a review of the existing development processes practiced in the countries. Specifically countries that face high risk of natural hazards should review their current development processes and identify the gaps, which may be the underlying cause of disaster risks and accordingly develop targeted programs to address those gaps.

These targeted programs should not follow the conventional program/project management cycle, but rather be adopted to take into account risks involved in disasters. It should also take into consideration the negative implications of the program/project itself on its environment. Thus, following the path of 'environment', disaster impacts need to be integrated into all stages of the program/project cycle. This would require building capacity, both institutional and human, for effective use of integrated program/project management tools. The issue related to building capacity remains two fold. On one hand, the disaster management institutional set-up (which are new in case of some countries) needs to build capacity at all levels. Similarly, development sectors (agriculture, health, education, etc.) also need to build capacity in terms of incorporating risk reduction concerns into their daily development work.

Finally, disaster, environment, and development practitioners could apply adapted tools WHICH ONES? resulting in a greater sense of ownership and commitment. Capacities could also be developed for the increased use and regular improvement of these tools. To achieve this, development of a common language should be encouraged that fosters the exchange of practices among experts in disaster management, environmental management, sustainable development and economics. In this regard, innovative forms of communication should be explored. Some adjustments in policy frameworks might be necessary to reflect this approach to disaster reduction. Close collaboration would also be beneficial among institutions working on climate change adaptation, biodiversity conservation, land degradation, wetlands management, sustainable development and poverty alleviation.

Climate change adaptation strategies

Key entry points

- Advocacy and dialogues and workshops would be conducted to raise awareness among stakeholders of the importance of integrating EM and disaster risk reduction into NAPA projects and the consequent benefit to local communities.
- Climate change and sea-level rise considerations to be incorporated into strategic and land-use planning for infrastructure and buildings, and social services.
- The plan mentions the need for communities to prepare and implement risk reduction strategies to address natural hazards, while preparing for the anticipated impacts of climate change. These strategies should identify structures, infrastructure and ecosystems at risk.
- Potential impacts of climate change on agriculture and aquaculture should be determined and the findings could provide the basis for strategies to minimize impacts on these sectors.

Suggested starting points

As mentioned in sections 1.1.24 and 1.1.32, NAPAs provide important and significant opportunities for community-level input. Hence, it is one of the important windows for integration. Like PRSPs, NAPAs also provide opportunities to integrate disaster risk reduction and help affect national development decisions. In the Asia-Pacific region, RCC has circulated the questionnaire survey to the RCC member countries to identify which counties are interested in undertaking PIPs on mainstreaming disaster risk reduction into the NAPA. Based on the results of the survey, RCC would carry out the project in RCC member countries who would express interest to undertake such a project. Following points should be concerned in developing climate change integration strategy.

RCC Program on Mainstreaming Disaster Risk Reduction into Development Policy, Planning and Implementation in Asia

The Regional Consultative Committee on Disaster Management (RCC) Program on Mainstreaming Disaster Risk Reduction into Development Policy, Planning and Implementation in Asia was launched at the 4th RCC Meeting in Dhaka in 2004. Since then, the program has been implemented by the RCC countries with support from ADPC, which serves as the secretariat of the RCC mechanism and the Program. The Program has adopted a two-track approach of mainstreaming into national and sectoral development. The primary components of the program include development of guidelines and tools, carrying out priority implementation projects (PIP) on mainstreaming, advocacy, capacity building and partnerships. The program is currently developing its Phase II for implementation entitled “Partnerships for Safe Development and Good Governance” (2008-2012). (For more details www.adpc.net)

Forest management

Key entry points

- Protect and improve the forest environment through increased vegetation;
- Help alleviate poverty by generating income through increased tree cover and related activities;
- Increase forest resources;
- Establish industries based on forest plantation;
- Increase multiple uses for land; and
- Create popular awareness about sustainable forest management.

Suggested starting points

??? NOTHING HERE, these are just examples

Examples of projects

The Perfume River Management Project, Vietnam

A large share of the 1999 flooding in Vietnam occurred in the Perfume River Basin in Thua Thien Hue Province. Degradation of ecosystem services during the past decades in the uplands has resulted in erosion and large-scale flooding. An integrated management approach is used to address shortcomings of dikes and dams in containing floodwater and preventing salt-water intrusion while providing solutions for the over-exploitation of resources. Donors for this project are the Asian Development Bank (ADB), Japan International Cooperation Agency, and Japan Bank for International Cooperation.

Tackling poverty and drought – The Sindh Programme, Pakistan

Most of the land area in Pakistan is arid or semi-arid and increasingly exposed to drought and soil degradation. This is particularly the case in the Sindh provinces. In addition, the substantial decline of floodwater in the Sindh has led to rapid sea intrusion in the delta region, raising salinity levels and increasing cattle migration to irrigated areas. The IUCN Sindh Programme is pilot testing bio-saline agriculture and aquaculture and promotes appropriate water conservation methods. Donors for this project are IUCN, the British Council, ADB, Norwegian Agency for Development Cooperation, and the Canadian International Development Agency.

Assessment of Environmental Risks and Needs

In addition to huge losses in life and property, the October 2005 Earthquake in Northern Pakistan led to land- and mudslides that continued after the earthquake, siltation of rivers and streams, damage to water channels, forest resources and agricultural land. Based on several missions, IUCN prepared a detailed assessment of environmental risks and needs with a view to rehabilitate sustainable livelihoods and reduce the risk of future disasters in the area. Research is also under way to better understand the land-use factors that increased the vulnerability of mountain areas in northern Pakistan to landslides.

Watershed management

Watersheds are necessary for agricultural, environmental, and socioeconomic development. The physical and biological resources of watersheds provide goods and services to human populations, including water protection, attenuation of disasters by regulating runoff, protection of coastal resources and fisheries,

protection of the environment and protection of productive lowlands. Watershed management programs need to build on existing environmental initiatives.

The following key points are required for successful watershed management:

- No permanent structures should be located in floodplains.
- All watercourses should have buffer strips.
- Intensive agricultural activity should not be permitted on slopes greater than a specified percentage reflecting land capacity.
- Clear cutting of forests should be limited with forest conservation and sustainable forest management stressed.
- Institutional bodies should be formally established to address conflicts.
- Public participation of both men and women should be stressed in management decisions.
- Effective management plans and enforcement of environmental and zoning regulation are critical.
- Regional environmental impact assessments are needed to ensure that cumulative impacts of economic activities are sustainable.

The following elements are impediments to comprehensive watershed management:

- Inadequate economic valuation of environmental services;
- Inadequate institutional structure and appropriate land-use practices; and
- Inattention to socioeconomic issues contributing to poverty, a degraded environment and vulnerability to hazards.

Several actions are needed to implement watershed management activities:

- Strengthen municipal authorities and their capacity to address land use and watershed management issues.
- Establish a national management strategy.
- Support sound land-use planning.
- Ensure public participation in watershed planning and ecosystems protection, including gender concerns.
- Support policies and market-based incentives that favor reforestation and sustainable forestry on steep upper watersheds.
- Promote participation of private sector through the Clean Development Mechanism of the UNFCCC.
- Require downstream beneficiaries to pay for watershed services.
- Support critical watershed protection and restoration of key ecological systems to mitigate disaster impacts.
- Support local NGOs to clarify land tenure issues and facilitate access to land property by rural farmers.
- Establish international watershed management frameworks.
- Pursue a research agenda incorporating economic valuation of environmental services, innovative financing, analysis of the relationship between land use and environmental management and the magnitude of losses from disasters.

Coastal zone management

Observations made by IUCN and other organizations in Thailand and Sri Lanka show how neighboring coasts and islands were affected differently, due in part to the presence or absence of well-preserved mangroves, coral reefs, and coastal vegetation. New scientific insights from ecologists also show that natural ecosystems such as coral reefs and coastal mangrove forests can adapt to change and recover from storms and floods and still provide services of protecting the coast and absorbing pollution. But once

these ecosystems are put under pressure by coastal development, they may lose their resilience. Coastal zone management strategies being considered in the Asia-Pacific region after the 2004 tsunami highlighted the continuum of inland areas, coasts, and oceans. Below are some key entry points.

Key entry points

- Create buffer zones and no-build areas that are clearly set back from the edge of the coast.
- Replant coastal forests and restoration of mangroves, which have been taken up as a part of the environmental recovery process.
- Restore the health of the coral reefs.
- Maintain and/or develop mangrove belts
- Protect wetlands and watersheds.

Suggested starting points

Action on coastal zone management could initiate from restorative programs and projects after the 2004 tsunami, since they have multiple benefits: coastal reforestation programs will not only absorb the energy from future tsunami waves, they can also prevent coastal erosion and help national objectives of reforestation and job creation. Environmental concerns are therefore not all about pre-disaster preparation – such management strategies can also be critical in coordinating relief and response in a post-disaster situation.

As relief efforts give way to rehabilitation and reconstruction programs in the affected countries, mainstreaming environmental concerns becomes an important pre-requisite for developing programs and projects, specifically in making them community-oriented. Programs and projects will also have to link environmental actions to larger developmental issues, such as job creation and income generation potentials, which will enable speedier recovery of the affected communities' livelihoods.

Examples of projects

Mangroves for the Future

Launched in September 2005, Mangroves for the Future (MFF) is a multi-agency, multi-country initiative for the long-term conservation and sustainable management of coastal ecosystems such as mangroves, coral reefs, wetlands, forests, lagoons, estuaries, beaches and sandy shores. It covers 12 tsunami-affected countries in South and Southeast Asia and the western Indian Ocean. The initiative involves collaboration between multiple partners, including government agencies, NGOs and CBOs, research institutes and universities, IUCN, UN agencies and other multilateral bodies.

MFF provides a platform to bring together the efforts of different countries, sectors and agencies under a common goal – to conserve and restore ecosystems to sustain human livelihoods, increase resilience and reduce vulnerability among coastal communities in the Indian Ocean region.

The initiative has received enthusiastic support from the many organizations involved in coastal management and post-2004 tsunami reconstruction. As a result of this support and interest, a detailed process of consultation and dialogue has been undertaken in tsunami-affected countries and at the global level, in order to identify priorities, needs and partnership arrangements, and to establish a comprehensive strategy and program document. These were presented to a donor roundtable in New York on 12 September 2006, where pledges of funding for the initiative were made.

MFF started implementation in January 2007. It will engage and directly involve a wide range of stakeholders from governments, international agencies, NGOs, CBOs, the private sector and local communities to work towards a common goal. At the regional level, implementation of the initiative will be supported and guided by a Regional Steering Committee co-chaired by the IUCN and UNDP, which will include representation from national governments, UN agencies (UNEP, FAO, in particular) and NGOs.

At the national level, MFF will be coordinated and steered through strengthening the existing mechanisms for coastal management which bring together different agencies, sectors and civil society groups. On the ground, the initiative will be implemented through a series of individual actions that are linked by a common goal and strategy, but are spread out geographically, temporally, and in terms of management and implementation responsibility. Many different agencies and organizations will take the lead in implementing these actions.

Marine Working Group on Climate Change and Coral Reefs

Coral bleaching is increasingly being seen as a social-ecological disaster, with similar social and economic consequences as other hazards induced by human processes. Mass bleaching events can eventually have severe impacts on food sources, biodiversity, tourism income and coastal protection and are predicted to increase in frequency and severity. To combat this problem, IUCN has brought together some of the world's leading coral reef scientists and managers to expedite the creation of practical management tools to strengthen the resilience of coral reefs. With the support from the MacArthur Foundation, IUCN has established a Marine Working Group on Climate Change and Coral Reefs (CCCR), with its first purpose to address the issue of resilience, coral reefs and climate change. The main outcome is to bridge the science-management gap and create management tools for the conservation of coral reefs in the face of climate change. The project period is 2006-2008. The global initiative aimed at studying the implications of climate variability and change in water resource policies and management modes.

Urban Management

Key entry points

- Risk exposure to be used as a criterion to rank infrastructure investments nationally across sectors and states.
- Natural hazard risk assessments to be carried out at the state level as the basis of guidelines ensuring that risks to infrastructure are identified and addressed at the design stage.
- Infrastructure must be located, built and maintained in line with codes and practices ensuring that it remains functional for the projected lifetime and avoids unacceptable risks associated with natural hazards and climate change.
- Environmentally sound disposal of debris and waste, particularly in exploring its recycling and reuse potentials.

Suggested starting points

Maintaining a critical balance of natural and man-made aspects of the urban environment particularly in eliminating or reducing the disaster risks and hazards will have to be built into local development plans. Examples include enhancing the ability of natural ecosystems such as mangrove forests and coral reefs to act as a 'bio-shield' to protect people and their livelihoods and the use of cost-effective and innovative engineering solutions to control coastal erosion.

Of particular importance is the quick and environmentally sound disposal of the debris and waste, particularly in exploring its recycling and reuse potentials – so that reconstruction and rehabilitation can commence. Field assessments in Banda Aceh, Maldives, and other regions have shown the haphazard intermixing of different types of wastes such as concrete blocks, bricks, trees, and vegetative matter. The potential for recycling and reusing the debris, particularly those that are inert, was set aside in order to rapidly clear the affected areas and dump the debris in already overloaded landfills. This also resulted, in some cases, in illegal dumping in agricultural fields.

Annex 1: Acronyms

ADPC	Asian Disaster Preparedness Centre
ADRC	Asian Disaster Reduction Center
APN	Asia-Pacific Network for Global Change Research
AP-net	Asia-Pacific Network on Climate Change
CDM	Clean Development Mechanism
DM	Disaster management
DRR	Disaster risk reduction
ECHO	European Commission's Humanitarian Aid Office
EDWG	ISDR Working Group on Environment and Disaster Risk Reduction
EIA	Environmental Impact Assessment
EM	Environmental management
DEWGA	Disaster Environment Working Group for Asia
FAO	UN Food and Agriculture Organization
GFMC	Global Fire Monitoring Center
HFA	Hyogo Framework for Action
HTTF	ASEAN Haze Technical Task Force
ICIMOD	International Centre for Integrated Mountain Development
IEDM/KU	International Laboratory for Environment and Disaster Management/ Kyoto University
IFRC	International Federation of Red Cross and Red Crescent Societies
ISDR	International Strategy for Disaster Reduction
IUCN	International Union for Conservation of Nature
IWMI	International Water Management Institute
MDG	Millennium Development Goals
MFJ	Mangroves for the Future
NAPA	National Adaptation Plan of Action
PDC	Pacific Disaster Center
PRS	Poverty Reduction Strategies
PRSP	Poverty Reduction Strategy Papers
RCC	Regional Consultative Committee on Disaster Management
REA	Rapid Environmental Impact Assessment
SEI	Stockholm Environment Institute
SIDA	Swedish International Development Cooperation Agency
SLRCS	Sri Lanka Red Cross Society
UN	United Nations
UN/ESCAP	UN Economic and Social Commission for Asia and the Pacific
UN/ISDR	Inter-Agency Secretariat of the International Strategy for Disaster Reduction
UNCRD	United Nations Center for Regional Development
UNDAF	United Nations Development Assistance Framework
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNEP GPA	UNEP Global Programme of Action for the Protection of the Marine Environment from Land-Based Activities

UNEP-WCMC	UNEP World Conservation Monitoring Centre
UNFCCC	United Nations Framework Convention on Climate Change
UNU-EHS	United Nations University Institute for Environment and Human Security
WFP	World Food Programme
WMO	World Meteorological Organization
WSSD	World Summit on Sustainable Development
WWF	World Wide Fund for Nature, or World Wildlife Fund

Annex 2: List of Tables, Figures and Boxes

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Annex 3: References

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Annex 4: Environment and disaster risk reduction platforms and policies in selected countries in the Asia-Pacific region

Global Level	Environment and Disaster Risk Reduction Platform
UN/ISDR	Working Group on Environment and Disaster Risk Reduction
Regional Level	Environment and Disaster Risk Reduction Platform
ISDR Asia Partnership	
International Recovery Platform	
Regional Consultative Committee on Disaster Management	
Asian Disaster Risk Reduction Network (ADDRN)	
Asian Disaster Reduction Center (ADRC)	
ASEAN Committee for Disaster Management	
ASEAN Regional Forum	
SAARC Disaster Management Centre	
Asia Flood Network	
Mekong River Commission	
Mangroves for the Future Steering Committees	
Asia-Pacific Network	
Asia-Pacific Network on Climate Change (Asia-Pacific-net)	
IGES's e-Learning system	
National Level	Disaster Management Strategies
Cambodia	Strategic National Action Plan
China	National Natural Disaster Reduction Plan (1998-2010)
Indonesia	National Action Plan, 2006
Philippines	National Calamities and Disaster Preparedness Plans
Vietnam	Second Strategy and Action Plan (2001-2020)
National Level	Environmental strategies, plans related to disaster risk reduction
Bangladesh	National Adaptation Program of Action (NAPA) of Bangladesh
Bangladesh	National Environmental Management Action Plan of Bangladesh
India	Regulation of Environmental Clearances for Port Project of India
Vietnam	Vietnam's national plan for environment and sustainable development
National Level	Focal agency for Disaster Management
Cambodia	National Committee for Disaster Management (NCDM)
China	Department of Disaster and Social Relief, Ministry of Civil Affairs
Indonesia	National Coordinating Board for Disaster Management (Bakornas PB)
Philippines	National Disaster Coordinating Council, Office of Civil Defense
Vietnam	Central Committee for Flood and Storm Control, Ministry of Agriculture and Rural Development