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# Thinking Ahead of Disaster

## Coastal Risk and Opportunity

The sea provides resources essential for building and maintaining sustainable livelihoods and communities for people living along coastlines, yet it poses immense perils. The sea is not alone in presenting coastal dangers and opportunities; interactions amongst saltwater, freshwater, the land and the air drive forces that both create and destroy.

Wind can be harnessed to produce energy and drives storm surges to the shore, inundating coastal communities. Wave and current action erodes cliffs, forcing settlements to retreat inland, but shape natural harbors and build beautiful beaches. Tidal zones provide a rich variety of marine resources for harvesting yet they are sensitive to salinity or sediment conditions affected by upstream rainfall or drought, or water quality and temperature that can be altered by human, industrial, commercial or agricultural effluents.



Photo courtesy of the National Geophysical Data Center's photo library, National Oceanic and Atmospheric Administration, Department of Commerce, U.S.A Government.

**A view of tsunami and related fire damage on southeast Okushiri Island in the community of Aonae following the 12 July 1993 tsunami.**

Opportunities can be influenced by risks and risks can provide chances for opportunity. In the dynamic coastal zone, at the interface of land, water and air, extreme natural cycles and powerful environmental processes are the norm. From the daily, monthly, yearly and decadal tidal cycles to the rare appearance of a new volcanic isle, managing life, livelihoods, and the built and natural environments in coastal zones means managing change. If such change is not recognized or not accepted, or if it is poorly managed, then disasters are inevitable.

Despite millennia of experience with the environment and its extremes, many people and communities do not see, or choose to ignore, the linkages which underpin a productive yet secure existence with the natural forces of change. There is a crucial set of relationships amongst sustainability, development, and managing extreme events which needs to be cultivated so that extreme, and often infrequent, events do not become disasters (e.g., see ISDR, 2004a; 2005).

Many of these changes and threats increasingly result from human activity. Pollution in the East Asian seas ranges

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from livestock effluent affecting migratory birds on the Manko tidal flat, Okinawa Island (Tashiro, et al., 2003) to oil spills in the Malacca Straits (Chua, et al., 2000). The Malacca Straits epitomize much of the chronic human-induced damage being done to the region's seas. Harmful algal blooms (HABs) have been reported on both sides of the Straits and along most of China's coastline. Overfishing occurs along the Straits and in the Gulf of Thailand where serious conflicts have occurred between commercial operators and small-scale subsistence fishers.

The latter example illustrates the rush towards economic development with scant regard for environmental and natural resource stewardship. Rapid, short-term economic gain is seen as more important than the rapid, long-term losses which are incurred. Using dynamite and cyanide for fishing, prevalent around the Philippines, is another example. While these may be easy methods for rapidly generating revenue, they soon leave a legacy of environmental destruction that precludes fishing-related livelihoods for generations.

When livelihoods and coasts are damaged through such pursuits, the population's vulnerability increases to extreme events as well as to a slow decline in health, communities and opportunities. Such risks must be faced within the wider context of rapid global changes. An altered

Photo by Ilan Kelman, 2004.



**The south coast of Viti Levu, Fiji.**

### Box 1: Selected Examples of Coastal Risks and Opportunities.

Location	Event	Risk and Opportunity
<b>Bangladesh</b>	Cyclone and storm surge	Two events of similar intensity yielded different consequences: on 25 May 1985, 11,069 people were killed but on 19 May 1997, due to early warning and appropriate action, 127 people died (Akhand, 1998).
<b>Fiji</b>	Coastal pollution	Agricultural and waste run-off along with soil erosion has been killing coral reefs along Viti Levu's south coast. Environmental restoration projects to regenerate and protect corals include partnerships with tourist resorts to reduce pollution in effluent, tree planting in the highlands and mangrove planting along the coasts (ADB, 2003).
<b>Indian Ocean countries</b>	Earthquake-generated tsunami	On 26 December 2004, one of the most powerful earthquakes during the last century occurred off Sumatra's coast and produced an immense tsunami. More than 300,000 people perished across more than a dozen countries around the Indian Ocean. Yet on the Indonesian island of Simeuleu near the epicentre, only a few people died because the people remembered from a 1907 event that a tsunami could follow an earthquake. They immediately fled the coast after they felt the tremor, and survived.
<b>Philippines</b>	Coastal erosion	In San Fernando, La Union, natural processes and human damage combine to yield significant coastal erosion. Attempts to use structural measures to protect the coastline failed. A combination of solutions is now being adopted, including mangrove rehabilitation and building structures on stilts above the water to minimize interference with sediment transport. Human impacts on the environment and the subsequent coastal erosion impacts on human livelihoods are being reduced (ISDR, 2005).

climate leading to more frequent and severe storms poses dangers for the East Asian seas along with associated rising sea levels which could make many coastal areas, including small islands, uninhabitable.

## An International Framework for Disaster Risk Reduction

Disaster risk reduction is the conceptual framework of elements considered with the possibilities to minimize vulnerabilities and disaster risks throughout a society, to avoid (prevention) or to limit (mitigation and preparedness) the adverse impacts of hazards, within the broad context of sustainable development (ISDR, 2004b).

The United Nations' International Strategy for Disaster Reduction (ISDR) and its interagency secretariat ([www.unisdr.org](http://www.unisdr.org)) advocates disaster risk reduction principles and practices by advancing them within international, regional, national and local sustainability and development frameworks. The ISDR aims at building disaster-resilient communities by promoting increased awareness of the importance of disaster reduction as an integral component of sustainable development, with the goal of reducing human, social, economic and environmental losses due to natural hazards and related technological and environmental disasters.

Commitments to environmental management, sustainable development, good governance and human rights are all pertinent for effective disaster risk reduction. Similarly, for success to occur in these areas, disaster risk reduction is essential. To reduce disaster risks, a change of values is necessary. Rather than people relying on emergency response in reacting to disasters after damage has been done and losses have been incurred, their attitudes and behaviour should reflect knowledge of conditions and demonstrate actions based on that knowledge before events become catastrophic. Efforts are needed to implement long-term processes which minimize the likelihood of catastrophes.

To address such issues on a global basis, the United Nations convened the intergovernmental World Conference on Disaster Reduction (WCDR) in January 2005, in Kobe, Hyogo, Japan. The WCDR promoted "a safer world for all" and was held to:

- Increase the international profile of disaster risk reduction;
- Promote integration of disaster risk reduction into development planning and practice; and
- Strengthen local and national capacities to address the causes of disasters that continue to devastate and impede the development of many countries.

The conference concluded by adopting the Hyogo Framework for Action 2005–2015 (UN, 2005). By reaffirming that "sustainable development, poverty reduction, good



Photo by Ilan Kelman, 2004.

**The riverfront of Shanghai, a coastal megacity subject to risks such as storm surge, windstorms, subsidence, disease and pollution.**

governance, and disaster risk reduction are mutually supportive objectives," five priorities for action were embraced in order to achieve "the substantial reduction of disaster losses, in lives and in the social, economic and environmental assets of communities and countries":

1. Ensuring that disaster risk reduction is a national and a local priority with a strong institutional basis for implementation;
2. Identifying, assessing and monitoring disaster risks, and enhancing early warning;
3. Using knowledge, innovation and education to build a culture of safety and resilience at all levels;
4. Reducing underlying risk factors; and
5. Strengthening disaster preparedness for effective response at all levels.

Specific activities are recommended in the Hyogo Framework which can be applied to East Asian coastal areas. One example mentioned for coastal floodplains is to "incorporate disaster risk assessment into rural development planning and management... including through the identification of land zones that are available and safe for human settlement." The suggestion to "provide easily understandable information on disaster risks and protection options" should incorporate relevant traditional knowledge and indigenous cultural heritage, tailored for different target audiences.



**Fishing off the shores of Tongatapu, Tonga.**



Photos by Ian Keimur, 2004.

**Selling the day's produce on Tongatapu, Tonga.**

Coastal megacities — for instance, Jakarta, Manila and Tokyo — present particular challenges in this regard because many inhabitants have moved from their traditional settlements to the coastal cities. Traditional coastal and marine knowledge might be absent amongst such migrants. The heritage and knowledge of migrants, which can help them build livelihoods in the coastal environment, need to be identified and supported. At the same

time, the inland factors which lead to migration towards the coast need to be addressed. This point is highlighted by the Hyogo Framework's suggestion to "promote diversified income options for populations in high-risk areas to reduce their vulnerability to hazards." Coastal areas are not only high risk, but are also opportune in lending themselves to diversified income possibilities from land, sea and the tidal zone in between.

# There should be no implicit assumption that an event must happen before prevention and mitigation could be considered.

## Disaster Risk Reduction around the East Asian Seas

The disaster risk reduction challenges faced by this region are large, but they can be surmounted. The key is linking coastal and marine livelihoods to the vulnerability and risks which are created. People do not live in coastal areas because they cannot understand the threats there. They live along the coasts because of the opportunities which have traditionally been present; livelihoods are made possible by the resources available. Effective disaster risk reduction needs to address the reasons why people continue to use coastal and marine resources, to support these activities, and to use elements within people's day-to-day lives to reduce their vulnerability to disasters.

The Pacific region illustrates an approach which could hold value for communities in the East Asian seas. The Comprehensive Hazard and Risk Management (CHARM) programme is focused within local communities but also assimilates risk awareness into the national planning processes. This process is supported by skill

development, continuous training and advocacy for the implementation of risk reduction measures. Key principles include ensuring ownership by local participants within the country and links with national strategic plans. Consultation and frequent communication among communities, donors and development partners convey a message that risk reduction is vital to national development. CHARM has become a powerful public safety tool, changing perceptions about the practical feasibility of local risk reduction. Based on local community activities, it is cost-effective and has become part of an agreed regional programme able to attract external support.

Early warning projects around the East Asian region include the UN Environment Programme-Global Environment Facility's 2003 project "Emergency Response to Combat Forest Fires in Indonesia to Prevent Regional Haze in South East Asia." An early warning detection mechanism for fires has been established, including local risk assessments, an aerial surveillance regime for Sumatra and communication system improvements. Such efforts mitigate the risks to shipping evident from earlier haze emergencies while also reducing the amount of sediment run-off from burned areas into the ocean.

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Coastal environments are healthier, and fishing and sea-related trade become less dangerous.

The Asian Disaster Preparedness Center (ADPC) based in Thailand is a regional leader in developing and organizing education programmes. With its vision of "Safer communities and sustainable development through disaster reduction," ADPC's research and training includes topics on community-based disaster risk management, disaster mental health issues and training of trainers. This work highlights coastal areas as being particularly prone to hazards, with typhoons and salinity intrusion mentioned as key threats in Vietnam and storm surges, tsunamis and sea-level changes prominent hazards in the Philippines (Bildan, 2003).

The Asian Disaster Reduction Center (ADRC) in Japan has similarly strong programmes for disaster risk reduction in coastal areas of the East Asian seas. ADRC's tsunami education programme in Papua New Guinea was tested in 2000 when an earthquake-generated tsunami destroyed thousands of buildings along Papua New Guinea's coasts. Because of warning and education, there were no casualties (ISDR, 2004a). ADRC also implements their "town-watching" tool for which local residents team up with government officials and external experts to walk around a settlement identifying perils and opportunities (ISDR, 2005). This method has been successfully implemented in the coastal areas of Indonesia, Japan and Vietnam.

Since 1994, the Vietnam National Red Cross Society has been protecting and planting additional mangrove forests in coastal parts of the country to reduce wave and surge damage (IFRC, 2002). In addition to reducing damage from sea storms, the mangroves are a habitat for shellfish, which families harvest for food and trade, reducing malnutrition and providing income. Coastal livelihoods and disaster risk reduction can be supported through the same programme.

## Conclusion

Coastlines of East Asian countries have provided lessons for the world which should not only be learned, but also applied. Considerable experience already exists to reduce disaster risks and case studies prove to be an effective means of transferring this knowledge into people's daily lives and livelihoods. Calls for action are not always matched by the resources to make activities happen — until a disaster occurs.

In previous years before the Indian Ocean tsunami in December 2004, several calls for a tsunami early warning system in the region have not been heeded. After the catastrophe, despite some initial hesitation by many governments, a global commitment of tens of millions of dollars for tsunami protection, specifically for early warning, was quickly realized. Any such initiative is far too late for the thousands who

perished for lack of basic knowledge and simple warnings, which in hindsight would have been greatly economical considering the eventual losses incurred.

Yet a headlong rush into warning systems for the disaster which has already happened could compound an earlier error of ignoring clearly-identified threats. If the systems implemented do not apply lessons from past mistakes and do not match the Hyogo Framework's priorities for action, then how much would have been gained? Post-catastrophe resources and opportunities should be used for much more than only averting a recurrence of the just-experienced event.

There should be no implicit assumption that an event must happen before prevention and mitigation could be considered. Living productively and safely in coastal zones requires people to think about the risks before a disaster occurs. Coastal and marine resources must be used to build and sustain livelihoods and communities without increasing vulnerability. Thinking ahead of disasters would avoid being sidetracked by specific events and focus instead on the emphasis provided at the World Conference on Disaster Reduction to produce a safer world. Where the land, sea and air meet in the countries of the East Asian seas, the continuing process of coastal disaster risk reduction can and should be built around coastal resources, communities and livelihoods. ■

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