1.2 Contexts and policy framework of disaster risk reduction: sustainable development

"While we cannot do away with natural hazards, we can eliminate those we cause, minimize those we exacerbate, and reduce our vulnerability to most. Doing this requires healthy and resilient communities and ecosystems. Viewed in this light, disaster mitigation is clearly part of a broader strategy of sustainable development – making communities and nations socially, economically and ecologically sustainable."

Source: J. Abramovitz, 2001.

Political support for disaster risk reduction has to be established from the apex of political power but is only realistic if the perceptions of risk and the actions proposed accord with the cultural beliefs and habits of society.

The national character and chosen form of governance can be as much of a determinant in understanding and managing the risks in a given country as are other various social, economic and environmental determinants.

In today's world, societies are confronted with rapid change. Therefore, the value of disaster risk reduction can only be realized through rigorous identification and continuous evaluation of the relationships that exist between the beliefs and conditions in which people live, the changing environment people inhabit and depend upon for their livelihoods, and the forces of nature.

Most importantly, disaster risk reduction relies on the consequences of collective decisions made and individual actions taken or not taken. The emergence of a disaster reduction culture is conditioned by the following contexts and processes:

- political context;
- sustainable development in its three related contexts: sociocultural, economic and environmental; and
- regional considerations linking disaster reduction and sustainable development.

Promoting sustainability in disaster reduction means recognizing and making the best use of connections among social, economic and environmental goals to reduce significant hazard risks. This entails abilities to reduce exposure and aid recovery from infrequent large-scale, but also more common smaller-scale, natural and human-driven events.

The bottom line for any country, especially the poorest, is to build sustainable communities with a social foundation that provides for health, respects cultural diversity, is equitable and considers the needs of future generations. All countries require a healthy and diverse ecological system that is productive and life sustaining a healthy and diverse economy that adapts to change and recognizes social and ecological limits. This cannot be

Box 1.3
The six principles of sustainability

1. Maintain and enhance quality of life
2. Enhance economic vitality
3. Ensure social and intergenerational equity
4. Maintain and enhance environmental quality
5. Incorporate disaster resilience and mitigation into actions and decisions
6. Use a consensus-building, participatory process when making decisions

Source: J. Monday, *Building back better*, 2002.

achieved without the incorporation of disaster reduction strategies, one of six principles of sustainability supported by strong political commitment.

The motivation to invest in disaster risk reduction is very much a poverty reduction concern. It is about improving standards of safety and living conditions with an eye on protection from hazards to increase resilience of communities. A safer society to withstand disasters may be argued as a case of ethics, social justice and equity. It is also motivated by economic gains. Socio-economic development is seriously challenged when scarce funds are diverted from long-term development objectives to short-term emergency relief and reconstruction needs.

Environmentally unsound practices, global environmental changes, population growth, urbanization, social injustice, poverty, conflicts, and short-term economic vision are producing vulnerable societies. The impact of development on disasters in an increasingly unstable world should be fully embraced if disaster risk reduction is to yield its expected benefits. This takes on particular urgency in the face of long-term risks brought about by climate change which goes much beyond environmental degradation or mismanagement of natural resources. Development-as-usual is blind to risk and fuels disasters which threaten further development (BCAS 2002).

The political context

Political commitment is an essential ingredient for sustained risk reduction efforts. Obtaining political commitment from public authorities is one of the four principle objectives of ISDR. This objective needs to be addressed through increased coordination at all levels. Disaster reduction should be dealt with as a policy issue across relevant fields of government including health, agriculture, environment and development. (National and regional policies are elaborated in chapter 3).

For example, in Southern Africa other forces have combined to influence the political context of disasters. Decades of armed conflict, political instability and population displacement have conditioned more recent approaches to disaster management. In addition to the loss of lives, war-related damage and destruction to infrastructure, the prevalence of prolonged relief operations has been widespread in places, creating a sense of dependency on external assistance.

International humanitarian assistance that often inundates countries facing severe drought or flood crises is seldom accompanied by support for long-term institutional change that promotes practical mitigation efforts. To a significant extent, the emphasis given to the urgent supply of material requirements and logistical capabilities born of crisis and responding to the needs of unsettled populations, persists long after the acute conditions have been resolved. Too often a memory of relief supplies or a legacy of external assistance remains to discourage local initiatives or sustained institutional investments in disaster risk reduction.

If today, short-term actions reducing loss of life are effective, longer sustained commitment towards disaster reduction seems to be lacking. However, to be feasible, disaster reduction needs to show it is able to address short-term needs of survival as well as to take care of longer-term objectives of prevention and capacity-building.

This approach is illustrated by efforts undertaken in the cities of Manizales and Medellin in Colombia. There, the death toll and economic damage due to landslides and floods have decreased considerably thanks to initiatives undertaken by the municipalities, universities, private sector and community groups, through reforestation, planting ground cover, improved drainage systems and engineering works. In some cases, these investments are even generating income through harvesting and tourism.

"There is a hope for a less hazardous environment, and its achievement will depend upon the linking and convergence, and the integration, of hazard studies into the larger consciousness of sustainability and equity".

Source: White, Kates and Burton, 2001

"Managing risk depends on political will. Political will depends on political leadership and a shifting set of incentives, pressures and polemics. The political costs of redirecting priorities from visible development projects to addressing abstract long-term threats are great. It is hard to gain votes by pointing out that a disaster did not happen. How can we, who see risk management as a central priority and who have valuable technical knowledge and skills to contribute, enter this policy arena? This question is at the centre of the discourse. We know now that we must engage, but do we know how?"

Source: I. Christoplos, J. Mitchell and A. Liljelund, 2001.

"The state of a country's…political condition at the time of the onset of a disaster is a major determinant in the impacts on society of that event."

Source: M. Glantz, 2000.

"Can sustainable development along with the international instruments aiming at poverty reduction and environmental protection be successful without taking into account the risk of natural hazards and their impacts? Can the planet afford the increasing costs and losses due to so-called natural disasters? The short answer is, no."

Source: UN/ISDR, 2003.

Political change, economic reform and development of public policy to protect people and resources are fundamental solutions for disaster reduction. Capturing opportunities for social change during the "window of opportunity" following disasters, for example by utilizing the skills of women and men equally during reconstruction, is both possible and necessary. Politicians that undertake no-regret policies and apply precautionary principles in matters of environmental protection should take the same stance regarding disaster reduction.

Similarly, the public that exercises great pressure to bring about environmental policy changes should become a political force putting pressure on governments to protect people from disasters. If it becomes a popular issue, disaster risk reduction will gain momentum.

It should also be noted that political decisions can have negative consequences on disaster impacts. For example, huge hydraulic projects displace people and change landscape references of communities and their perception of risk, thereby increasing vulnerability by reducing the people's capacity to assess and anticipate hazard-related threats.

Sustainable development

Disaster reduction has emerged as an essential requisite for sustainable development. The UN General Assembly includes disaster reduction in its treatment of the sustainable development items in its annual deliberations. Furthermore, the 2002 World Summit on Sustainable Development (WSSD) adopted the Johannesburg Plan of Implementation including reducing risk and vulnerability as main targets by 2015 (for more detail see Annex 5).

The escalation of severe disasters poses a threat to both sustainable development and poverty reduction initiatives. Repeated exposure to disasters can lead to a downward spiral of poverty. As a consequence, Principle 1 of the Rio Declaration is at risk. This principle states that human beings are at the centre of concerns for sustainable development and are entitled to a healthy and productive life in harmony with nature.

The post-disaster reconstruction period provides the best time to introduce disaster reduction into sustainable development planning. When perceived as a distinct set of activities, risk management

Box 1.4
Paired perspectives

Two countries respond to the question of the role of political commitment in disaster risk reduction.

Country one: A highly disaster-prone country, with considerable technical, material and financial resources, with strong political aspirations to modernize.

"Disaster mitigation is not a priority item, except at times of disaster. With many pressing requirements related to health, education, development, defence, etc., disaster mitigation must during normal times be given diminished attention. We do not think that an easy recipe exists to overcome these obstacles."

Country two: A highly disaster-prone country, with few technical, material and financial resources, and much greater demands to realize its strong political aspirations to develop.

"It has been possible for the government to institutionalize the concept of disaster management and also to generate momentum at the grass-roots level for self-reliance in coping with and responding to disasters."

Source: ISDR questionnaire, 2001.

initiatives are placed in competition with other environmental and developmental objectives, rather than being seen as integral parts of the same whole. Therefore, political commitment and social acceptance of the value of risk reduction are necessary to increase the sustainability of communities.

Societies will become resilient when they integrate adaptive and risk management processes in sustainable development strategies. This implies the need to protect livelihoods against risk and uncertainty from global environmental changes, based on trade-offs between different components of the strategic development framework.

Sociocultural context

As a pillar of sustainable development, the links between disaster and the sociocultural system are important components in disaster risk reduction. (Social vulnerability is discussed further in chapter 2). The term culture is understood in a myriad of ways and represents a complex notion.

Differences exist among groups of people, and these differences reflect a variety of factors including language, socio-economic and political systems, religion and ethnicity as well as historical experience and relationships with nature. Each cultural group has its own set of experiences and expectations as do women and men and people in different age groups. Furthermore, these relationships among people are embedded in unequal power relations with different sets of values; some groups become dominant and others are marginalized. All of these factors are highly relevant in the context of natural disasters.

Much early thinking about disasters was based on a notion of nature and culture being separate. Disasters were seen as the products of a capricious and unpredictable nature and therefore beyond the control of humans. Often they were referred to as acts of supernatural forces, or acts of god. It became increasingly obvious that the causes of disasters are complex and that besides nature, people are also a causal factor. Looking beyond beliefs, more and more disasters are understood in terms of their cultural and social components. Vast differences in disaster vulnerability among countries and within individual societies have their roots in unequal sets of power relationships, leading to unequal distribution and access to wealth among different cultures or political settings. Therefore, much more research is needed on the social causes of disasters.

It is important that ownership of the disaster context is not stripped from local people by external interference. There is a growing appreciation of the need for disaster reduction activities to be based on more attentive participatory approaches involving local communities as much as possible, considering them as proactive stakeholders and not passive targets for intervention.

Common sense solutions in one cultural setting are often contrary to what may be common sense in others. Local socio-political structures and cultural conditions such as kinship arrangements, customary rights, community and family networks and systems of leadership nearly always persist during disasters. It is important that these are not undermined.

For example, it is important to recognize that death and illness have strong cultural implications. When decisions about matters such as mass burials are imposed on cultural groups by others, serious problems can occur that disrupt grieving and have long-term social, legal and psychological consequences. Some traditional practices must also be examined critically as cultural norms and family structures may increase the vulnerability of girls and women to disasters.

Cultural patterns which structure the lives of women and men also must be clearly understood. Their differing needs, roles and social power in various social contexts

A definition of culture

A complex whole which includes ways of life of a people, attitudes, values, beliefs, arts, sciences, modes of perception, and habits of thought and activity; that set of capacities is fundamental to the mode of adaptation of a particular people.

Adapted from: Dictionary of concepts in cultural anthropology, Robert H. Winthrop, 1991.

"The three-legged stool of environmentally sustainable growth, resource protection and conservation, and just social development will never prevent women and men from harm caused by naturally-occurring extreme events—but will certainly help prevent them from becoming disastrous in their effects upon people. But neither sustainability nor disaster reduction are possible so long as structural inequalities constrain women's lives and other forms of social inequality persist between peoples, nations, and regions. Women and men can and must find common ground as they take up the hard work ahead of building more sustainable, just, and safer ways of living on this planet."

Source: Elaine Enarson, 2002.

need to be taken into account. Men are usually seen as primary income generators while women's economic activities, often the mainstay of the household economy, are less visible. Women assume primary responsibility for the care of children, the elderly, the disabled and the ill whose mobility and survival in disasters may be limited. Sex-specific dependencies and vulnerabilities based on reproductive differences are relevant in disasters as is the respective ability of women and men to participate fully in household, community and national decision-making about hazard and risk management.

In many cultures, attachment to place is a critically important element, thus decisions to move people must be made carefully. In some cases, people reported feeling more afraid and at risk in relocation sites than if they had remained in their home environment. In many cases people are unwilling to leave a house in which they have invested most of their time and money, in which they earn income and care for family members. Often it constitutes their principal legacy to their children.

In other instances, host communities have felt imposed upon by those who have been relocated and violent reactions are not uncommon. Relocation of communities at risk may be scientifically the most attractive and seemingly reasonable prevention measure but it can be contrary to cultural norms.

Cultural change is an important consideration in disaster reduction, as is cultural continuity. For example, intercommunity cooperation following disasters was extremely common among traditional Pacific island communities, and to a large extent sustained by ceremonial exchange systems. These exchange networks fell away as commercial trading, often centred in colonial capitals, replaced traditional forms of exchange. Colonial governments replaced traditional political networks and missionaries further discouraged exchanges as threats to Christianity. Relief aid also reduced the need to maintain such networks.

With the migration of many Pacific islanders to places such as Australia, California and New Zealand, new exchange networks have emerged. Following disasters, major flows of resources now enter Pacific island states in the form of help from expatriates. Culturally, disasters have become important events through which Pacific island diaspora maintain links with their former homes.

An important finding of many researchers working in developing countries or in local communities is that a wide variety of measures for reducing disasters existed in earlier, often pre-colonial, times. A variety of sociocultural or economic factors have in some cases eroded these measures, undermining cultural support and social activities that might have otherwise contributed to sharing the exposure to risk among members of the community, or increasing their abilities to cope with abnormal situations.

Box 1.5
The impact of cultural change on disaster resilience

Cultural changes tend to reduce disaster resilience in traditional communities and at the same time, disasters can exaggerate their influence. While such changes most probably would have happened anyway, there can be little doubt that they can be hastened by disaster events, as the following examples from Pacific island states demonstrate:

- Introduction of new crops, especially cassava which is more vulnerable to high winds than yams or taro, the common traditional subsistence crops.
- Replacement of traditional hazard-resistant housing with climatically inappropriate disaster-relief homes.
- Reduced need for food preservation and storage resulting from relief supplies, especially of rice, which has become an increasingly dominant component of diets in both rural and urban areas.

Source: John Campbell, University of Waikato, 2001

Economic context

The links between disaster and the economic system, another pillar of sustainable development, are clear. Historically, people have always made investments to obtain, and then to protect, those resources that hold the greatest value for them. This is the principle behind insurance or other efforts to spread risk within a community, including joint ownership or responsibility for protecting assets.

The concern demonstrated by a farmer to protect a single cow, a homestead gardener to conserve water or a fisherman to mend nets in subsistence economies further reinforces the crucial role of economic systems in reducing risk.

Economics and the awareness of an increase in disaster severity and frequency provide incentives for development banks and international assistance institutions to integrate risk reduction in their development strategies and to develop innovative forms of financial investment. This also happens at the household and micro-entreprise level, and in national and regional economies.

Risk management planning involves an estimation of the impacts of potential disasters on the economy, based on the best available hazard maps and macroeconomic data. These include assessments of the costs of disasters, evaluation of the costs and benefits of disaster reduction and risk transfer measures (including the value of improved forecasting systems) and incentives from the international community that lead towards proactive disaster reduction projects. Such studies are carried out through international cooperative arrangements, especially by the Inter-American Development Bank (IADB).

Better understanding the real costs of natural disasters is difficult. Major impediments include a lack of reliable data, or clear and consistent definitions of what is being measured.

Methodologies employed tend not to be so readily comparable, and approaches to estimating costs or determining the extent of coverage can be inconsistent from place to place. In addition it remains to be proven that more precise damage and loss calculations would necessarily lead to evident changes in policy decisions or marketing practices.

Monetary indicators linked to disasters should be critically reviewed as they often fail to capture specific economic and social circumstances. Calculation of losses should take the nature and magnitude of employment losses into account. Similarly losses have to be related to households' situation and vulnerability before and after disasters. The impact of a US$ 50 loss of assets can be minor or huge depending on one's economic and social situation.

Given the recurrence and frequency of natural hazards, a concerted effort will always be required to respond effectively to them, and to assess the frequency of emergency recovery assistance, as well as the prospects of reducing damage in the future. Promotion of disaster risk reduction needs to be matched by reality. In the case of the 2000 floods in Mozambique, only 15 per cent of the money

Box 1.6
Economic loss due to natural hazards in 2003

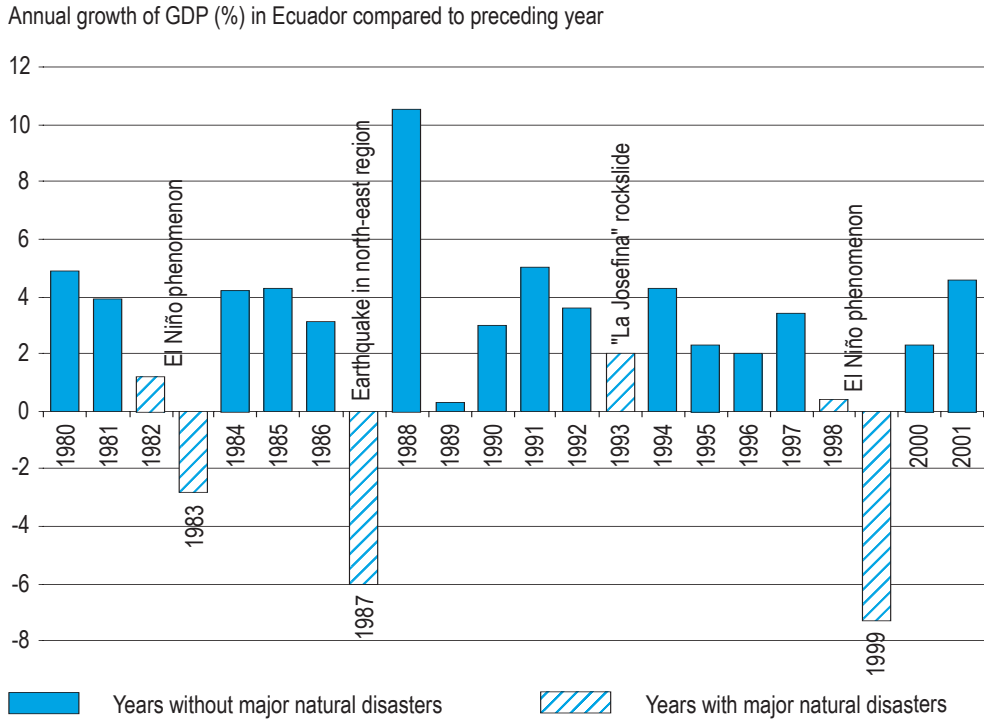
2003 was marked by a series of severe natural hazard events, with the number of fatalities far exceeding the long-term average. More than 50,000 people were killed in natural catastrophes worldwide, almost five times as many as in the previous year (11,000); such a high number of victims has only been recorded four times since 1980. The heat wave in Europe and the earthquake in Iran each claimed more than 20,000 lives.

The number of natural catastrophes recorded in 2003 was around 700 – the same level as in the previous year – but economic losses rose to over US$ 60 billion (in 2002: US$ 55 billion).

Around the globe, 70 earthquakes caused damage resulting in economic losses of approximately US$ 6 billion, far higher than the insured losses of approximately US$ 100 million. Windstorms accounted for about a third of the 700 events recorded, but for 75 per cent of all the insured losses caused by natural catastrophes.

Source: Munich Re, 2003.

Figure 1.4
Annual growth Gross Domestic Product (GDP) and occurrence of major "natural disasters" in Ecuador, 1980-2001



Source: PRECUPA/SDC project, Central Bank of Ecuador 2002

Box 1.7
Evidence of the economic benefits of disaster reduction efforts

In the Caribbean, empirical evidence shows that it is significantly more cost-effective to design and build a structure to standards that would withstand maximum expected wind or seismic forces in a given location, rather than build to lower standards and suffer the damages.

Source: Organization of American States, 1993.

Switzerland long ago recognized the value of forests in protecting important economic assets (roads, industries, infrastructure, tourism) as well as human settlements and people against avalanches and landslides. The economy provided by the protection afforded by forests was estimated between US$ 2 billion and US$ 3.5 billion per year.

Source: Swiss Agency for the Environment, Forests and Landscape, Economics and Climate, 1999.

In the United States, after the 1993 Midwest floods, government buyouts of flood-prone residents and movement of material property to areas outside the 100-year flood plain were successful in reducing flood claims in subsequent flood events. The buyout initiative resulted in a significant reduction in National Flood Insurance Program claims and the availability of land in flood plains for other purposes. In the long run, economic sustainability, hazard mitigation efforts plus enhanced risk assessment utilizing appropriate tools will have environmental pay-offs.

Source: Annual Hazards Research and Applications Workshops, University of Colorado, 2001.

Box 1.8
Economic initiatives for disaster reduction

- Assess natural disaster damage and loss potential (including historical perspective).
- Analyse costs and benefits of disaster management (cost-effective allocation of resources).
- Assess hazard risks at the project appraisal stage of all potential investment projects, including cost-benefit analyses that estimate the hazard vulnerability implications of alternative levels of overall quality and strength, as well as returns from specific disaster-proofing features.
- Evaluate trade-offs between quality and quantity of structural mitigation measures.
- Create incentives, cost-sharing and recovery for disaster reduction.
- Consider disaster risk transfer and financing opportunities.
- Enforce regulations under different levels of economic development and government capacity.
- Determine pricing policy designed for rational use of resources.

Adapted from: C. Benson, United Kingdom Overseas Development Institute, Department for International Development, 2002.

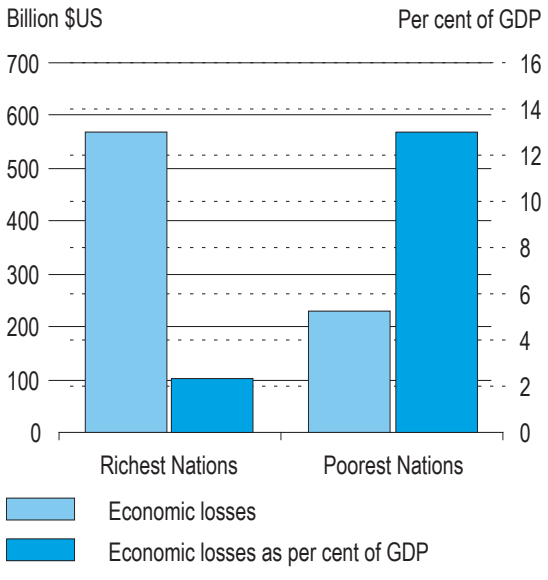
asked to replace river-level gauges was promised despite large aid sums otherwise pledged. As the aid was so slow to materialize anyhow, key infrastructure works could not be completed before the next rainy season.

The benefits of long-term disaster risk reduction versus the costs of repeated short-term post-disaster reconstruction need to be documented. In view of the exorbitant economic and social costs of recurring disasters, long-term hazard reduction planning is becoming, more and more, a guiding principle and prerequisite for the sustainability of physical investments. Efforts to estimate the net benefits of location or land use in hazardous areas, and also the actual benefits of extreme events both need to be undertaken.

Improvement and enforcement of regulatory frameworks for disaster reduction, including disaster-related insurance, building codes and land use planning can improve the chances that infrastructure is properly sited and built to minimize damages. This involves public insurance policy, market and regulatory incentives for risk and vulnerability reduction, protection against fluctuations in insurance and reinsurance prices, augmentation of insurance coverage at reasonable cost and backstop financial mechanisms.

The relationship between disaster and risk reduction and globalization also needs to be researched further to explore, on the one hand, the detrimental effects of deregulation, and on the other hand, the beneficial effects associated with economic competitiveness. Changes associated with globalization which impact social cohesion, environmental resources, economic stability and living conditions closely related to disaster resilience must not be underestimated. Capacities to cope should not be undermined by widening wealth gap, debt repayments, inequitable world trade practices and misguided economic adjustment policies. By contrast, the potential for risk reduction to become an essential element to increase competitiveness, protect investment and contribute to securing trade opportunities, while avoiding new risks and business interruptions, has to be more fully considered.

Figure 1.5
Disaster losses, total and as share of GDP, in the richest and poorest nations, 1985-1999



Source: Adapted from MunichRe, 1999

Box 1.9

The economic impacts of natural disasters in Pacific small island developing states

Experience in Pacific small island developing states (SIDS), as in many other poor countries, shows that it is probably not the actual dollar value of disaster loss that is most relevant, but rather the cost to the particular nation in terms of percentage of GDP – and this can be very significant indeed.

A South Pacific study of 1997 concluded that natural disasters have a significant impact on key economic elements such as GDP, employment and trade, and macroeconomic aspects, including government finances, monetary policy, inflation and the level of international reserves.

The conclusions underlined the importance of adopting appropriate policy and institutional capabilities in order to minimize the extent of physical damage and economic losses, in addition to the continuing role that donors have played in providing assistance for relief and rehabilitation purposes.

The study noted that, "with their limited economic diversification, combined with a high agriculture-GDP ratio prevalent among many of the small Pacific island states, [they are] particularly exposed to disaster devastation and considerable economic losses. In the short to medium term, the destruction of standing crops, physical infrastructure and housing could be severe, with the consequences that GDP could become sharply depressed for some time, with likely consequence of provoking macroeconomic instability".

In the longer term, the study noted that damage to productive assets could lead to a loss of output with reduced economic growth and declining standards of living. "The reallocation of financial resources after a disaster for emergency and rehabilitation purposes as well as reductions in capital investments can impede the realization of major national development objectives."

However it was equally noted that "the extent of the destruction and economic losses that result, both immediately and over time, depends on a variety of factors including the degree of dependence on agricultural production, the level of structural diversification achieved, resource endowment and the level of disaster preparedness".

In small countries generally, and in small developing states specifically, primary attention needs to be given to a range of mitigation strategies that can reduce the exposure or risk of damage to productive assets and associated economic losses.

The promotion of appropriate macroeconomic policies can also be vital in cushioning the destabilizing impact of natural disasters. These can include firm adherence to fiscal and monetary policies at the time of severe demands on financial resources created by emergency conditions or post-disaster requirements, the encouragement of property owners to adopt insurance as means of spreading their risk, and the creation of a disaster reserve fund to facilitate a quick recovery of vital economic activities or infrastructure facilities following a disaster.

At a more basic level of reducing risks long before they threaten, practices that maintain a continued commitment to strong macroeconomic fundamentals, including adequate external reserves, can serve as buffers against disaster-related crises.

Source: Adapted from Te'o I.J. Fairbairn, South Pacific Disaster Reduction Project, 1997.

Environmental context

The third system with which disaster reduction is closely linked is the environmental system, yet another pillar of sustainable development. Disasters do not only affect the built environment but also the natural environment.

Environmental degradation increases the intensity of natural hazards and is often the factor that transforms the hazard into a disaster. For example, river and lake floods are aggravated or even caused by deforestation which in turn causes erosion and clogs rivers. As stated by the Intergovernmental Panel on Climate Change (IPCC), social and economic systems are already affected by the recent increasing frequency of floods and drought.

Global environmental change, particularly climate change, poses an exceptionally complex challenge for humanity that affects vulnerability and hazard patterns. In this context, the work of the Global Environmental Change and Human Security (GECHS) project of the International Human Dimensions Programme on Global Environmental Change (IHDP) is of interest. It develops methods for an early warning system of environmental change and its potential impacts to determine why some groups or communities are more vulnerable than others, given the same level of biophysical risk.

Poverty and vulnerability are linked to this situation. The poor are compelled to exploit environmental resources for survival, therefore increasing both risk and exposure to disasters, in particular those triggered by floods, drought and landslides. Environmental refugees settling in fragile drylands with low resilience are major concerns to resource managers, especially in Africa. Addressing the poverty challenge is therefore urgent. The initiative taken by ten international organizations including the World Bank and UNDP to discuss how to integrate adaptation to climate variability and change into poverty eradication is a welcome step in this direction.

The natural environment provides solutions to increase protection against disaster impacts. Therefore, successful disaster reduction should enhance environmental quality, which includes protection of natural resources and open space, management of water run-off, and reduction of pollution.

Successful environmental policies should highlight the effectiveness of disaster reduction measures. This should entail an acceptance of some degree of natural disturbance to avoid the greater consequences of extreme events, and an appraisal of alternative solutions to an exclusively engineering approach. As women and men tend to use different environmental resources, a gender perspective is especially important. Women's roles as primary resource users and managers, not always in the interests of sustainability, make them vital partners in wise environmental management to reduce risk.

"Around the world, a growing share of the devastation triggered by 'natural' disasters stems from ecologically destructive practices and from putting ourselves in harm's way. Many ecosystems have been frayed to the point where they are no longer resilient and able to withstand natural disturbances, setting the stage for 'unnatural disasters' – those made more frequent or more severe due to human actions. By degrading forests, engineering rivers, filling in wetlands, and destabilizing the climate, we are unravelling the strands of a complex ecological safety net."

Source: J. Abramovitz, 2001.

Box 1.10
The International Human Dimension Programme on Global Environmental Change

Launched in 1990, the International Human Dimension Programme on Global Environmental Change (IHDP) is a non-governmental science programme devoted to interdisciplinary and international research on the human dimensions of global environmental change. Its national committees and programmes around the world bring scientists together on these issues. Research on urbanization, mountains, vulnerability assessment and "science for sustainable development" are some of its main activities.

Global Environmental Change and Human Security (GECHS) is one of its core projects. Working with a definition of human security that connects the theoretical with the practical, the purpose is to promote research on various topics related to environmental change and security, exploring among others the link between environmental stress, vulnerability and human security. Another goal of the project is to extend collaboration among scholars and link policy makers, researchers and other groups, facilitated by the International Network on Environment and Security (INES), a European-based project involving institutes interested in environment and security.

Box 1.11
Nature's solutions to reduce disaster impacts

"The time has come to tap nature's engineering techniques – using the services provided by healthy and resilient ecosystems. Dunes, barrier islands, mangrove forests, and coastal wetlands are natural shock absorbers that protect against coastal storms. Wetlands, floodplains, and forests are sponges that absorb floodwaters. Nature provides these valuable services for free, and we should take advantage of them rather than undermining them."

Source: J. Abramovitz, Unnatural disasters, 2001.

"Open space, greenways, and riverside parks serve as habitat for wildlife, protect streams from pollutants, help maintain water temperatures, and keep people and development from the highest-risk floodplains. Trees can drastically reduce storm water management costs. American Forests studied Garland, Texas, and calculated that the city's canopy reduced storm water runoff by 19 million cubic feet during a major storm. Annually, the trees save Garland US$ 2.8 million in infrastructure costs and US$ 2.5 million in air quality costs and residential energy bills."

Source: Natural Hazards Research and Applications Information Center, 2001.

Around the village of Guarita in Honduras, local people practiced traditional Quezungal farming methods consisting of planting crops under trees, maintaining ground vegetation and terracing in order to root the soil and reduce erosion. During Hurricane Mitch, only 10 per cent of the crop was lost, leaving reserves that could be shared with more severely affected neighbouring areas.

Source: UNDP/BCPR communication, 2002.

The Viet Nam Red Cross Society conducted an environmental preservation project in Thai Binh province to address different aspects of risk relating to typhoon occurrence that threatens the people living on the coast. Two thousand hectares of mangrove plantation were created along the coastline serving to reduce wind and wave velocity and action, thereby protecting landscape, human life and local development assets.

Resource opportunities for improving livelihoods were provided by a healthier natural environment. The limited damage provoked by the worst typhoon in a decade provided the best possible indication of the effectiveness of the plantation in reducing risks and its ability to enhance the resiliency of local communities.

Source: International Federation of Red Cross and Red Crescent Societies, World Disasters Report, 2002.

During the 2002 summer floods in Europe the floodplains of Moravia absorbed the Danube flood wave and helped protect Bratislava from higher flooding levels. This effect could be multiplied across the whole Danube basin to prevent future losses of life, property, and threats to human health – all that is needed is governments to invest in nature rather than in hard, old-fashioned, engineering solutions.

Source: World Wide Fund for Nature, 2002.

There is growing recognition that by following principles of wise environmental management, increased hazard protection as well as economic benefits can be provided by the natural environment. This can be accomplished by building capacities, exchanging information, experience and knowledge and collaborating with other groups.

The wealth of information in both environmental and disaster management studies should be shared. Both areas are multidisciplinary and innovative in their approaches and analysis of the socio-environmental nexus. Traditionally, each is dominated by the public sector and non-governmental organizations which encourages wide participation. Tools such as vulnerability indexing, inventory mechanisms, educational programmes for public awareness and impact assessments are continuously being refined in both fields.

Encompassing long-term comprehensive goals to manage growth, development and land use implies incorporating an effective environmental component into disaster reduction strategies. Sustainable management of natural resources, including reforestation and settlement schemes should increase the resilience of communities to disasters by reversing current trends of environmental degradation and by addressing hazard management in a comprehensive way. This will also contribute to the social acceptance, political feasibility and economic rationale of disaster reduction programmes. Furthermore,

synergies with policy goals pursued in the area of adaptation to climate change will bring additional support to efforts in disaster reduction.

Disaster reduction and environmental management should become joint national priorities. Entities responsible for disaster reduction should have clear environmental mandates. Inter-agency programmes are needed to promote a holistic problem-solving strategy, justifying the protection and restoration of natural functions of ecosystems, and assessing programme subsidies to create the right incentives for sustainability.

Until recently, there was scant discussion and even less organizational contact between environmental management experts and risk reduction experts. In fact, antagonism, power and authority struggles and competition over uses of land and natural resources often prevailed. It should also be recalled that the existence of environmental divisions within organizations and national ministries of environment were not the norm in the 1980s.

As disaster reduction and environment have a lot in common, the disaster reduction community should look closely at experience gained in promoting environmental policies. The environmental community has been promoting its agenda for 30 years. Today, an environmental strategy to achieve sustainable development is a given policy option. Disaster reduction policy must follow a similar path.

Environmental accounting systems that produce information suited for decision-making should reflect disaster reduction considerations. Additional studies are needed to improve systems of ecological economic accounting. Translating environmental resources and services into conventional economic figures is still very much a challenge.

Some of these boundaries have been breached. In the late 1990s in Latin America and the Caribbean, El Niño, Hurricane Georges and Hurricane Mitch focused attention on the full spectrum of the hydrological cycle to both development and disaster concerns.

The magnitude of the resulting fires, drought, flooding and landslides associated with these disasters inevitably stimulated discussion about the relationships that exist between environmental mismanagement and the occurrence of hazards.

Until recently, the gender dimensions of sustainable development, as well as in disaster risk reduction were easily neglected. This occurred despite ample evidence that environmental degradation, development practices, and natural disasters impact women's and men's health and livelihoods differently. Women are also especially proactive in risk reduction initiatives at the household and local levels.

An important initiative in linking environmental management to disaster risk reduction was the publication of *Strategy for the Reduction of Environmental Vulnerability in Central America when Faced with Natural Disasters: Environmental Management and the Evaluation of Vulnerability* (May 1999). Produced in

Box 1.12
Linking the environment and disaster reduction activities

- Assessment of environmental problems linked to hazards based on reliable sources of existing information with the related evaluation of impacts and the need for additional data.
- Mapping of environmentally sensitive areas, description of the characteristics of the environment and development trends in these areas.
- Examination of environmental benefits to be drawn from disaster reduction activities throughout various sectors.
- Monitoring to provide information for decision-making purposes (for example, suitability of land for development).
- Environmental tools for disaster reduction purposes: regulations, incentives, conservation programmes, hazard control and mitigation, water/watershed, and coastal zone management.

"The failure by the development community to take climate change and disaster reduction seriously represents a double disconnect in policy which threatens the lives of millions of vulnerable people around the world. Part of the problem is that professionals working within these sectors operate in different worlds and on different timescales. Disaster managers are too busy grabbing the phone and ordering more food and blankets to worry about risk reduction and development concerns. Meanwhile climate change scientists work with 100-year models that bear little immediate relevance to the timespan of policy makers and field workers. The development community sits between these two groups and bears the major responsibility for bringing them together into one coherent discourse."

Source: Bangladesh Centre for Advanced Studies/New Economics Foundation, 2002.

collaboration with the UN Economic Commission for Latin America and the Caribbean (ECLAC), UNDP, UNEP and the World Bank, this document provided an overview of the disaster and vulnerability problems in the region and proposed many wide-ranging projects for financing as part of the international process to rehabilitate Central America. The content of the proposals went quite beyond environmental problems, touching on almost every foreseeable topic of interest to risk analysts and managers.

Reflecting increased attention about the need for gender-aware and culturally-specific perspectives in the global dialogue about sustainability and disasters, the World Bank and IADB commissioned studies of gender issues arising from Hurricane Mitch. Within the UN, the Division for the Advancement of Women initiated a global Internet conference and subsequent expert working group to examine linkages between gender equality, environmental management, and natural disaster reduction.

The report and recommendations drew on extensive work conducted during the 1980s and 1990s to incorporate gender perspectives into sustainable development, disaster reduction, and emergency relief. Gender analysis has proven to be a useful common thread for weaving together ways of thinking about disasters and sustainability which, while too often separated institutionally, are inescapably joined empirically.

Box 1.13
Long-term environmental changes and disasters

At the beginning of the 21st century, there is, particularly in Pacific small island developing states (SIDS), growing concern about the long-term consequences of climate change, the El Niño phenomenon and the potential for rising sea levels. In recognizing the heavy dependence of SIDS on the natural environment and their exposure to almost all types of natural, technological and human-related hazards, there is a strong rationale for considering all these hazards in a generic sense as environmental hazards. Environmental impact is precisely the premise for disaster reduction in five generic environments:

- built environment – property, buildings, infrastructure;
- natural environment – geography, physiology;
- human environment – human life, socio-economic factors;
- terrestrial environment; and
- marine environment.

Regional considerations linking disaster reduction and sustainable development

Progress can be shown through examples of regional strategies for sustainable development that strive to reduce the risk of disasters.

It was only after unacceptable losses occurred that risk assessment and management processes were included in infrastructure development projects. Angry demands of the public after particularly disastrous events (e.g. after the Gujarat earthquake in India, following Hurricane Mitch in Central America, or in the aftermath of the floods in Mozambique) provoked important and new commitments. These include the mandatory inclusion of risk assessment by international and regional development banks and development assistance agencies in their respective activities.

Asia

Although there have been few examples of effective, systematic and long-term integration efforts between disaster reduction and poverty alleviation programmes, a dialogue between these two interest groups is beginning to take place in the region.

In February 2001, the Asian Development Bank (ADB) organized the Asia Pacific Forum on Poverty. One of the key focus areas was social protection to diminish vulnerability to risks, generate employment and improve productivity and working conditions in Asia and the Pacific. It was one of the few times that a discourse on poverty alleviation in the region recognized disaster reduction as one of the key interventions for social protection.

A notable example of an integrated programme is the initiative of the Mekong River Commission (MRC). Following the extensive floods in Viet Nam and Cambodia in 2000, it developed a holistic strategy for flood management and mitigation that emphasizes land-use planning, structural measures, flood preparedness and emergency response.

The Phnom Penh Regional Platform on Sustainable Development for Asia and the Pacific, adopted in the wake of the WSSD, noted that the

financial crisis of 1997, the isolation and vulnerability of small island developing states and recurrent natural disasters pose major constraints to the achievement of sustainable development.

Gender and risk issues linked to environmental management and mitigation of natural disasters were discussed at the Asia Pacific Forum on Women, Law and Development (March 2002). States were urged to "recognize the impact of development policies and projects on environmental crises and natural disasters that manifest themselves in an aggravated and differentiated manner for women, causing the loss of their income, workspace and livelihoods; and, often, leading to destitution and denial of women's human rights".

In preparation for the Third World Water Forum (Kyoto, March 2003), the Asian Development Bank conducted a series of consultations on poverty, floods and gender. Results of these workshops that looked into the impacts of water-related disasters on the poor are available on their website. <http://www.world.water-forum3.com/>

Coping with natural disasters is perceived as an essential issue to be addressed in the region. Measures are called for to ensure that populations suffering the consequences of natural disasters, severe environmental degradation and other relevant humanitarian emergencies are given every assistance and protection so that they can resume normal life as soon as possible.

The region, however, has a long way to go in terms of integrating poverty alleviation and disaster reduction programmes in practice. More research is required on understanding the nature of linkages between poverty and vulnerability in different social, political, economic and hazard-specific contexts. This will then improve specific frameworks, tools and methodologies developed and applied to integrate poverty alleviation and disaster reduction programmes.

The Pacific

The crucial relationships that exist between natural disaster risks, the environment and their combined impacts on human societies are particularly evident in the Pacific small island developing states. People are highly dependent on the natural environment, and historical records testify to the devastating effects that natural disasters cause in the region.

There is growing concern among government officials and scientists about the potential for increasingly frequent and more severe meteorological and hydrological hazards resulting from climate change, and how they may affect Pacific islands.

Africa

Poverty levels remain high in Africa, especially among the rural poor. High levels of foreign debt and international conflicts have discouraged investment and growth. Under these austere conditions, significant investments at household or national level to mitigate the impact of natural or other threats are difficult to achieve.

In Southern Africa, the Southern African Development Community (SADC) expressed concern that ten years after the adoption of international agreements at the UN Conference on Environment and Development, Southern Africa was still "confronted by social, economic and environmental crises".

Among the core issues identified, poverty was highlighted as the primary constraint to socio-economic development, but matters of health, food security, climate change, water availability, land degradation and market access were also cited as critical issues.

Each of these factors has a bearing on prevailing vulnerability and risk issues in the region. In a region still heavily dependent on agriculture to maintain household livelihoods and national food security, drought and floods present serious challenges to sustainable development. Although the links between disaster reduction and national development programming are still weak in Africa, some countries including Ghana explicitly integrate disaster reduction in their poverty reduction strategy.

The African Ministerial Statement to the WSSD stated that the increased incidence of

natural disasters in Africa poses a major obstacle to the African continent's efforts to achieve sustainable development, especially in view of the region's insufficient capacities to predict, monitor, handle and mitigate natural disasters.

Reducing the vulnerability of the African people to natural hazards and environmental risks is mentioned as a requirement to achieve the poverty reduction goals of the Millennium Declaration alongside other basic requirements including economic growth, access to sources of energy and basic health services. Extreme weather events such as floods and droughts induced by climate change are singled out.

Latin America and the Caribbean

The health sector has recognized that risk reduction is a key consideration for an improved health sector throughout the region. The hurricanes and earthquakes affecting the region in the 1990s have convinced the Pan American Health Organization (PAHO) and most health authorities that a culture of prevention must include mitigation of structural and non-structural damages to health facilities and water supply systems.

This was made clear following the collapse of several hospitals during an earthquake in Mexico in 1985. Action requires significant capital investment, a decision in the hands of ministries and financing organizations. As a result, only a limited number of hospitals have been retrofitted, illustrating that disaster reduction requires broad consensus and political will.

The severity of the El Niño/La Niña phenomenon of 1997-1998, led to the establishment of the Andean Regional Programme for Risk Prevention and Reduction (PREANDINO) with the objective of promoting the development of disaster risk prevention and mitigation policies and new institutional arrangements aimed at incorporating prevention into development planning.

The Rio de Janeiro Platform for Action on the Road to Johannesburg 2002 was adopted by the Regional Preparatory Conference of Latin America and the Caribbean for WSSD. Ministers of environment and other senior representatives from Latin American and Caribbean countries stressed the need for actions that reduce disaster vulnerability and promote a culture of risk awareness by means of education, improved information dissemination and the use of early warning systems.

In Central America, natural hazards are exacerbated by the high level of vulnerability in the region. Therefore, any sustained commitment to reduce risk needs to be considered in the context of poverty reduction.

Increasing attention is being given to the global notion of risk as opposed to a more restricted view of disaster management. United Nations Development Programme (UNDP) in El Salvador has proposed the use of risk management as a uniting concept in the design of its five-year programme with the government. The conceptual framework used in the Lower Lempa Valley implemented with the Ministry of Environment was elaborated around the notion of global or total risk, where risk reduction is regarded as a component of development investment.

Europe

Disaster reduction has traditionally been approached through rigid civil protection frameworks at the national levels throughout Europe, but shifts from emergency to prevention outlooks and from national to regional perspectives are now taking place.

The European Commission has no overall disaster reduction or prevention strategy, but it is funding specific activities related to this field. Council decision of 9 December 1999 (1999/847/EC), establishing a European community action programme in the field of civil protection recognized that a greater awareness of the relationship between human activities and nature may in the future make it possible to prevent many disasters, including floods.

By referring to risk awareness, assessment and sustainable development, the decision encouraged projects in the area of prevention, preparedness, detection and study of the causes of disasters as well

as analysis of the socio-economic implications of disasters. In this regard, an integrated European strategy on prevention, preparedness and response to natural, human-induced and other risks is being elaborated. The sixth Community Environment Action Programme also foresees a network for exchange of prevention practices and tools.

At the Ninth Ministerial Session of the EUR-OPA Major Hazards Agreement in Bandol (France) in October 2002, several recommendations concerning national Euro-Mediterranean disaster reduction platforms were adopted. These involved considerations about elaborating a risk culture, a first phase implementation of risk prevention initiatives and ISDR. It called for strengthening and developing cooperation with the European Commission, in particular the Directorate General of the Environment to develop and implement the existing EUR-OPA initiatives in risk prevention.

Concluding remarks

Despite the progress achieved, much more is required to implement institutional changes that will help in the evolution of a disaster reduction culture. The processes conditioning the emergence of disaster reduction need to be conducive to understanding risk and vulnerability, awareness and management, leading to safer long-term development planning based on anticipation rather than cure.

Disaster reduction strategies drawing upon sustainable development concepts should be proactive and continual. To be effective, they need to promote political commitment, a financial rationale, environmental sensibility and cultural awareness. Such a shift in mentality should, in particular, meet the mitigation requirements imposed by the slow-onset disasters that global environmental changes will bring about.