1.2. Contexts and processes linked to disaster risk reduction: sustainable development

back

Political support for disaster risk reduction has to be established from the apex of political power but that can only be realistic if the perceptions of risk and the actions proposed accord with the cultural beliefs and habits of society. In today's interconnected world, societies are confronted with rapid winds of 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 distinctive beliefs and human conditions in which people live, the changing environment people inhabit and depend upon for their livelihoods, and the immutable forces of nature. Most importantly, disaster risk reduction relies upon the consequences of collective decisions made and individual actions taken – or not taken.

The emergence of a disaster reduction culture is conditioned by contexts and processes that are described below:

- The sustainable development context, the ultimate international goal;
- The political context, essential for action;
- The three contexts linked to the pillars of sustainable development:
  (a) The socio-cultural system
  (b) The economic system
  (c) The environmental system

Sustainability means recognizing and making best use of the interconnection between social, economic and environmental goals to reduce significant hazard risks. This entails the ability to reduce one's exposure to, and recover from, infrequent large-scale, but also frequent smaller scale, natural and human driven events.

The bottom line for any country, especially the poorest, is to build sustainable communities thriving from generation to generation with a social foundation that provides for health, respects cultural diversity, is equitable and considers the needs of future generations. They require has a healthy and diverse ecological system that is life-sustaining and productive, a healthy and diverse economy that adapts to change and recognizes social and ecological limits. This cannot be achieved without the incorporation of disaster reduction strategies, one of the six principles of sustainability supported by a strong political commitment.

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, 2002

Disaster risk management and reduction are about looking beyond hazards alone to consider prevailing conditions of vulnerability. It is the social, cultural, economic, and political setting in a country that makes people vulnerable to unfortunate events. The basis of this understanding is simple: the national character and chosen form of governance can be as much of a determinant in understanding the risks in a given country, as are the various social, economic and environmental determinants.

"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."
J. Abramovitz

The motivation to invest in disaster risk reduction is first and foremost a human, people centred 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 and social justice and equity. It is also motivated by economic gains. Socio-economic development is seriously challenged when scarce funds are diverted from longer-term development objectives to short-term emergency relief and reconstruction needs. It is considered by some as illusory to quantify benefits from disaster reduction. They see the issue foremost as a human and social concern rather than based on economic rationale and efficiency. Others advocate that effective planning and development options can only be based on a careful estimation of the economic gains and poverty impacts of disasters, accompanied by economic justification for the required investments in vulnerability reduction.

Environmentally unsound practices, global environmental changes, population growth, urbanization, social injustice, poverty, and short-term economic vision are producing vulnerable societies. The impact of development on disasters should be fully embraced if disaster risk reduction is to yield its expected benefits. "Instead of demonising hazards for their impacts on society, it would be probably more correct to demonise society for its impacts on hazards!" *(A. Lavell, IDNDR Programme Forum Proceedings, 1999).*

Children preparing to combat wildland fires in Indonesia

Photo: Global Fire Monitoring Centre, 2000

The sustainable development context

back

"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."

ISDR background paper for WSSD, 2002

The escalation of severe disasters is increasingly posing a threat to both sustainable development and poverty reduction initiatives. As a consequence principle 1 of the Rio Declaration is imperilled. This 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. Repeated exposure to disasters can lead to a downward spiral of poverty.

It is still the post-disaster reconstruction period that provides the most opportune time to introduce disaster reduction into sustainable development planning. Therefore, political commitment and social acceptance of the value of risk reduction are necessary for forward-looking developers who want to increase the sustainability of communities. When perceived as a distinct set of activities, risk management initiatives are placed in competition with other developmental objectives, rather than being seen as integral parts of the same whole.

Regional considerations

Progress can be shown by some examples of regional strategies for sustainable development that strive to reduce vulnerability to disasters. In some cases, it was only after unacceptable losses occurred, or when provoked by 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), that international development banks and development assistance agencies have begun to require risk assessment and management processes to be included in new infrastructure development projects.

• **In 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 the two interest groups is beginning to take place.

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.

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. Only then can specific frameworks, tools and methodologies be developed and applied to integrate poverty alleviation and disaster reduction programmes.

A notable example of an integrated program is the recent 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 participatory phase leading up to WSSD, notes that the financial crisis of 1997, the isolation and vulnerability of *Small Island Developing States (SIDS)* and recurrent natural disasters had posed major constraints to the achievement of sustainable development. 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.

• **In 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 states people are highly depend-

ent 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.

• **In Africa** poverty levels remain high, especially among the rural poor. High levels of foreign debt have discouraged investment and growth. Under these austere conditions, it is unrealistic to expect significant investments at household or national level to mitigate the impact of natural or other threats.

In Southern Africa, in preparation for WSSD, the *Southern African Development Community (SADC)* expressed concern that ten years after the adoption of international agreements at the United Nations 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 extreme rain events present serious challenges to sustainable development.

The African Ministerial Statement to WSSD states 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 disasters 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.

• **In Latin America and the Caribbean,** the health sector has recognized that risk reduction is a key consideration for an improved health sector. The hurricanes and earthquakes affecting the region in the nineties 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 in health facilities and water supply systems. This was made clear following the collapse of a hospital during an earthquake in Mexico in 1995. 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 once more that disaster reduction requires a large consensus and political decisions across the board.

• In **Central America**, natural hazards are exacerbated by the high level of vulnerability in the region. Therefore, any sustained commitment to reduce risk should 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. *UNDP* in El Salvador is proposing the use of risk management as a uniting concept in the design of its next five-year programme with the government. The conceptual framework used in the Lower Lempa Valley implemented with the Salvadoran Ministry of Environment was elaborated around the notion of global or total risk, where risk reduction is regarded as a component of development investment.

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.

back

The political context

*"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 [disaster risk reduction] discourse. We know now that we must engage, but do we know how?"*
I.Christoplos, J. Mitchell and A. Liljelund, 2001

Political commitment is an essential quality for sustained efforts of risk reduction. Only political willingness can give disaster reduction the place it deserves. Obtaining political commitment from public authorities is one of the four overriding objectives of ISDR to effectively reduce the impacts of disasters. This objective needs to be addressed through increased coordination at all levels, risk management strategies and the allocation of appropriate resources including development of new funding mechanisms. Disaster reduction should be dealt with as a policy issue across relevant fields of government including health, agriculture and environment. National and regional policies are addressed in chapter three.

To be feasible, disaster reduction needs to show it is able to address short-term and immediate 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, together with universities, the private sector and community groups, through reforestation, plant cover works, improved drainage systems and engineering works. In some cases, these investments are even generating income through harvesting and tourism.

Political change, economic reform and development of public policy to protect people and resources are fundamental solutions to treating causes rather than only symptoms. Politicians that undertake no-regret policies and apply precautionary principles in matters of environmental protection should be able to take the same stance regarding disaster reduction.

"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."
M. Glantz, 2000

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.

While disaster reduction will not reign without political willingness, a word should also be said about the negative consequences political decisions can have on disaster impacts. For example, huge hydraulic projects may 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.

The political context in Southern Africa

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 was 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 longer-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.

Paired Perspectives: Two countries' response to the same question in the ISDR questionnaire regarding the role of political commitment in disaster risk reduction.

Country 1: 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 2: 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 institutionalise 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.

Links to the pillars of sustainable development

The socio-cultural context

The links between disaster and the socio-cultural system are an important component in disaster risk reduction and a pillar of sustainable development. Social vulnerability is further discussed in chapter two.

The term culture is understood in a myriad of ways and represents an extremely complex notion. It is, therefore, useful to provide a definition.

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 towards nature. Each cultural group has its own set of experiences and expectations. Furthermore, relationships between people and groups of different cultures are often embedded in different sets of values, unequal power relations with some groups becoming dominant and others being 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 precocious and unpredictable nature and therefore to be out of the control of humans or referred to in terms such as acts of supernatural forces, or acts of god.

***Philosophical definition of culture**: The way of life of a people, including the attitudes, values, beliefs, arts, sciences, modes of perception, and habits of thought and activity. Cultural features of forms of life are learned but are often too pervasive to be readily noticed from within.*

***Psychological definition of culture**: The sum total of the ideas, beliefs, customs, values, knowledge and material artefacts that are handed from one generation to the next in a society.*

It became increasingly obvious that the causes of disasters are complex and that beside nature people are 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 relations, leading to unequal distribution and access to wealth among different cultures or political settings.

It is important that ownership of the disaster context is not stripped from local people who can be left even more powerless than would be the case if external intervention did not occur. 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

back

and cultural conditions such as kinship arrangements, customary rights, community and family networks and systems of leadership nearly always persist during disasters and it is important that these are not undermined. For example, it is important to recognize that dealing with death and illness is a strong cultural process. Where 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.

The differing needs and roles of men and women also need to be taken into account. Men are usually seen as income generators while women ensure social cohesion and continuity by taking care of children, the elderly and the disabled. Different priorities, perceptions and abilities to cope with abnormal situations need careful thinking to maximize the success of risk management and to achieve sustainable development.

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 the influence these change agents exert. 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 small 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 rural and urban areas, alike.

In many cultures, attachment to place is a critically important element, thus decisions to move people must be made carefully. In some cases, people have felt more afraid and at risk in the sites they have been moved to than if they had remained (even where the risk of death is relatively high). In many cases people are also unwilling to leave a house in which they have invested most of their time and money and which constitutes their principal legacy to their children.

In other instances, host communities have felt imposed upon by those who have been relocated and violent responses are not uncommon. The issue is that relocation of communities at risk may be scientifically the most attractive and reasonable prevention measure but it can be strongly opposed culturally.

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 discouraged exchanges as threats to Christianity.

Relief aid also reduced the need to sustain such networks. However, 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 remittances from kinfolk. Culturally, disasters have become important events through which the Pacific island diasporas maintain links with the home islands.

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 socio-cultural or economic factors mentioned have gradually eroded these measures, undermining cultural support and social activities that might have contributed to sharing the exposure to risk among members of the community.

The economic context

The links between disaster and the economic system, another pillar of sustainable development, are as clear as the financial incentive for disaster reduction. Indeed, 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 among a community including joint ownership or responsibility for protecting assets.

The concern demonstrated by a farmer to protect a single cow, or a fisherman to mend nets in subsistence economies, as well as the rapid growth of investment in business continuity practices seen in more commercialised societies, validate the economic basis of reducing risks in order to minimize the negative impacts of future disasters. Economics and the awareness of the importance of disasters that increase in severity and frequency through human action, 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. Some of these strategies are discussed further in chapter five.

Risk management planning involves an estimation of the impacts of 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.

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.

Economic losses due to natural hazards in 2001

Altogether, 700 natural hazard losses were recorded last year. At around US$ 36 billion, economic losses were about 20 per cent above the previous year's level. Insured losses in 2001 increased by more than 50 per cent compared with the previous year. Around the globe 80 earthquakes produced economic losses of US$ 9 billion and insured losses of about US$ 900 million. As in previous years, insurers' statistics were dominated by windstorms and floods. These accounted for more than two thirds of all events (480) and no less than 92 per cent of all insured losses. Tropical Storm Allison (United States) triggered an overall loss of US$ 6 billion (more than half of which was insured). Typhoon Nari caused major damage in Taipei (Taiwan, Province of China) and generated an insured loss of US$ 600 million.

Source: MunichRe, Topics (2001).

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: OAS, 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: OFEFP, Switzerland,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 (NFIP) claims and the availability of land in floodplains 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.

back

Areas for action specific to economic aspects of disaster reduction

- Assessment of natural disaster damage and loss potential (including historical perspective).
- Consider costs and benefits of natural disaster management (cost-effective allocation of resources).
- Assessment of 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 to 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.
- Enforce regulations under different levels of economic development and government capacity.
- Determine pricing policy designed for rational use of resources (water, energy).

Adapted from: C. Benson, ODI, DFID, 2001 2002.

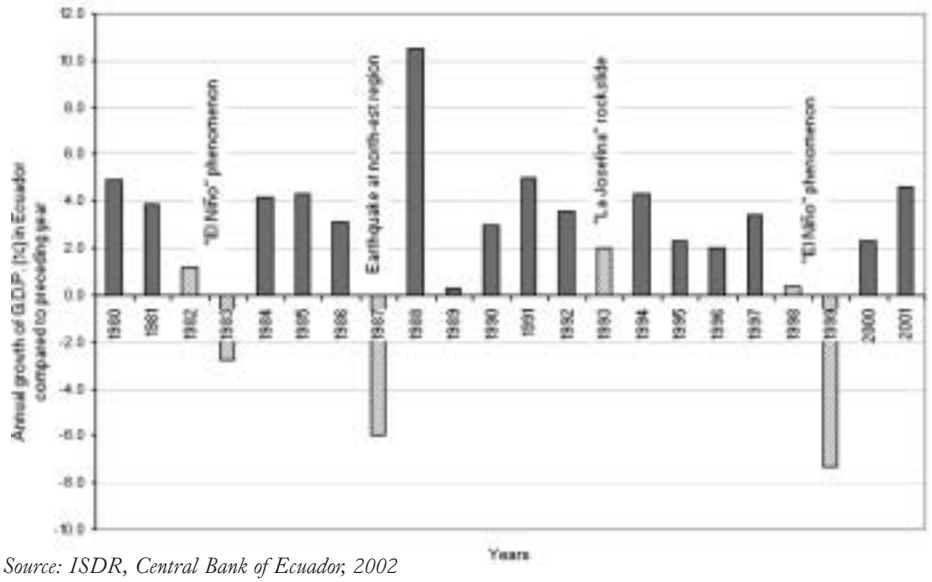
The benefits of long-term disaster management versus the costs of repeated short-term post-disaster reconstruction need to be documented. In view of the exorbitant economic and social costs of recurring disasters, long-term hazard reduction planning is, more and more, a guiding principle and prerequisite for the sustainability of physical investments in need of replacement, reconstruction or construction.

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

The relationship between disaster and risk reduction and globalisation also needs to be researched further to explore, on the one hand the detrimental effects of deregulation and economic interconnection, and on the other hand, the beneficial effects associated with trade opportunities and economic competitiveness.

In a globalizing world, the potential of risk reduction as an essential element to building competitiveness, protecting investment and securing trade opportunities, while ensuring that new risks are not created and business not interrupted, has to be fully comprehended.

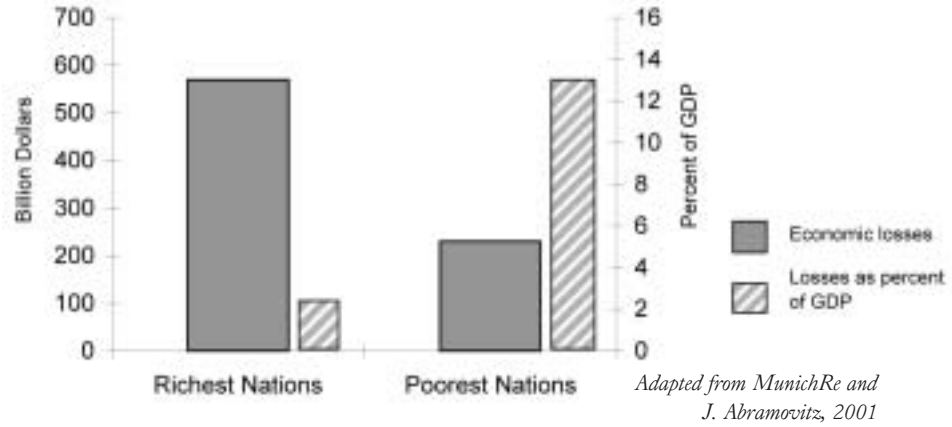
Annual growth Gross Domestic Product (GDP) and ocurrance of major "natural disaster" in Ecuador



Source: ISDR, Central Bank of Ecuador, 2002

The figure shows the gross domestic product (GDP) of Ecuador from 1980 to 2001. The disruption of normal growth coincides with the occurrence of some major disasters, even though political and other circumstances also have influenced this trend. After the El Niño event of 1982-83 the GDP decreased to minus 2.8 per cent compared to the previous year. In 1997 a medium intensity earthquake affected important, economic infrastructure, including a key oil pipeline, decreasing GDP to minus 6 per cent. The widespread damage by floods due to the El Niño event of 1997-98, an earthquake in 1998 and political turmoil, was followed by a decrease of the GDP to minus 7.3 per cent in 1999.

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



Adapted from MunichRe and J. Abramovitz, 2001

Although smaller in absolute figures, the percentage of economic loss in relation to the gross national product (GNP) in developing countries far exceeds that in developed countries. This fact becomes even more relevant for small island developing states (SIDS).

The economic impacts of natural disasters in Pacific small island states

Experience in Pacific small island states as in many other poor countries, shows that it is probably not the actual dollar value of disaster losses 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 major study of the economic impacts of natural disasters in Pacific island coutries was conducted as a part of the *South Pacific Disaster Reduction Project (SPDRP)* by Te'o I.J. Fairbairn (UNDHA-SPO 1997a). The study 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.

Fairbairn observed that "with their limited economic diversification, combined with a high agriculture-GDP ratio prevalent among many of the small Pacific island countries, [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 development 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.

back

Environmental context

"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."
J. Abramovitz, 2001.

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. Furthermore, environmental degradation increases the intensity of natural hazards and is often the factor that transforms the hazard, or climatic extreme such as a heavy downpour, into a disaster. For example, river and lake floods are aggravated or even caused by deforestation which causes erosion and clogs rivers. Poverty and hazard vulnerability is integrally 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.

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

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: Abramovitz, 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 $2.8 million in infrastructure costs and $2.5 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.

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: IFRC, 2002.

Linking environment and disaster reduction activities

- Assessment of environmental problems linked to hazards based on reliable sources of existing information, mapping of environmentally sensitive areas, description of the characteristics of the environment and development trends in these areas, assessment of impacts and the need for additional data.
- Examination of environmental benefits to be drawn from disaster reduction activities throughout sectors.
- Monitoring to provide information for decision-making purposes, e.g. removal of disaster-prone land from development (land-use plans enable local governments to gather and analyse information about the suitability of land for development, so that the limitations of hazard-prone areas are understood by policy makers, potential investors and community residents).
- Environmental tools for disaster reduction purposes: regulatory (zoning, subdivision regulations, building codes, special ordinances), incentives (tax incentives, transfers of development rights, easements, land purchases, voluntary agreements, donations, leases, covenants, charitable deductions), programmes (conservation/restoration of ecosystems, wildlife, wetlands), hazard control and mitigation, water/watershed, coastal-zone management.

extreme events, and an appraisal of alternative solutions to an exclusively engineering approach.

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 national and local capacities, exchanging experience and information regionally and engaging programme and investment partners internationally.

The wealth of information and knowledge from both environmental and disaster management studies should be mutually beneficial. Both areas are inherently multi-disciplinary and dynamic in their approach and analysis of the socio-environmental nexus. Institutionally, both have been, and largely continue to be, operated by the public sector and NGOs. Similar tools are continuously being refined in both fields, namely vulnerability indexing, inventory mechanisms, educational programmes for public awareness and impact assessments.

Encompassing long-term comprehensive goals to manage growth, development and land use implies incorporating an effective environmental component into disaster reduction strategies. Adapted, sustainable and integrated management of natural resources, including reforestation schemes, proper land use and judicious settlements should increase the resilience of communities to disasters by reversing current trends of environmental degradation and dealing with hazard management in a comprehensive way. Secondary benefits expected from the introduction of environmental projects in disaster reduction programmes include social acceptance, political feasibility and economic rationale.

Disaster reduction and environmental management should become national priorities. Entities responsible for disaster reduction should have clear environmental mandates. Coordinated and 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. 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.

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, the role of environmental strategies to achieve sustainable development is now no longer questioned and disaster reduction policy must follow a similar path.

back

Until recently, the relationship between environmental degradation and mismanagement, hazard incidence and vulnerability was a non-issue in most regions and countries except for lip-service. Neither the subject nor the designated authorities for disaster management were thought to be relevant for ecologists and environmentalists. There was little discussion, and even less organizational contact, linking the perceived interests of environmental management and the dynamics associated with risk reduction. In fact, the primary actors frequently considered one another to be antagonists, struggling to represent forces either empowering the interests of the people or expanding the uncompromising power and authority of the State, often played out over competing uses of land and natural resources. It should also be recalled that the existence of environmental divisions in bilateral and multilateral agencies as well as of environmental ministries was not the norm during the 1980s.

Long-term environmental changes and disasters

At the beginning of the 21st century, there is, particularly in Pacific island developing states, 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 small island developing states on the natural environment and that they are exposed 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 ultimately being 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 integral with the surface of the earth
- Terrestrial environment
- Marine environment

This changed dramatically in the closing years of the 1990s in Latin America and the Caribbean. El Niño and Hurricanes Georges and Mitch focused attention on the importance of the full range 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. One of the most important initiatives was the CCAD publication, *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 with the collaboration of the 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 the Central American region. The content of the proposals went quite beyond environmental problems, touching on almost every foreseeable topic of interest to risk analysts and managers.

Concluding remarks

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

Disaster reduction strategies drawing upon sustainable development concepts should be proactive, and, on a continuous basis. They should promote political commitment, 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.