Natural hazards and disasters

Drawing on the international experiences from disaster reduction in developing countries

REPORT

16. January 2006

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Norwegian Institute for Urban and Regional Research (NIBR)

Info - page

Preface

This report presents the findings of the project "Natural hazards – coping, resilience and governance". The first part provides comprehensive background information about natural hazards, why hazards can turn into disasters, and the impacts they have. It also explains why developing countries and poor people are more vulnerable to natural hazards and suffer the greatest losses in terms of lives and livelihoods.

In the second part, an outline of the international strategies on disaster reduction is presented, including recommended approaches and activities, with reference to lessons learned from various countries. It also includes a case study from Sri Lanka that was conducted after the tsunami disaster that occurred in the Indian Ocean in December 2004.

The final part discusses disaster reduction in view of Norwegian Development cooperation and presents ideas for developing a comprehensive agenda for action.

The project has been financed by the Norwegian Agency for Development Cooperation (NORAD). It is intended to feed into NORAD's and the Norwegian Ministry of Foreign Affairs' (MFA) work on improving the knowledge base about natural hazards and disasters in developing countries; how disasters are addressed, future directions, and good practices in disaster reduction.

Researchers Jan Sørensen, Trond Vedeld and Marit Haug from the Norwegian Institute for Urban and Regional Research (NIBR) have written the report. The authors gratefully acknowledge the contributions of the NORAD advisors Kari Strande and Hans Olav Ibrekk – and for sharing their experience and ideas. We also recognise the valuable comments from our colleagues at NIBR; among them research director Arne Tesli and researchers Berit Aasen and Inger-Lise Saglie.

Norwegian Institute for Urban and Regional Research (NIBR)

16. January 2006

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Table of Contents

Summary

Natural hazards and disaster trends

Natural hazards turning into disasters have increased dramatically, both in terms of frequency, complexity, scope and destructive capacity. Small-scale disasters at the local level are often overlooked, but may have even greater impacts in the long run than big disasters that occur more seldom. The majority of the 20 most devastating natural disasters since 1950 have occurred during the last 10 years. Natural disasters are estimated to have claimed about 3 million lives around the world in the past two decades, as well as severely affecting the livelihood of about 1 billion people.

What are natural hazards?

Natural hazards are naturally occurring physical phenomena caused either by rapid or slow onset events having atmospheric, geologic and hydrologic origins on global, regional, national and local scales. They include earthquakes, volcanic eruptions, hurricanes, landslides, tsunamis, floods, drought and epidemics. Natural disasters are the consequences or effects of natural hazards. They may represent a serious breakdown in sustainability and disruption of economic and social progress.

Underlying conditions of disaster risk

Global warming and climatic change as well as decadal variations in storms etc. contribute to the increasing number of disasters, but the main causes of disaster are related to other factors such as population growth, urbanization, alteration of the natural environment, substandard dwellings and public buildings, inadequate infrastructure maintenance as well as poverty exacerbation. Land areas that earlier could retain heavy rainwater, is now cultivated, asphalted and inhabited, which enhances the risk for floods and landslides. As such, disasters are to a large extent human-induced.

Regional variations

Floods, storms, droughts and epidemics of various sorts are the most frequently occurring natural hazards across all regions. Hydro-meteorological disasters, such as hurricanes, floods and droughts, show the highest increase in frequency and magnitude, especially flood emergencies that are mainly human-induced. Asia is the most disaster-prone continent, with China, Bangladesh, India and Iran on top of the list when measured by absolute number of affected people. Drought is a problem especially associated with Africa. Africa is the only continent whose share of reported disasters in the world total has increased over the past decade; 11 of the 20 most affected countries are African: Nigeria, Burkina Faso, Niger, Tanzania, Sudan, Malawi, Kenya, Ethiopia, Zimbabwe, Tanzania and Mozambique.

The linkage between disaster and development

Development and human disaster is closely interlinked. Developing countries and poor people are more vulnerable to the effects of natural hazards and suffer the greatest losses

in terms of lives and livelihoods – and also economically in proportion of the gross domestic product (GDP). Disasters may setback social investments aiming to ameliorate poverty and hunger, provide access to education, health services, safe housing, drinking water and sanitation, or to protect the environment as well as the economic investments that provide employment and income. The economic losses resulted from disasters may exceed contributions from international development sources in many developing countries, and in some cases they even exceed the annual gross domestic product.

Why are poor people more vulnerable to disasters?

A community's vulnerability to disasters reflects an interaction of physical, social and other factors. Research shows that poor people are more likely to occupy dangerous locations, such as flood plains, river banks, steep slopes, and reclaimed land. The growth of informal settlements and inner city slums often take place in exposed areas, such as ravines, steep slopes, or along flood plains. Poor communities are also forced to use inadequate materials for infrastructure and housing, which further add to their vulnerability. Social factors that may enhance vulnerability include aspects related to education, health, social security and human rights and war.

Disaster reduction – international strategies

The international community is gradually stepping up activities to prevent disasters and increase the preparedness to cope with natural hazards. In the past 10 years, concepts associated with disaster reduction have advanced in both scope and sophistication. There is evidence of greater official and public understanding that the threat of combined political, economic and environmental consequences of disasters demands more effective means to address vulnerability to current and emerging risks.

The United Nations (UN) International Strategy for Disaster Reduction (ISDR) serves as a global framework for action with a view to enabling all societies to become resilient to the effects of natural hazards and related environmental and technological disasters, in order to reduce human, economic and social losses. It involves a conceptual shift from an emphasis on disaster response to the management of risk through the integration of disaster reduction into sustainable development.

The Hyego Declaration, the outcome of the World Conference on Disaster Reduction (WCDR) that was arranged in January 2005, draws up a Framework for Action for disaster reduction in the next decade (2005-2015). The Framework focuses on the following issues: Capacity building, risk assessment and monitoring, early warning, education and improving knowledge; addressing the underlying factors of disasters and strengthening of disaster preparedness at all levels.

Approaches and activities

Some of the key challenges for effective disaster reduction are endorsement at all political levels and mainstreaming of disaster reduction in development and programming. The international and regional organisations play a decisive role in advocacy and creating awareness about disaster reduction, but the main responsibility lie with the national governments. Multidimensional approaches are needed, including mainstreaming and creating a culture of risk reduction in all development sectors, strengthening resilience to cope with natural hazards and disasters, and measures for mitigation of the damaging impacts of disasters.

Education and training are key components in disaster reduction. Schools, academic institutions and training centres have an important role to play in developing knowledge

and awareness on disaster safety. Children who know how to react during an earthquake, community leaders who have learned how to warn their neighbours in a timely manner, and societies familiar with preparing themselves for natural hazards all demonstrate how education can make an important difference in protecting people at the time of a crisis. Among the international initiatives are the "Coalition for Education" programme established by UNESCO in 2004, which focuses on integrating disaster reduction education into school programmes and in making school buildings safer.

Activities for risk reduction must be rooted in the core principles of good governance: Equity, participation, pluralism, partnership, subsidiarity, transparency and accountability, the rule of law, effectiveness, efficiency, responsiveness and sustainability. Many of the topics related to disaster reduction are best addressed at the community level and through participatory approaches. Most of the community-based initiatives underpin holistic management, involving a broad number of issues that altogether influence upon resilience towards disasters. This should also include the incorporation of culture and traditional knowledge, as well as gender perspectives.

Norwegian assistance to disaster reduction

Natural disasters are increasingly regarded as a global problem that requires concerted action and long-term commitment by the international community. Norway as international donor has a responsibility to ensure that all activities and programmes carried out under the development cooperation do not make the recipient countries more vulnerable to natural hazards or contribute to intensifying the negative impacts when disasters strike. Norway should also be well placed to contribute in promoting disaster reduction more actively, because we already play a prominent role in various related fields, such as the in the environment and in promoting peace, democracy and human rights. Such involvement is also fully justified through the existing policies for development cooperation, as one of the five goals is to "contribute towards preventing hardship and alleviating distress arising from conflicts and natural hazards".

Building international partnerships

Building partnerships with the international organisations and networks that play an important role in disaster reduction is a route by which Norway can promote disaster reduction principles in the programmes and projects that they fund, as well as to support the agencies that work on disaster issues. Important international actors are the various organisations of the United Nations (UN), i.e. the United Nations Development Programme (UNDP), with its Bureau for Crisis Prevention and Recovery (BCPR) and Disaster Reduction Unit (DRU) and the United Nations Environment Programme (UNEP).

Other key organisations involved in disaster reduction are i.e. the international development banks: The World Bank (WB), the Asian Development Bank (ADB), the Inter-American Development Bank (IDB) and the African Development bank (AfDB). Important actors are also the Organisation for Economic Co-operation and Development (OECD), the World Conservation Union (IUCN), and the International Federation of the Red Cross and Red Crescent Societies (IFRC).

Promoting disaster reduction in the partner countries

In addition to channelling support through the international organisations, Norway could take on a pro-active role in promoting and supporting a risk reduction agenda amongst its development partners. Many of the partner countries are among the most severely

affected by natural disasters, but most of them have not taken appropriate and necessary measures to reduce hazard risks and strengthen resilience. The Poverty Reduction Strategy Papers (PRSP) is the main policy instrument in bilateral cooperation and as such they are the main entry point for donor-government consultations related to disaster reduction.

The initial focus should be on enhancing the recipient country's capacity and willingness to ensure integration of disaster reduction into its own development and environmental management policies, develop legislation, strengthen environmental and natural resource management and in developing and implementing contingency plans.

The way forward – defining an agenda for action

Incorporating disaster reduction in Norwegian Development cooperation, taking a proactive stand, will require development of a comprehensive agenda for action. This implies formulation of a conceptual framework; disaster reduction as a cross-cutting and multi-dimensional issue needs to be defined, linking it with the various sector programmes and themes in Norwegian development cooperation. An organisational position and space for natural hazards and disasters need to be established with clarification of roles and responsibilities. An important part of the agenda is policy formulation; deciding on the key themes and the geographical and regional focus, and development of an operational work-plan with objectives, priority activities and indicators.

Activities to strengthen the internal capacity on disaster reduction will be required, including training and competence building, strategic recruitment of staff, and development of support systems, such as guidelines and tools for information handling, quality assurance, monitoring and evaluation. Collaboration with research institutions is recommended for further expanding the knowledge base on disaster reduction and to learn from the experiences of other agencies and countries' work related to the topic.

A two-sided approach is suggested for implementation, aiming at an integrated and coordinated use of bilateral and multilateral channels and systems; pursuing the agenda through the work of the embassies in direct bilateral dialogue with development partners; and by enhancing the role of the Norwegian Directorate for Development Cooperation (NORAD) and the Norwegian Ministry of Foreign Affairs (MFA) as influencers i.e. through the multilateral system, in dialogue with other key donors, and with NGOs, private sector, or other institutions concerned.

1 Introduction

The number of natural hazards turning into disasters has increased dramatically. The majority of the 20 most devastating natural disasters since 1950 have occurred during the last 10 years. In 1998, the International Federation of the Red Cross and Red Crescent Societies (IFRC) reported that for the first time more people have been displaced by natural disasters than by war.

There is reliable evidence that risk of natural hazards is growing with the global climatic changes that are taking place. However, the principal reasons for the continuing increase in natural disasters are related to development; the growth of the population, the increase in building density, the growing concentration of people and economic assets in urban areas, and a constant migration of people to coastal areas that are generally more highly exposed to natural disasters.

Natural disasters are estimated to have claimed about 3 million lives around the world in the past two decades, as well as severely affecting the livelihood of about 1 billion people. Annual economic losses associated with disasters averaged USD 75.5 billion in the 1960s and showing a continuous rise to USD 659.9 billion in the 1990s. Thus, natural disasters exert an enormous toll on the society and on development. The UNDP report "Reducing Disaster Risk-A Challenge for Development" (2004) conclude: "Disasters can wipe out local gains; disaster losses interrupt and even aggravate development; and development policies can determine whether disaster risk is being reduced or increased".

It is the poor that suffer the greatest costs when disasters hit, because they are the most vulnerable. 85 percent of the people exposed to earthquakes, tropical cyclones, floods and droughts live in countries having either medium or low human development, and more than 95% of all deaths caused by disasters occur in developing countries. Although the majority of economic losses are concentrated in the developed world, the statistics fail to adequately capture the impact of the disaster on the poor who often bear the greatest costs in terms of lives and livelihoods, and rebuilding their shattered communities and infrastructure (www.undp.org – 2005).

As such, natural disasters pose a significant threat to prospects for achieving the Millennium Development Goals, in particular the overarching target of halving extreme poverty by 2015. Not only is the world globally facing more potential disasters but increasing numbers of people are becoming vulnerable to hazards. The combination of growing environmental problems; global warming, deforestation, soil erosion and desertification along with growing social problems, increasing poverty, larger shanty towns, combine to produce a much higher magnitude of catastrophe than seen before. Most of the factors that make people vulnerable to hazards are due to development pressures or outcomes of the development process. Therefore, the task of disaster reduction is two-fold: (1) to reduce the impact of disasters; and (2) to promote

development processes that help to reduce disaster risks. Reducing disaster impacts requires transforming disaster management towards a risk reduction approach while promoting risk-sensitive development depends on the integration of disaster reduction into development planning and practices.

Preparedness in relation to natural hazards and disaster reduction has become increasingly important for international development, especially in the aftermath of the tsunami in Asia. Country case studies presented at the World Conference on Disaster Reduction (WCDR) in Hyogo, Kobe, Japan in January 2005, strongly suggest that improved governance, including early warning, and disaster preparedness, can reduce the chance of natural hazards turning into disasters. Broader institutional issues may involve such as looking at principles for multi-actor governance, awareness and human resource capacity, property and institutional structures, public finance, and shift in management of natural resources and agriculture (property rights, land use planning, allocation of production and infrastructure, land and water management).

The Hyogo Declaration further emphasises the need to involve all stakeholders in disaster reduction, including governments, regional and international organisations and financial institutions, civil society, including non-governmental organisations and volunteers, the private sector and the scientific community (UN 2005). Undoubtedly, reducing the impacts of natural hazards will take the concerted efforts of all nations in order to succeed.

2 Purpose and analytical framework

This report seeks to explore the relationships between natural hazards and development and focuses on strategies for disaster reduction. It draws on the international experiences from natural hazards and disasters and addresses the global challenges in reducing disaster risk. In some sections of the report, special attention is given to the African continent, since African countries are among the poorest and most vulnerable to natural hazards, and because Africa is given high priority in the Norwegian development cooperation.

The work has been carried out mainly as a desk study utilising existing literature and information found on the web[1]. In addition, a case study in three coastal communities in Sri Lanka has been conducted, involving various survey methods and interviews. The case-study focuses on the experiences in the aftermath of the tsunami disaster that struck the island in December 2004.

The analysis builds on recent frameworks for assessing risks and resilience to hazards, such as presented by the International Strategy for Disaster Reduction (ref. UN/ISDR 2002, UN/ISDR 2005 and IFRC 2004). It reflects on the shift from focus on analysing risk to understanding (community) resilience in the international literature. Two important observations underscore this shift. First, a key observation from the tsunami and other disasters was that most lives are saved by the early engagement of friends and neighbours. Second, evidence suggests that everyday threats to livelihoods, i.e. epidemics, droughts, might be of greater concern to most poor communities than "one-off" disasters. The argument goes that efforts are required to place natural hazards into a broader analytical framework, in order to understand local perspectives about sustainable livelihoods and coping, and, in turn, put communities in charge of defining their needs and crafting "the right" solution (IFRC 2004).

The report relates to climate change and global warming, but does not involve in the ongoing controversies to what extent the changes are human induced or naturally occurring. Climate change is assumed to lead to more extreme weather with secondary effects such as floods, droughts, vegetation change, and land slides, and therefore tends to enhance the risk of natural hazards, and reduce the resilience to cope with disasters.

[1] Addresses to useful web-sites are given in the back of the report.

3 Key concepts

3.1 Natural hazard

Natural hazards are natural processes or phenomena occurring in the biosphere that may constitute a damaging event or disaster (UN/ISDR 2002). Natural hazards comprise geological phenomena such as earthquakes, tsunamis, and volcanic eruptions, and natural phenomena such as floods, storms, droughts and related disasters, landslides, avalanches, waves and surges. There are also biological hazards such as epidemics and insect infestations, which are of lesser concern here, although important in an African context

Natural hazards are characterised by the following: they are related to known processes; they occur within a short timescale; the effects are immediate; the effects are unintentional; an emergency situation arises; and they represent potential disasters (Smith 2001). (See chapter 4.1 for more information on natural hazards).

3.2 Natural disaster

A natural disaster is the adverse result of the impact of a natural hazard on a socio-economic system with a given level of vulnerability and resilience, which prevents the affected society from coping adequately with the impact without assistance from outside.

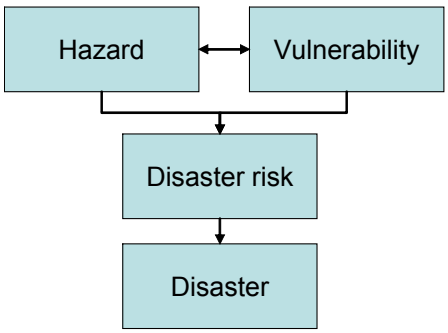

Figure 3.1 *Natural disaster as a function of hazard and vulnerability.*

A disaster implies serious disruption of the functioning of society, causing widespread human, material or environmental losses (IDNDR/DHA 1992 in ISDR 2002). Blaikie et al. (1994) emphasises the importance of understanding the social roots of disasters (while nature causes the event, man makes the disaster). A potentially damaging event such as a drought can have disastrous results in a region if people are not prepared to handle droughts. But if people in the region are well prepared, the drought can be little more than an event. Disasters, which are not triggered by natural phenomena, are named as technological disasters, i.e. related to industrial production, transport etc.

For a disaster to be entered into the database of the UN's International Strategy for Disaster Reduction (ISDR), at least one of the following criteria must be met:

- A report of 10 or more people killed.
- A report of 100 people affected.
- A declaration of a state of emergency by the relevant government.
- A request by the national government for international assistance.

3.3 Impacts

Disasters lead to social, economic and environmental losses. It is often the cumulative impact of frequent, but small and unspectacular disasters that cause the most losses, especially for the poor. The social impacts of disasters include the loss of life, injury, disease outbreaks, disruption of social services and malnourishment. Economic losses include the loss of livelihood, capital (i.e. homes and livestock), infrastructure and communications, and the interruption of development programmes. The environmental losses are often the most significant, as the poor generally depend on a healthy environment for their livelihood (UN/ISDR 2005a).

The overall impact of a disaster on a given country, and its ability to recover from the resulting human and material damage, depends on several factors. A hurricane, for example, may have a disastrous effect on a country with a small population and a weak economy, whereas a disaster of similar magnitude (i.e., an earthquake) in another country with a strong economy and large population might not cause serious socioeconomic disruption in the national context (www.wmo.ch. – 2005).

It is, however, important to remember that natural processes also may have positive benefits. Hazards, such as floods, can play a positive role within our ecosystems and the environment at large, for floodwaters carry nutrients that allow for fertile flood plains and are important for various aquatic species. Integrated risk-based management provides the opportunity to take account of these benefits as well as mitigate the adverse impacts of the natural processes.

3.4 Vulnerability

Definition of vulnerability is dependent on the context it is used in. A general, commonly used definition is “being prone to or susceptible to damage or injury”. Referent objects can be both human beings and the environment. Human vulnerability to hazards results from a complex interplay of political, economic, social, and ideological practices present at a given locale and varies by a given hazard and by specific household characteristics (Blaikie et al. 1994). The components of vulnerability have been variously identified, and

include elements of livelihood security and assets, personal health and access to basic needs such as food, water and shelter, and extent of social organization, preparedness and safety nets. In other words, those with access to various forms of capital – financial, physical, social, or human capital are better prepared towards hazards. Poor people may not only face greater exposure to hazards due to factors such as lower housing standards (poor construction material), location, and lack of access to information, but also have a lower capacity to cope.

3.5 Risk, uncertainty and incertitude

Risk refers to the probability of harmful impacts and consequences, or expected human injury, environmental damage, loss of life, property and livelihood, resulting from natural hazards and vulnerable conditions (www.unesco.org/water - 2005). It can be calculated as the interaction between the probability of a hazard occurring and the vulnerability of a community to the hazard, together with the capacity of the community to cope with and recover from a disaster (UN/ISDR 2004a). Since, typically, there is little knowledge about the potential impact of natural hazards, it is mostly impossible to fully assess or quantify the associated risks. Risk management will therefore most of the time have to deal with levels of uncertainty.

The social study of uncertainty has lead to the introduction of the concept of "incertitude", making a graphical distinction between risk, uncertainty, ambiguity and ignorance to illustrate the problem (see figure 3.2). An example of ambiguity is the contradicting opinions among experts about the likely human impacts on climate change versus the magnitude and patterns of long-term natural variability. Ignorance occurs when there is lack of information and knowledge about possible risks or due to various reference frames ("we don't' know what we don't know"), i.e. regarding exceptional natural hazards, such as the Tsunami in the Indian Ocean. The basic idea is to ensure greater humility over the role of science and to the limits of risk assessment.

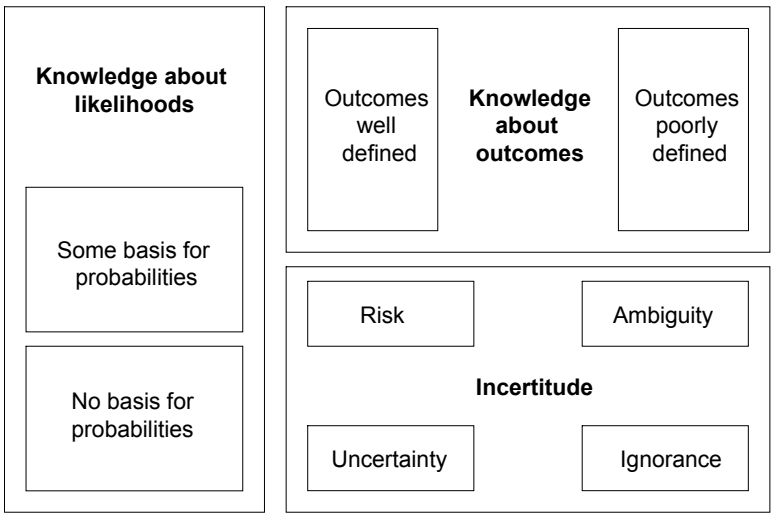

Figure 3.2 *Incertitude; risk, ambiguity, uncertainty and ignorance. Source: ESRC 1999.*

3.6 Capacity, coping, and resilience

Capacity is the combination of all the strengths and resources available within a community that can reduce the level of risk or the effects of a disaster and coping is the manner in which people use their existing resources in the adverse conditions of a disaster or risk (UN/ISDR 2004a).

Resilience describes the capacity to survive, adapt and bounce back from crisis. The emphasis on identifying and building strengths and capacities represents a paradigm shift in approaching risk (IFRC 2004). The resilience of poor communities depends as much on invisible social capacities such as their ability to organise themselves, make decisions and solve conflicts as on material or technical assets. The most resilient communities are those which work together towards a common aim.

Even if natural hazards do extract a disproportionate toll from the poor, this does not mean that they constitute the greatest threat to poor communities. When risk mapping and capacity-vulnerability analyses are conducted within the safety of established relationships, poor communities rarely identify sudden impact "natural disasters" as their greatest concern, and more often prioritise risks associated with the uncertainties of daily life. After all, why prepare for disasters you may not live to see? Hazards commonly identified by poor communities include: food, employment and housing insecurity; disease; inability to access or afford health care, education, legal and financial services; social and economic marginalisation; local market fluctuations and falling commodity prices; exclusion from decision-making processes and political representation; corruption; and conflict. With such diverse risks to manage, investing in typical disaster preparedness projects may reduce a community's capacity to deal with more insidious hazards—and so increase its vulnerability overall (Storie 2003).

3.7 Early warning

Through the Indian Ocean tsunami disaster in December 2004, the world was reminded of the crucial importance of efficient early warning systems. Early warning is a critical element in preventing hazardous events from turning into disasters. Clear warnings, received in time, coupled with the knowledge of how to react, can make the difference between life and death, between economic survival and ruin, for individuals and for communities.

Ideally, early warning should prevent any loss of life and reduce the economic losses to a minimum. It is more than just a prediction: a complete and effective early warning system comprises a chain of four elements (www.unisdr.org – 2005):

- Risk knowledge: prior knowledge of the likely risk-scenarios communities are faced with.
- Monitoring and warning service: monitoring capacities for these risks and rapid and reliable decision mechanisms for early warning.
- Communication: dissemination of understandable warnings to those at risk.
- Response capability: knowledge and preparedness capacity to act by all partners of the information chain.

Failure in any one part of the chain can mean breakdown of the whole system. Effective systems for early warning have strong linkages between the four elements.

Many groups are important to disaster early warning systems; public officials, community and business leaders, NGOs, scientists, academics, teachers, the media, community leaders, and of course householders. The best early warning systems find ways to link all these groups and to facilitate their cooperation (www.unisdr.org –2005).

3.8 Disaster management – disaster reduction

Disaster risk management (or disaster risk management) is the systematic process of using administrative decisions, organisation, operational skills and capacities to implement politicise, strategies and coping strategies of the society and communities to lessen the impacts of natural hazards and related environ-mental and technological disasters. This comprises all forms of activities, including structural and non-structural measures to avoid (prevention) or to limit (mitigation and preparedness) adverse effects of hazards.

Disaster reduction (or disaster risk reduction –DRR) refers to the conceptual framework of elements aimed at minimising the vulnerabilities and disaster risks throughout a society, avoiding (prevention) or limiting (mitigation and preparedness) the adverse impacts of hazards, within the broad context of sustainable development (www.irinnews.org – 2005).

In practical use, the terms disaster reduction, disaster risk reduction, disaster risk management (and similar terms) are often used with the same meaning (across variations of definition).

In this report, the term **disaster reduction** is mostly preferred.

4 Natural hazards and their impacts on developing countries

4.1 Types of natural hazards and disasters

Natural hazards and disasters can be split into three categories: Hydro-meteorological, Geophysical and Biological hazards (www.unisdr.org – 2005). Types of hazards under each of the categories are briefly described in the following sub-chapters.

4.1.1 Hydro-meteorological hazards

Hydro-meteorological disasters are natural processes or phenomena of atmospheric, hydrological or oceanographic nature that may cause loss of life or injury, property damage, social and economic disruption or environmental degradation. These include:

Floods: Significant rise of water level in a stream, lake, reservoir or coastal region.

Droughts: Period of deficiency of moisture in the soil such that there is inadequate water required for plants, animals and human beings.

Landslides: In general, all varieties of slope movement, under the influence of gravity. More strictly refers to down-slope movement of rock and/or earth masses along one or several slide surfaces.

Storms: Wind with a speed between 48 and 55 knots.

Hurricanes: Large-scale closed circulation system in the atmosphere above the western Atlantic with low barometric pressure and strong winds of at least 118 kph and that rotate clockwise in the southern hemisphere and counter-clockwise in the northern hemisphere.

Tidal waves: Abrupt rise of tidal water (caused by atmospheric activities) moving rapidly inland from the mouth of an estuary or from the coast.

4.1.2 Geophysical hazards

Geophysical disasters are natural earth processes or phenomena that may cause loss of life or injury, property damage, social and economic disruption or environmental degradation. These include:

Earthquakes: Sudden break within the upper layers of the earth, sometimes breaking the surface, resulting in the vibration of the ground, which where strong enough will cause the collapse of buildings and destruction of life and property.

Tsunamis ("wave in the port" in Japanese): Series of large waves generated by sudden displacement of seawater (caused by earthquake, volcanic eruption or submarine landslide); capable of propagation over large distances and causing a destructive surge on reaching land. The Japanese term for this phenomenon, which is observed mainly in the Pacific, has been adopted for general usage.

Volcanic eruptions: Discharge (aerially explosive) of fragmentary ejecta, lava and gases from a volcanic vent.

4.1.3 Biological hazards

Biological disasters are processes of organic origin or those conveyed by biological vectors, including exposure to pathogenic micro-organisms, toxins and bioactive substances, which may cause loss of life or injury, property damage, social and economic disruption or environmental degradation. These include:

Epidemic: Either an unusual increase in the number of cases of an infectious disease, which already exists in the region or population concerned; or the appearance of an infection previously absent from a region.

Insect infestation: Pervasive influx and development of insects or parasites affecting humans, animals, crops and materials.

4.2 Disasters, triggering hazards, and impacts

4.2.1 Disaster trends and triggering hazards

According to the EM-DAT, the number of natural disasters reported each year has been steadily increasing in recent decades (see figure 4.1). Africa is the only continent whose share of reported disasters in the world total has increased over the past decade. It is estimated that about 2/3 of the total increase is real, the rest can be explained by improved and more reliable reporting systems and advances in communications (www.msnbc.msn.com – 2005).

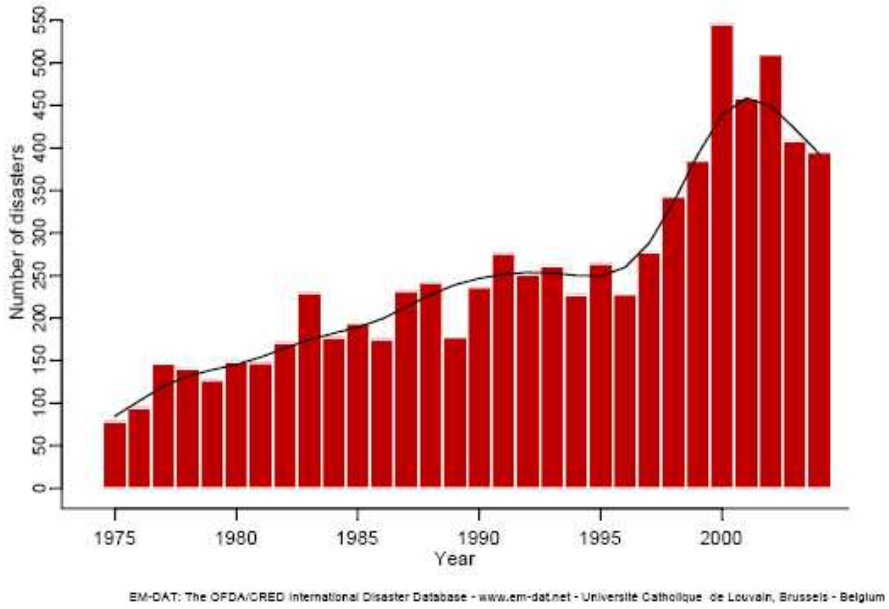

Figure 4.1 *Total number of reported disasters in the world 1975-2004. Source: www.em-dat.net - 2005.*

The overview in table 4.1 below gives an indication of what type of triggering hazards that occur in various regions.

Table 4.1 *Number of natural disasters by type of triggering hazards in each continent (1994-2003). Source: www.unisdr.org – 2005*).

Region	Floods	Storms	Droughts	Landslides	Earth-quakes	Volcanic	Epidemics
Africa	269	70	116	12	11	4	329
Asia	421	311	152	91	164	12	133
Europe	183	83	110	8	26	2	30
America	256	277	143	41	49	25	42
Oceania	29	61	25	8	10	6	8
Total*	1158	802	546	160	260	49	542

*) Avalanches, waves and surges, and insect infestations have not been included due to their small numbers; 26 or less as total number across all regions).

Relatively speaking, it seems that floods, storms, droughts and epidemics of various sorts are the most frequently occurring natural hazards across all regions; Asia being most prone, followed by America and Africa. The most pronounced types of hazards leading to disasters in each of the regions are as follows:

Africa: Floods, droughts, epidemics.
Asia: Floods, storms, droughts, earthquakes, epidemics.
Europe: Floods, droughts.
America: Floods, storms, droughts.
Oceania: Storms.

Earthquakes, hurricanes and floods are together associated with approximately 39% of deaths in large- and medium-scale natural disasters at the global level, while droughts and famines account for 55% of global deaths in large- and medium-scale natural disasters (www.undp.org – 2005).

Drought is a problem especially associated with Africa. Around 220 million people are found to be exposed annually to drought and African states are having the highest vulnerability to drought.

Hydro-meteorological disasters, such as hurricanes, floods and droughts, show the highest increase in frequency and magnitude, especially flood emergencies that are mainly human-induced (i.e. due to various human interventions in the watershed).

4.2.2 The most affected countries

China, Bangladesh, India and Iran are among the countries most affected by natural disasters when measured in absolute numbers of affected people. Among the African countries on the "top twenty" list are Nigeria, Burkina Faso, Niger, Tanzania, Sudan, Malawi, Kenya, Ethiopia, Zimbabwe, Tanzania and Mozambique (see figure 4.2).

When measured by affected people in percentage of the countries' population (relative numbers), Malawi is on top of all the countries, and 9 out of 20 on the "top list" are African countries. Most of these countries are also among the poorest countries in the world. The numbers are based on statistics for the 30-year period 1974-2003.

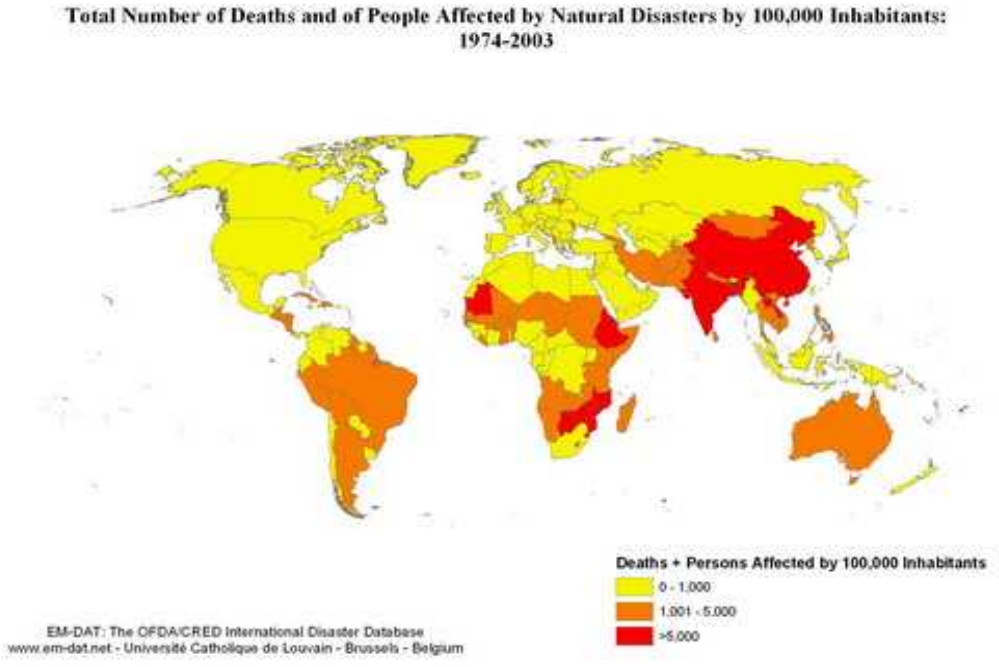

Figure 4.2 *Total number of deaths and number of people affected by natural hazards by 100,000 habitants, 1974-2003. Source: www.em-dat.net – 2005.*

When looking only at the last decade (1994-2003), the picture becomes somewhat different. Zimbabwe, Djibouti, Cambodia and Antigua/Barbados have entered the top of the list (based on relative numbers). This shows that the vulnerability to natural hazards is

changing over time due to various factors such as variances in types and frequencies of hazards (hurricanes and storms are on the rise), demographic changes – and single events such as a major earthquake or tsunami. Probably it also reflects changes in the quality of reporting of disasters between the countries.

4.2.3 Economic losses

While the number of lives lost have declined in the past 20 years—800,000 people died from natural disasters in the 1990s compared with 2 million in the 1970s—the number of people affected has risen, and with that also the economic losses. In the past two decades alone, estimated economic losses from natural disasters have multiplied five-fold to USD629 billion. Annual losses from weather-related events have increased in real terms from an estimated USD3.9 billion in the 1950s to USD63 billion in the 1990s (www.irinnews.org – 2005)[2].

Asia is by far the most affected continent with regard to the amount of damages and economic losses caused by natural disasters, when measured in USD. Earthquakes, storms and floods are the most significant single causes (see figure 4.3).

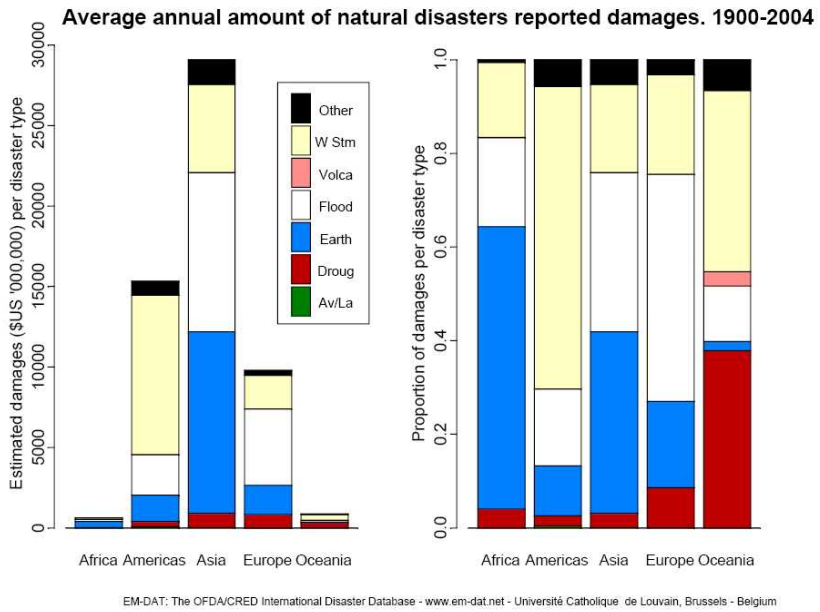

Figure 4.3 *Annual amount of natural disasters reported damages per continent, 1900-2004. Source: www.em-dat.net - 2005.*

Economically, industrialised countries tend to experience higher losses in terms of money, although the impact as a proportion of the gross domestic product (GDP) is lower. This is not surprising when the expensive infrastructure of rich countries is taken into account, but the overall impact on the economies of rich countries is negligible.

For developing countries, disasters can cause serious setbacks to economic and social development. Recovery is slow or impossible due to an absence of insurance mechanisms

[2] Data on economic losses are incomplete, especially data from developing countries. Livelihood losses, especially in the informal sector, are also poorly understood and rarely recorded. (IFRC 2005).

or government recovery-programmes. In addition, any reconstruction, or repeat investment, that follows a disaster will invariably divert funds away from development programmes to emergency relief and recovery. Figures compiled by the World Bank show that from 1990-2000, natural disasters resulted in damages constituting between 2 to 15% of an exposed country's annual GDP (see table 4.2).

Table 4.2 *Natural damages in percentage of annual GDP in exposed countries. Source: www.worldbank.org - 2005.*

Natural Disaster GDP - 1990-2000	
Argentina	1.81%
Bangladesh	5.21%
China	2.5%
Jamaica	12.58%
Nicaragua	15.6%
Zimbabwe	9.21%

GDP losses for individual events can be even more devastating. In Honduras in 1998, Hurricane Mitch caused losses equal to a staggering 41% of GDP. In terms of the government's annual tax revenue, the losses amounted to 292 percent. In Aceh, Indonesia, the total estimate of damage and losses from the tsunami, according to the UN's Rapid Environmental Assessment, was USD4.45 billion, nearly 97% of Aceh's

4.3 The linkage between development and disaster

As already have been indicated, development and human disaster are closely interlinked. From 1992 to 2001, developing countries accounted for 20% of the total number of disasters, and over 50% of all disaster fatalities. Approximately 13 times more people died per reported disaster in developing countries than in developed countries.

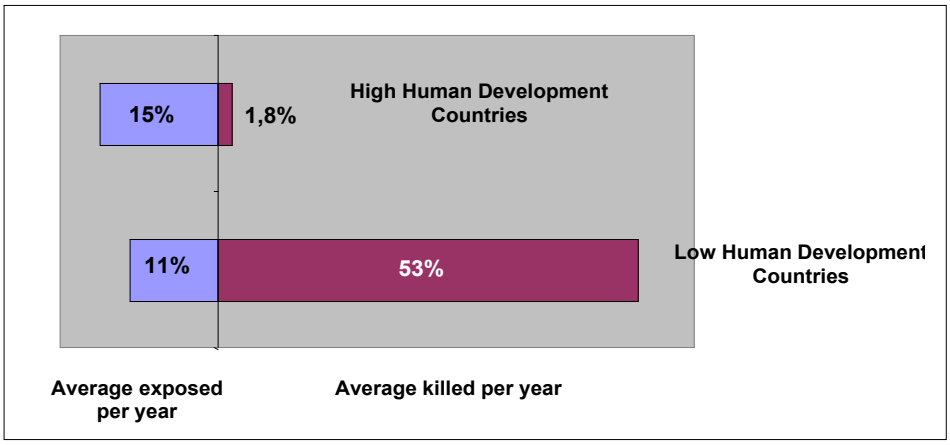

Figure 4.4 *Average of population exposed/killed by natural disasters in HHD Countries versus LHD Countries (UNDP Human Development Index) Source: EM-DAT 2005.*

Disproportionately many of the victims of natural disasters are people that are often depended on eco-system services and natural resources for their livelihoods and that belong to the lower income classes (see figure 4.5).

Figure 4.5 *Number of people killed by natural disasters, by income classes. Source: EM-DAT 2005.*

In addition to the lives lost in natural disasters, such events also have different impacts on livelihoods in developing versus industrialised countries. These impacts have more long-term effects and may erode the development capacity and livelihoods and weaken the local communities' coping and survival capacity. This is illustrated by table 4.3.

Table 4.3 *Developing countries are more vulnerable to damaging impacts from natural disasters, and suffer greater and more long-term setbacks. Source: UNDP 2005.*

Industrialized countries	**Developing countries**
Tend to suffer higher economic losses in strict dollars terms.	Cause setbacks to economic and social development.
Have mechanisms in place to avoid loss of life, such as early warning systems.	Lack resources for early warning systems.
Have immediate emergency and medical care.	Inflict massive casualties .
Insurance of property losses.	Divert funds from development programs to emergency relief and recovery.

4.4 Underlying conditions of disaster risk

The United Nations Development Programme (UNDP 2005) has recently published a report "Reducing disaster risk – a challenge for development", which surveys vulnerability factors for most countries. The report concludes that humans by exploiting the natural resources have degraded the environment and destroyed natural buffers that help to reduce the impacts of certain hazards. The cutting of timber on hillsides is magnifying the impact of landslides. The draining of wetlands has amplified the effects of flooding. Flooding in urban areas has been greatly exacerbated by extensive paving (which reduces the penetration of water into the ground), aging sewer systems that are less able to cope with larger loads, and the construction of roads, homes, and other structures on flood plains.

Population growth and urbanization are also major contributors to our increase in vulnerability Coastal areas exposed to extreme weather, such as hurricanes, are more densely populated. Higher concentrations of people living in urban areas mean that if disasters do hit, they affect a larger number of individuals. Urban expansion has also led to more development in high-risk areas, such as flood plains. Land areas that earlier could retain heavy rainwater, is now cultivated, asphalted and inhabited, which enhances the risk for floods and landslides. The growth of informal settlements and inner city slums often take place in hazard prone areas, such as ravines, steep slopes, or along flood plains. These development trends are especially the case in developing countries (McBean 2005). Unplanned acceleration of urban areas is also concentrating new risks. Diseases from filthy water and sanitation kill over 2 million people a year - many of them slum children (IFRC 2005).

Urbanisation also has the power to radically shape disaster risks at the regional scale. Major investments in infrastructure and productive facilities, the development of new urban areas and trade corridors, and the unplanned urbanisation of new regions are all examples of modalities through which urbanisation can shape risk in broad territorial areas (UNDP 2005).

Bendimerad (2003) summarizes the most important factors that correlate disasters and development:

- Poor land management.
- Increased population concentrations in hazard areas.
- Environmental mismanagement, resulting in environmental degradation.
- Lack of regulation and a lack of enforcement of regulation.
- Social destitution and social injustice.
- Unprepared populations and unprepared institutions.
- Inappropriate use of resources.

However, not all the underlying causes of natural disasters are purely human-induced. Hydro-meteorological disasters are due to a combination of natural and human factors. Global warming is increasing the temperatures of earth's oceans and atmosphere, leading to more intense storms of all types, including hurricanes. The decadal variations in the frequency and intensity of hurricanes are also believed to be a contributing factor, as are large-scale temperature fluctuations in the tropical waters of the Eastern Pacific Ocean, known as El Niño and La Niña.

UNDP (2005) refers to an analysis of the developing factors and underlying processes that configure disaster risk in relation to earthquakes, tropical cyclones and floods. The following profiles were found for each of the three types of hazards:

Earthquake:	Countries with high urban growth rates and high physical exposure were associated with high levels of risk.
Tropical cyclone:	Countries with a high percentage of arable land and high physical exposure were associated with high levels of risk.
Flood:	Countries with low Gross Domestic Product (GDP) per capita, low local density of population and high physical exposure were associated with high levels of risk.

According to the World Bank's "Natural Disaster Hotspots: A Global Risk Analysis", more than 160 countries have more than a quarter of their populations in areas of high mortality risks from one or more natural disasters. Taiwan has been singled out as the place on earth most vulnerable to natural disasters, with 73% of its land and population exposed to three or more threats.

Thus, development lead to disasters, but at the same time disasters also put development at risk. For example, meeting the Millennium Development Goals (MDGs) is severely challenged in many countries by losses from disasters. Such disaster losses may setback social investments aiming to ameliorate poverty and hunger, provide access to education, health services, safe housing, drinking water and sanitation, or to protect the environment as well as the economic investments that provide employment and income (UNDP 2005).

4.5 Poverty and community vulnerability

A community's vulnerability to disasters reflects an interaction of physical, social and other factors. Poverty significantly affects each of these factors and hence increases the vulnerability of communities to disasters. The 2004 Indian Ocean tsunami and more recently hurricane Katrina in the USA and the earthquake in Pakistan and India demonstrated once again that the poor usually suffer most from disasters occurring from natural disasters. Research shows that poor people are more likely to occupy dangerous locations, such as flood plains, river banks, steep slopes, reclaimed land and highly populated settlements of flimsy shanty homes Poor communities are also forced to use inadequate materials for infrastructure and housing, which further add to their vulnerability (UNDP 2005).

Rural poverty is one of the key factors that shape risk to hazards such as a flooding or drought. The rural poor, who are most at risk, are often no longer subsistence peasants. Instead, rural dwellers depend on complex livelihood strategies, including seasonal migration or inputs from remittances sent from relatives living in cities or overseas. These new survival strategies are reconfiguring risk in the countryside. Often the poorest in rural areas occupy the most marginal lands and this forces people to rely on precarious and highly vulnerable livelihoods in areas prone to drought, flooding and other hazards. Local ecological and environmental change as a consequence of agricultural practices can itself create risk. For example, deforestation to make way for agricultural production often leads to soil erosion, loss of nutrients and eventually, the marginality of agriculture. In some circumstances, these processes can lead directly to the generation of new patterns of flood, drought, fire or landslide hazard (UNDP 2005).

Also a number of social factors include aspects related to education, health, social security and human rights and peace. Poverty reduces social wellbeing thus making it more difficult for poor communities to realise a common purpose and coordinate their limited resources. The lack of communal resilience increases their disaster risks and intensifies the impact of disasters. For example, lack of access to health services and lack of adequate sanitation and water supply lead to illness, which increases vulnerability to hazards and further increases disaster risk by inducing hazards, such as disease outbreaks.

Although it is clear that the poor are often the most affected by natural disasters, it is perhaps too simplistic to suggest that there is a direct and absolute correlation between poverty and vulnerability. Poverty, as an indicator of lack of access to resources and income opportunities, is one of several dimensions of vulnerability. In addition to an economic dimension, there are other aspects of social positioning such as class, ethnicity, community structure, community decision-making processes and political issues that also determine the vulnerability of the poor to natural disasters. A poor community may be economically vulnerable but at the same time may have social, cultural and political capacities to cope with disasters. Risk reduction strategies for the poor should work towards reducing economic vulnerability and at the same time, capitalize on (and perhaps nurture), these inherent social and cultural capacities. It is imperative that while improving the economic resilience of poor communities, the physical, social and political risks are also recognized and managed (Yodmani 2005).

There is also another aspect of the vulnerability of the poor to disasters that is frequently overlooked - that disasters are often local. Disaster statistics that are collected and aggregated at local and national levels and that represent the formal and most defined sectors of the economy do not capture the suffering of the poor. Maskrey (1999, 86) points out: "The creeping impact of the small-scale disasters on the lives and livelihoods of vulnerable communities, whose economy is largely in the informal or subsistence sectors, is rarely documented given that one of the most vulnerable communities are those with the least assets to lose".

5 Disaster reduction

5.1 The disaster reduction cycle

As described earlier, disaster reduction (or disaster risk management) is the systematic development and application of policies, strategies and practices to minimise vulnerabilities and risks throughout a society to avoid (prevention) or limit (mitigation and preparedness) the adverse impacts of hazards, within the broad context of sustainable development (ISDR 2002). The Disaster Reduction Cycle illustrates the main phases of disaster reduction – before (pre-disaster) and after disasters (post-disaster) (see figure 5.1).

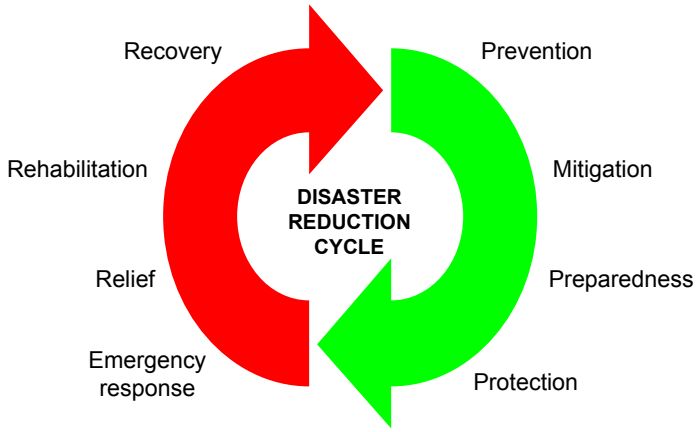

Figure 5.1 *Disaster Reduction Cycle.*

The traditional role of disaster reduction/management has focused almost exclusively on actions taken immediately before, during or shortly after a disaster in order to avoid loss of life and reduce economic damage. It is, however, a growing understanding that disaster reduction is a long-term development issue which is not confined in time. The new focus on disaster reduction and preparedness in development suggests two important avenues ahead. First, disaster reduction should become an integrated concern of developing countries' own policies and plans. Secondly, these efforts should be geared to strengthen local resilience and community coping strategies - and reinforced by international organisations (ISDR 2004).

5.2 International and regional strategies

There has been an evolution in disaster reduction thinking from relief and response, to contingency planning, hazard reduction and vulnerability and finally to comprehensive risk management. The emphasis is now turning from reducing social and economic vulnerability through investment in mitigation activities to more integrated approaches focusing on strengthening community resilience to disasters. The new approaches are consistent with wider changes in development practice that stress good governance, accountability and advocacy of bottom-up approaches as the basis for sustainable poverty reduction (Yodmani 2005).

5.2.1 The International Strategy for Disaster Reduction (ISDR)

The United Nations (UN) has established the International Strategy for Disaster Reduction (ISDR) as a global framework for action with a view to enabling all societies to become resilient to the effects of natural hazards and related environmental and technological disasters, in order to reduce human, economic and social losses. It involves a conceptual shift from an emphasis on disaster response to the management of risk through the integration of disaster reduction into sustainable development. The four goals of the strategy are to:

1. Increase public awareness about disaster reduction.
2. To obtain commitment from public authorities.
3. To stimulate interdisciplinary and inter-sectoral partnerships.
4. To improve the scientific knowledge of the causes of natural disasters and the consequences of the impact of natural disasters.

The Inter-Agency Secretariat of the ISDR in Geneva is responsible for coordinating disaster reduction strategies and programmes and serves as facilitator among partners.

5.2.2 The "Hyogo Declaration"

The World Conference on Disaster Reduction (WCDR) was held at Kobe City of Japan's Hyogo Prefecture from 18-22 January 2005. The "Hyogo Declaration and Framework for Action" came out as the result of the conference. The declaration states that disasters have a tremendous detrimental impact on efforts at all levels to eradicate global poverty and thus the impact of disasters remains a significant challenge to sustainable development. It emphasises the need to involve all stakeholders, including governments, regional and international organisations and financial institutions, civil society, including non-governmental organisations and volunteers, the private sector and the scientific community (UN 2005).

The Declaration/Framework for action (2005-2015) sets the following priorities:

- Ensure that disaster risk is a national and local priority with a strong institutional basis for implementation.
- Identify, assess and monitor disaster risks and early warning.
- Use knowledge, innovation and education to build culture of safety and resilience at all levels.
- Reduce the underlying risk factors.

- Strengthen disaster preparedness for effective response at all levels.

The priorities are further elaborated in the Framework of Action.

5.2.3 Africa Regional Strategy for Disaster Risk Reduction

The report "Towards Sustainable Development in Africa – Status of Disaster Risk Management & Disaster Risk assessment in Africa (UN/ISDR 2004) is a result of the ongoing efforts by the African Union (AU) Commission, the New Partnership for Africa's Development (NEPAD) Secretariat and the African Development Bank (AfDB) to integrate disaster reduction into development processes in Africa, with the support of the Africa Office of the United Nations International Strategy for Disaster Reduction (UN/ISDR).

Based on the findings in the report, a regional strategy for disaster risk reduction was adopted by African ministers at the 10th Meeting of the African Ministerial Conference on the Environment (AMCEN) in June 2004 and submitted to the African Union (AU) Assembly Summit, with a call to develop a Programme of Action for its implementation.

Disaster reduction policies and institutional mechanisms do exist at various degrees of completeness in African countries. However, their effectiveness is limited, hence the need for a strategic approach to improving and enhancing their effectiveness and efficiency by emphasizing disaster reduction. A baseline study was initially carried out concluded that development was at risk from disasters mainly because of gaps in the following areas: institutional frameworks; risk identification; knowledge management; governance; and emergency response.

The strategy builds on existing disaster reduction institutions and programmes available in African countries and in the Regional Economic Communities (RECs), and aims to mainstream them into development so that they can better contribute to disaster reduction.

AU/NEPAD recognizes that promoting disaster reduction as an integral part of development is a major challenge. Strengthening and expanding the existing practices and mechanisms for disaster reduction will not adequately address the disaster risk problem in Africa: what is required is a transformation of the basic mindset and practices of national authorities; the disaster reduction community; the public and development partners regarding the reduction of disaster risks. Since changing mindsets often is a rather slow maturation process, the Strategy will adopt a longer-time approach.

The strategy is comprehensive in that it takes into account the need to reduce disaster risks sustainably, including those induced by conflicts. Complex humanitarian emergencies arising from conflicts exacerbate the effects of natural hazards, such as famine and epidemics. This is because they increase the vulnerability status of populations and ecosystems already stressed, thereby worsening the level of disaster risks. In turn, the type, onset and intensity of conflicts are also influenced by natural hazards, particularly environmental hazards. Therefore, both issues need to be integrated in disaster reduction interventions.

The following stakeholders have key institutional roles to play in the implementation and monitoring of the Strategy: the AU/NEPAD, the REC's, the Africa Working Group on Disaster Risk Reduction, national governments, major groups (mainly civil society bodies and the private sector) and international development partners.

5.2.4 International conventions and agreements

There are also several international conventions, protocols and acts that may provide a mandate and encouragement to policy makers and legislators in addressing disaster reduction Examples are the 1998 Aarhus Convention that covers rights of access to information, public participation in decision-making and access to justice in environmental matters, the United Nations Convention to Combat Decertification in countries experiencing serious drought and/or desertification - particularly in Africa, and the Convention on Biological Diversity (CBD).

5.3 Approaches to disaster reduction

5.3.1 Key dimensions of disaster reduction

Disasters impact socio-political factors. Actions aimed at reducing risk should address the social factors that determine vulnerability as well as changes in the political environment that could increase the resilience of communities. Four parallel and complementary lines of actions can be considered to reduce exposure to disasters and achieve a more sustainable approach to development (Bendimerad 2003):

- Community/stakeholder participation.
- Public policy actions.
- Safer construction and urban development.
- Development of a culture of prevention.

The inter-relatedness between the various dimensions is illustrated by figure 5.2.

Figure 5.2 *The main dimensions ("four cornerstones") of disaster risk reduction. Source: info.worldbank.org.*

5.3.2 Target-oriented and people-centred approaches

A general characteristic of the international strategies for disaster reduction is the focus on long-term partnerships based on good governance across many sectors and disciplines. An integrative and target-oriented approach is believed to provide the best basis for tackling the threats posed by disasters. Viewing disasters in this way may steer away from the "technical fix" towards more people-centred strategies IFRC 2004).

Setting targets for risk reduction helps to promote political will and resources. Such targets should be specific, time-bound targets for disaster reduction, with clear responsibilities and measurable commitments; others should focus on processes that would allow stakeholders to meet their targets or to establish common standards. Targets could be set by governments, communities, NGOs and donors, to include: reducing numbers killed and affected by disasters; implementing disaster plans; training response teams; establishing early warning and evacuation systems; protecting essential infrastructure; reversing environmental degradation; devoting a percentage of relief funds to disaster mitigation and preparedness www.unisdr.org -2005).

5.3.3 Disasters as an opportunity for changes

There is a trend towards viewing disasters not only as destructive, but also as an opportunity to create positive changes that can reduce poverty and strengthen resilience towards natural hazards in the future. Blaikie et al. (1994) introduces a set of approaches to risk reduction, where emphasis is placed on the possibility that the recovery phase offers. The strengthening of local institutions and education of political leaders and decision makers about vulnerability and risk are examples of such possibilities. The goal is to make people prepared to handle future events in such a way that they do not become disasters.

Searching for opportunities will have to involve innovative thinking and considering new untraditional means to strengthen community resilience to natural hazards. One example is the use of micro-credit facilities. Micro-credit is a useful tool for poverty reduction, but its potential to reduce the impact of disasters needs to be further explored (ISDR www.unisdr.org). It can do much to help empower those with little or no access to traditional financial institutions, thereby reducing disaster risk and improving disaster reduction. By diversifying the income of high-risk populations and promoting disaster insurance, microfinance can strengthen coping mechanisms before disasters, while hastening recovery afterwards. Microfinance cannot, however, provide standalone protection against disasters. It must be part of a greater strategy of disaster reduction.

5.3.4 Legal and institutional structures

Laws, executive orders and other legal instruments set the ground rules for governmental and non governmental activities relating to disasters and risk reduction. They define the authorities, responsibilities and roles of officials and organisations, establish legal authority for organisations and programmes, and sometimes create organisations and co-ordination mechanisms. They may dictate or encourage relevant policies, practices and processes.

In recent years, many countries have moved their disaster reduction agenda forward through progressive legislative reform, often as a result of a major disaster. An example is the 1998 Law on Earthquake Preparedness and Reduction in the People's Republic of

China, which takes a holistic approach to disaster reduction, emphasises linkages to national economic and social development plans, assigns leadership and other responsibilities at all levels, contains guidelines for emergency planning, provides for a range of anti-seismic measures, and includes sanctions for non-compliance (www.unisdr.org – 2005).

The growing adoption of rights-based approaches by humanitarian and development organisations worldwide may also stimulate positive legislative change. There has been some discussion about the application of the rights-based approach to disaster reduction. The notion of a 'right to safety' (i.e. the right to the highest attainable standard of protection against natural and human-induced hazards), although not explicitly set out in international human rights instruments and their interpretations, is consistent with them. It can be linked to several basic and accepted political, social, economic and cultural rights (i.e. to life, liberty and security of person; to economic, social and cultural development; to an adequate standard of living (including housing); to freedom from hunger; to health and safety at work; and to health), as well as to government's established duty to provide security to its citizens. Several national constitutions already contain provisions that support the right to safety, sometimes expressed as the right to an environment that is healthy and safe (www.unisdr.org – 2005).

Although the willingness of governments to undertake legislative reform is an important indicator of political commitment to disaster reduction, the road of legal reform is not easy. Legal reform processes have proven to be lengthy. New laws and regulations have to be consistent with existing ones applying to this and other areas of public life. In some countries, particularly those in political and economic transition, an additional concern is the sheer number of laws and decrees that have been passed, making it difficult to get a clear overview and often leading to contradictory legislation. Furthermore, enacted legislation frequently lacks enforcement. Failure to enforce official building codes and standards, for example, was a contributory factor to the high loss of life in the earthquakes in Turkey in 1999. The main reasons for this include the limited resources and capacities available, unclear designation of responsibilities for enforcement, the lack of incentives and disincentives (including penalties) to promote the application of disaster reduction and reduction measures, and the inadequacy of implementation guidelines (www.unisdr.org – 2005).

Policies and legislative measures are, however, often weakened by the absence of adequate means of carrying them out. For this, appropriate institutional frameworks and arrangements are needed. These comprise all organizations or institutions with a recognized role to play in disaster reduction, the mechanisms for co-ordination between them, their human resources, funding, equipment and supplies, leadership and effectiveness. It is widely believed that a strong, well located or central agency/authority for disaster and risk management is a key element in the institutional framework, providing a visible focal point for the management and reduction of risk as well as efficient emergency response. Successful nodal agencies facilitate a coherent approach to disaster reduction and provide a framework for coordinated action. But it is vitally important that such agencies demonstrate leadership and professional competence, and earn the confidence and support of stakeholders at all levels. In practice, such calibre and commitment are often lacking. It must be acknowledged that in many if not most countries such agencies originated to undertake disaster response/civil defence activities and have found it difficult to adjust to new, holistic, approaches to risk management (www.unisdr.org – 2005).

5.3.5 Good governance and decentralisation

Good governance has long been recognized as an important prerequisite for successful disaster reduction and key for achieving sustainable human development. Governance is the exercise of authority by society to manage its affairs in the economic, political and social spheres (hence it cuts across all aspects of development, including the environment, climate change, health, poverty and economic planning). However, it must be kept in mind that the environment and the threat of hazards are constantly changing. Therefore, governance in all its dimensions must be forward-looking to anticipate changes, new conditions and uncertainty. The capacity of governance structures and systems to adapt and respond to rapid significant change – in particular, to the disaster risk implications of rapid urbanization and climate change – requires much more analysis and debate (www.undp.org – 2005).

There are many examples of good governance in relation to disaster reduction from all parts of the world. It is a common lesson that risk management must be rooted in the core principles of good governance: equity, participation, pluralism, partnership, subsidiarity, transparency, accountability, the rule of law, effectiveness, efficiency, responsiveness and sustainability. Appropriate institutional and policy frameworks for risk reduction are essential to minimize human, material and environmental losses from disasters, limit the disruption they cause to socio-economic systems and generally reduce vulnerability to them. As such, good or weak governance can be seen as one of the fundamental factors influencing disaster risk (www.unisdr.org – 2005).

There is widespread a drive towards decentralization of government authority and responsibilities. Decentralization is an important vehicle for sharing responsibilities between central, intermediate, municipal/city and local levels, as well as for mainstreaming disaster reduction within the essential functions of government. Based on the principle of co-responsibility for vital functions, tasks should be transferred to the lowest institutional or social level that is capable of completing them. Decentralization empowers local levels with a sense of ownership and fosters participation. Where local governments are put in charge of implementing government policies and programmes, decentralization serves as a vehicle for mainstreaming disaster reduction at local level and reaching communities more effectively. Decentralization coupled with multi-stakeholder participation creates a more inclusive atmosphere and leads to greater community participation; decisions are also more accountable if made locally. It has facilitated effective counter-disaster partnerships in many countries, notably the Philippines, which underwent extensive decentralization in 1991: here, local government is gaining capacity and becoming more committed to disaster reduction, and its relations with civil society in local-level disaster reduction are growing stronger (www.unisdr.org – 2005).

Whilst decentralization has been an asset in many contexts, especially where central government lacks capacity to act for whatever reason, the appropriateness of this model must be judged in the context of the local organizational and administrative culture. Decentralization can lead to disaster reduction becoming isolated from mainstream government decision-making. Collaboration between different sectors and levels of administrative and operational responsibility is crucial if disaster reduction activity is not to become fragmented. The scale of some major disasters can overwhelm the resources available at local levels. Local-level actors cannot address all the structural causes of vulnerability: they have neither the jurisdiction nor the power to tackle the deeper political, social and macro-economic forces that put people at risk. Disaster reduction therefore requires robust and sustained linkages to be established between local and national levels (www.unisdr.org – 2005).

5.3.6 Political commitment

A key challenge for effective disaster reduction is endorsement at all political levels, including at the national level, as well as creating a "culture" of disaster reduction. The uncertainty of a disaster, if or when it will strike, makes it easy for governments to give less priority to disaster reduction, especially in face of scattered interest groups. Undoubtedly, the lack of political commitment and funding mechanisms underlie many communities vulnerable to hazards.

International and regional cooperation and political "buy-in" can serve as a mean to national ownership. The international and regional organisations could play a decisive role in advocacy and creating awareness. In addition, proper monitoring and measuring mechanisms have to be established to document the positive effects of disaster reduction. Awareness and knowledge creation targeting politicians and decision-makers, as well as building political pressure from below based and civil society initiatives, political lobbying etc. may also be part of a comprehensive strategy to ensure political commitment.

An important key to leverage the interest may be to demonstrate the benefits of investing in disaster reduction. There are many cases where cost-effectiveness appears to have been convincingly demonstrated. During the 1998 floods in Bangladesh, for example, the value of cattle saved on a 4-acre flood shelter exceeded the shelter's construction cost by a factor of seventeen. Reconstruction costs for a new deepwater port in Dominica hit by Hurricane David were equivalent to 41% of the original investment, compared with about 12% extra for building the port to a standard that could resist such a hurricane. Yet a more systematic approach to appraising costs and benefits of risk reduction activities is urgently required (www.dfid.gov.uk – 2005).

Furthermore, disaster reduction should be promoted as an integral part of development policies in fighting poverty. In policy terms this means that poverty reduction can help reduce disaster risk, but this requires a proactive focus on addressing such risk rather than seeing it as just another constraint to work within.

5.3.7 Financial resources

One of the most telling indicators of political commitment to disaster reduction is the level of resources allocated to it by governments, civil society and the private sector. Dealing with disasters is always a challenge for decision-makers, and swift and immediate response brings popular approval to political leaders. Political systems therefore recognize the need for strong intervention following a disaster, which is reflected in the considerable resources allocated to emergency assistance. There is still a major challenge to increase the focus on disaster reduction as a central element of ongoing development funding and programming, or in other words to use existing development resources in a manner which reduces risks by addressing the underlying causes of vulnerability.

Despite the many calls for mainstreaming disaster reduction into development planning, budgetary allocations to such work in national or international financial instruments remain extremely limited. In addition, resources from international donors are still biased towards humanitarian needs, which may limit governments' willingness to allocate their own resources to risk reduction (www.unisdr.org – 2005).

Another key problem in resource allocation refers to the degree of accountability, transparency and even corruption in both state and non-governmental organizations. Decisions about the allocation of limited development and relief resources are frequently influenced by political considerations rather than the real needs of marginalized populations. Ultimately, such failings also undermine the legitimacy of the organizations concerned. Moreover, funds allocated to disaster reduction may not be identified as such, especially where disaster reduction is integrated into other sectors. For example, strengthening hospital and school structures to withstand particular hazard risks is likely to be included within health and education sector budgets, and the amounts spent specifically on hazard-resistant features will probably be hidden within overall capital and building costs. This makes monitoring of the allocation and use of resources very difficult (www.unisdr.org – 2005).

It is, however, important to be aware of possible pitfalls. Recent studies suggest that governments (and donors) tend to fund disaster relief and rehabilitation by reallocating resources from development programmes. Although the impact of any such reallocation is difficult to measure as it is unrecognised in official figures, it can be expected to affect the poor disproportionately through adverse effects on poverty reduction efforts (www.dfid.gov.uk – 2005).

5.3.8 Mainstreaming a culture of disaster prevention

In order to address the underlying causes of disaster linked to development and resource utilisation, it is necessary to mainstream a culture of prevention in development programmes, plans and projects. A considerable incentive for rethinking disaster risk as an integral part of the development process comes from the aim of achieving the Millennium Dedevlopment Goals (MDGs). Most of the MDGs are set for achievement by 2015 (UNDP 2005).

Furthermore, the Poverty Reduction Strategy Papers (PRSPs) as coherent guidelines for national development planning offers a tool for enhancing the place of equity for poverty and vulnerability reduction in development. Other such tools are the National Environmental Action Plans (NEAPs), Regional Policy Plans and other plans at various administrative levels, i.e. related to Integrated Water Resources Management (IWRM) and Integrated Coastal Zone Management (ICZM). All policy alternatives should ensure that every aspect of development contributes to identifying, managing and reducing disaster risk rather than generating new risks. IWRM, for example, should take account of climate variability and expand the capacity to identify trends, manage risks and adapt to hazards such as floods and droughts. Anticipation and prevention are more effective and less expensive than having to react to emergencies. Early warning systems should become an integral part of water resources development and planning (Bonn Recommendations for Action 2001).

A possible danger that has been pointed out is that increased focus on mainstreaming and integration may "complicate" disaster reduction and lead to more bureaucracy, rather than concrete results. The "World Water Development Report" of the UN (2003) thus emphasises the need of pragmatism in managing disaster risk, because the increasing vulnerability to risk cannot always be matched by an appropriate adaptive capacity. As a consequence, there is a call for alternative and more sustainable risk management approaches. The report argues that steps forward need to be scheduled as a period of smooth transition from current integrated management to pragmatic and straightforward risk-based management.

5.3.9 Community based initiatives

Over the last two decades there has been a growing realization that many top-down approaches to disaster reduction have failed to address the specific local needs of vulnerable communities. Ignoring the potential of local resources and capacities may in some cases even lead to an increase in people's vulnerability. In such a context, the relevance of community based approaches to disaster reduction is being recognized (www.adpc.net – 2005).

Communities have an important role to play in disaster reduction, as they are the source of local knowledge and resources. Community leaders are in a good position to lead the disaster reduction process and in incorporating local knowledge. Community-based approaches to disaster mitigation lead to more accurate definition of problems and solutions, because they draw on local expertise in living with disasters. They can deploy low-cost, appropriate technologies effectively and they are more likely to be sustainable because they are "owned" by the community and build up local capacity.

A number of guidelines have been developed for community based disaster reduction. These also include various specialised analytical tools, such as Vulnerability Capacity Assessment (VCA), Community Risk Assessment (CRA) or Community Based Risk Assessment (CBRA). Most of the guidelines are based on step-wise procedures starting with drawing up a baseline (assessment of vulnerability status and possible threats) and proceeding with collecting information i.e. at household level for designing action-oriented plans for how to improve the community's resilience and coping capacity. The plans should be based on the stakeholders' own comprehensions and priorities. Assistance by experts is often required, at least in the initial phases, involving training and capacity building. For example in the Pacific Islands, villagers are taught to assess their own vulnerabilities and capacities (IFRC 2004). They are encouraged to draw maps of their local community, identifying vulnerable locations (i.e. houses on steep slopes, deep water lagoons) and vulnerable people (for example the elderly and disabled). They also map resources such as strong buildings to use as evacuation centres. Islanders are trained to set up disaster preparedness committees and plans, and receive first-aid training.

Most of the community based initiatives underpin holistic management, involving a broad number of issues that altogether influence upon resilience towards disasters. At the community level this implies addressing all the factors that determine the coping capacity and ultimately the community sustainability, such as the environmental quality, the economic vitality, social equity etc., see figure 5.3.

Figure 5.3 *A community's resilience towards disasters depends on and interacts with on several other conditions. Source: ISDR 2004.*

The main weakness of community-based initiatives might be their limited outreach. Scaling up to achieve greater impacts, i.e. at the municipal and district levels needs the participation of government. In that respect, mechanisms for sharing of knowledge and experiences between communities are important.

5.3.10 Indigenous coping strategies

According to the IFRC (2004), indigenous coping strategies are crucial in promoting disaster resilience. For example, in the Fiji islands, before cyclones, the population prepare containers of food and water, cut down overhanging branches, erect windbreaks and lash their houses to trees. One non-governmental organization in Fiji communicates preparedness messages through community theatre – a method rooted in the way that islanders learn their history, through songs, dance, rituals and legends handed down from one generation to the next. Measures to include the role of indigenous people are i.e.:

- Ensure that disaster risk is a national and local priority with a strong institutional basis for implementation.
- Development models based on risk reduction, incorporating indigenous coping strategies.
- Disaster awareness campaigns with materials available in local languages.
- Coordinated plans for relocating threatened communities with appropriate political, legal and financial resources.

5.3.11 Gender perspectives

Women and men are affected by disasters differently and the response to their needs must take into consideration these differences. Women play a primary role in providing assistance to the family and the community in prevention activities as well as during disasters. They are disproportionately affected by disasters and face targeted gender-based violence and exploitation in the aftermath of disasters. Women are often left out of planning for the response and therefore the special needs of women and girls are not met –or met as an afterthought. The special talents and skills of women are not capitalized upon –wasting a valuable resource (www.un.org – 2005).

In many parts of the world, women have organized effectively to reduce the risk of natural, human-induced and technological disasters. But these efforts are not well-known nor are they integrated into mainstream disaster reduction programs (www.ssri.hawaii.edu – 2005).

In recognition of the importance of gender and disaster reduction, participants from 28 countries met at the East-West Centre in Honolulu in August 2005 to develop a strategy for incorporating gender-fair practices in disaster reduction. One of the outcomes of the conference was a set of recommendations, prepared by the platform on Gender Equality and Disaster Risk Reduction, in preparation for the World Conference on Disaster Reduction (WCDR). The recommendations provide concrete guidelines on how to ensure that gender perspectives are consistently integrated into all aspects of disaster reduction:

- Mainstream a gender perspective in all disaster reduction initiatives.
- Build capacity in women's groups and community-based organizations.
- Ensure gender mainstreaming in communications, training and education.
- Ensure opportunities for women in science and technology.
- Ensure gender mainstreaming in programme implementation, monitoring and evaluation.

5.3.12 Risk reduction strategies aimed at the poor

As described earlier, it is the poor that suffers most when natural disasters strike, because they are the most vulnerable to risk. Risk reduction strategies therefore have to take into consideration the complex and varied nature of vulnerability of poor communities. It is at the local level that the physical, economic and social factors can be best assessed and managed (Yodmani 2005).

Risk reduction strategies for the poor should capitalize on (and nurture) the social, cultural and political and attitudinal capabilities of the poor. Existing local mechanisms for managing risk should be identified and strengthened. Efforts targeted at developing economic resilience in poor communities should be integrated with overall disaster management at the local level. An example is local access to credit for risk reduction activities that could be channelled through already established village councils. Micro-financing of self-employment activities could be linked with requirements for reasonable safety levels in the workplace (through retrofitting) that ensure that economic well-being is sustainable. Mechanisms that can help transfer risk from the informal sector of the economy could be explored. State supported crop insurance for small and marginal farmers could help share the risks they face over a wider sector of society.

Information is crucial: it may be the only form of disaster preparedness that the poorest people can afford (IFRC 2005). It is about giving the right information, so that those at risk can take greater control of their own lives. This requires information strategies that are based on consultation and communication with the target groups, including the poor. In some countries, public awareness campaigns, i.e. through schools and practice drills, have demonstrated good results. Informal networks and the media can also play an important role in disseminating and targeting information. Radio in particular is a very accessible medium for poor people – especially women in their homes. Apart from radio's uses to supply information after sudden onset disasters, skilfully produced radio dramas can be used to help reduce ongoing disaster risks. In Afghanistan, for example, a long-running BBC soap opera in local languages has been shown to change listeners' attitudes and behaviour towards risks such as landmines and infectious diseases.

Although risk reduction strategies for the poor must be well anchored at the community level, political commitment and actions at the higher political and administrative levels are also required in order to ensure coordination, mainstreaming and sustainable solutions. For example, the government must ensure that the Poverty Reduction Strategy Papers take disaster risk and environmental sustainability into account. Other national policies related to development, especially in relation to the primary sectors (i.e. agriculture, forestry, fishery), should have built-in measures for reducing vulnerability and for strengthening the resilience of the poor.

5.3.13 Environmental and natural resources management

As described earlier, impacts of disasters, whether natural or man-made, not only have human dimensions, but environmental ones as well. Environmental conditions may exacerbate the impact of a disaster, and vice versa, disasters tend to have an impact on the environment. Deforestation, forest management practices, or agriculture systems can exacerbate the negative environmental impacts of a storm or typhoon, leading to landslides, flooding, silting and ground/surface water contamination – as illustrated by the 2004 hurricane and storm tragedies in Haiti, and in the Philippines (UNEP 2005).

On the other hand, disasters can have large-scale impacts on the environment, both through direct effects on the ecology, but also through breakdown of important infrastructure, such as sewerage systems. The high volume of wastes from disasters, from households and debris from forests and rivers, also constitute a major concern for proper disposal.

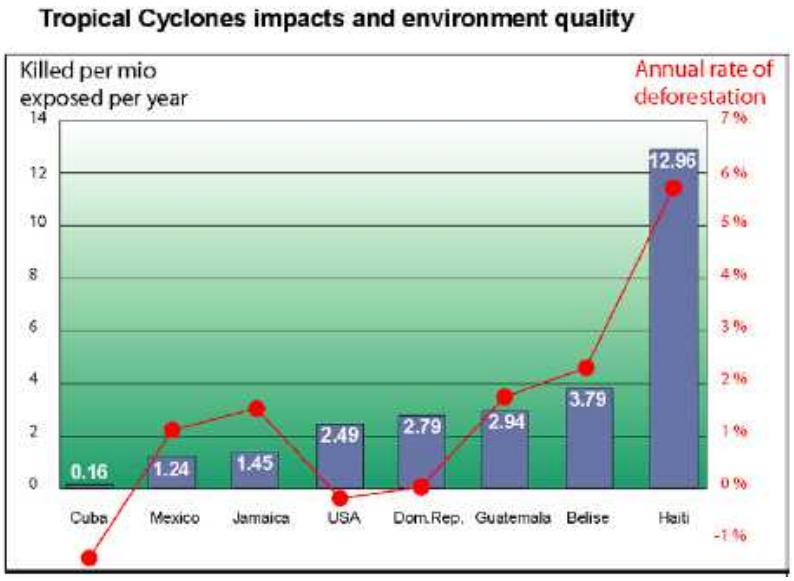

Figure 5.4 *Possible links between deforestation rate and the impacts of tropical cyclones. Source: DEPI, UNEP 2005.*

Although the inherent links between disaster reduction and environmental management are recognized, little research has been undertaken on the subject. The general lack of empirical work and scientific analysis poses a barrier for the development of knowledge-based policies and strategies for mitigation (UNEP 2005).

Furthermore, the concept of using environmental tools for disaster reduction has not yet been widely applied by many practitioners." (ISDR 2005). Such tools include i.e.

National Environmental Action Plans (NEAPs), Environmental Assessment (EA), Environmental Impact Assessment (EIA), Strategic Environmental Assessment (SEA), IWRM and ICZM and various contingency plans. Environmental management institutions that include monitoring components could also play a role in alerting local community members and decision makers to changing hazard risk (www.unisdr.org – 2005).

The linkages between poverty and environmental degradation are already well documented. Less well understood is the role of environmental management in supporting local coping strategies. An illustrating example: in the aftermath of disaster, communities in Cambodia relied on fishery resources for subsistence and supplemental income. Poor fisheries management however has led to increased pressure on the resources by outsiders, and in the aftermath of disaster even more people turn to these resources. As a result, the viability of fishing as a coping strategy is jeopardized by inadequate environmental management capacities. Weak institutions are often cited as another cause of vulnerability.

Thus, there is a clear need to reinforce the importance of environmental concerns in the entire disaster reduction cycle of prevention, preparedness, assessment, mitigation and response and to integrate environmental concerns into planning for relief, rehabilitation, reconstruction and development. This will also require the enhancement of capacities to undertake short and medium-term activities in disaster reduction based on long-term environmental considerations (UNEP 2005).

5.3.14 Transfer of risk

It will probably never be possible to completely eliminate risk from natural disasters or vulnerability to such risk. In many cases, there may be critical components of a nation's infrastructure that remain at risk.

Insurance mechanisms are used to transfer risks that cannot be mitigated through structural or ex-ante damage reduction measures, and against events that have the potential to cause large economic losses. These include standard insurance and reinsurance contracts as well as the creation of contingency funds to build up economic and fiscal resilience in the face of natural hazards (www.worldbank.org -2005).

5.3.15 Addressing disaster reduction at various time-scales

A common experience from many countries is that developing comprehensive and effective risk management systems takes time. It should be recognised as an evolutionary, incremental and step-wise process, where focus changes according to the needs. Hence, the setting of goals and targets will have to take into account the time scale.

McBean (2005) argues that in short time scale, the main focus should be on building systems for prediction and early warning. In the longer time horizon, emphasis should be put on prevention and mitigation of natural hazards and adaptation, i.e. to climate changes. Activities to reduce future vulnerabilities would typically include the development and enforcement of building standards, environmental protection measures, land use planning that recognizes hazard zones, and resource management practice, etc.

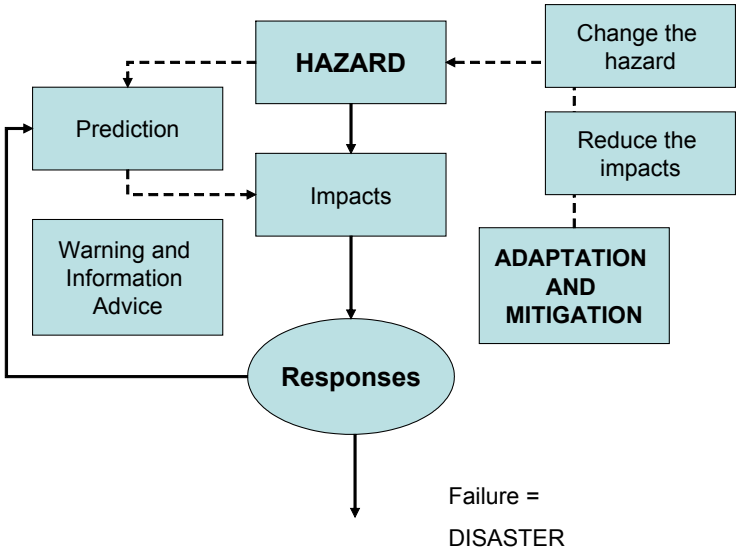

Figure 5.5 *Adaptation to, and mitigation of, natural hazards. Longer time scale. Source: McBean 2005.*

5.3.16 Education, information, and technology

According to the report ”Living with Risk: A global review of disaster reduction initiatives” (UN/ISDR2004), past experience has revealed the enormously positive effects of education for disaster reduction. Schools, academic institutions and training centres thus have an important role to play in developing knowledge and awareness on disaster safety. Children who know how to react during an earthquake, community leaders who have learned how to warn their neighbours in a timely manner, and societies familiar with preparing themselves for natural hazards all demonstrate how education can make an important difference in protecting people at the time of a crisis. Numerous opportunities exist whereby educational programmes can be used to introduce hazards, surrounding conditions of vulnerability and community risks. Experiences from various programmes indicate that disaster safety topics are best incorporated into the normal curricula instead of handling it as a separate subject. Internationally, institutions such as UNESCO and IFRC have taken initiatives in developing comprehensive education programmes. Most noteworthy is perhaps the “Coalition on Education" established by UNESCO in 2004, which focuses on integrating disaster reduction education into school programmes and in making school buildings safer.

Academic programmes related to hazard studies and emergency management have also expanded widely over the past ten years but only in some parts of the world, primarily in the US, UK , Japan and Latin America (UN/ISDR2004). Graduate and post-graduate studies in disaster management and response, disaster prevention, risk assessment etc. are offered by a number of Universities/Faculties.

Information is another vital component in building capacity on disaster reduction at all levels. The changing disaster risk landscape requires a continuous updating of knowledge, data and related analytical tools. Much of the advance in disaster reduction capacity worldwide is due to the greater availability and systematic dissemination of information and expertise, including studies of lessons learned. Internet communications, which

greatly facilitate this, provide models of formal and informal networking involving a very wide range of stakeholders worldwide (i.e. ISDR's electronic dialogues in 2003 and 2004, and the Natural-Hazards-Disasters email discussion list). It is essential that authoritative, impartial and systematic or comparative information on disaster risks and impacts and effective approaches to risk reduction, is made available more widely, especially at local level.

The 2004 Tsunami disaster emphasised the importance of information and communication throughout the disaster reduction cycle. The IFRC "World Disasters Report" (2005) states: "Looking back over the events of 2004, it is striking how many of the year's disasters could have been avoided with better information and communication. For tens of thousands of people, disaster arrived suddenly, unannounced". As well as saving lives, information reduces suffering in the wake of disaster. Tracing lost family and friends, knowing how much compensation you're entitled to or where you're going to live, simply understanding why disaster struck: such information means an enormous amount to survivors left homeless and traumatized.

Early warning of disasters is the most obvious way in which accurate, timely information can make the difference between life and death. This is a lesson learned from countries such as Cuba and Jamaica, which have developed good systems for spread of information and knowledge and where the inhabitants learn about disaster prevention already at the primary school level. In Cuba, for example, a high public awareness of disasters has ensured that death tolls from hurricanes are far lower than in neighbouring countries. Disaster awareness is taught as part of the school curriculum and evacuation drills are held every year before the hurricane season. Cubans understand the warnings issued by their meteorologists and relayed by the media. They know what to do and where to go. Vulnerable communities keep in close contact with government at all levels – unlike in Haiti which, undermined by political violence and deforestation, suffers many more disaster deaths (IFRC 2005). Cuba's success shows that scientific knowledge alone isn't enough – information only becomes useful when it's shared with people at risk. Those with the best information about the oncoming Indian Ocean tsunami in December 2004, for example, were scientists in the Pacific. But they were unable to communicate warnings to those people in the path of disaster (IFRC 2005).

As such, preparedness against disasters is a question of information and communication together with knowledge, technology, planning, awareness and much more. To be prepared for something, means to be aware of the possibility that this something may occur. Knowledge of physical qualities as well as cultural and social specifics of the region is essential to be able to foresee events to come and their impact. The right technology can be a key to limit the impact of a disaster. Relevant technology can help; predict natural phenomena such as an earthquake, or provide watering systems or earthquake proof housing (Lie and Røisli 2003).

Knowledge, technology and planning are easily associated with modern equipment, computer technology. However, local and traditional knowledge can be the most important keys to preparedness. The local knowledge derived from living in this natural environment for centuries, maybe millennia, is of great value. When introducing new technology and knowledge to local disaster reduction planning, it is therefore important to make this a synthesis of modern and local technology and knowledge, and thus taking the best from both (Haugseth 2003, UNDP 2001).

5.3.17 Monitoring and accountability

Monitoring is necessary to identify the baseline, to document the positive results of investments in disaster reduction strategies and actions, and to what extent actions the defined targets are met, which are crucial in creating a basis for political legitimacy. Monitoring also facilitates that disaster reduction can become a continuous learning process leading towards improved systems and also for promoting transparency and protecting and fulfilling the rights of crisis-affected people etc.

Proper monitoring systems related to disaster reduction are still in their infancy and need further development. The Hyogo Declaration (2005) emphasises the need to develop indicators to track progress on disaster reduction activities and to measure the impacts. Although there a many examples from world-wide demonstrating good results of preventative risk reduction, there is still lack of empirical evidence and concrete methods for demonstrating the value of investing in preventive measures.

A related issue is accountability. At field level, accountability means ensuring that crisis-affected people are involved in the decisions that affect them. They have their own ways of coping, so it's essential to include them in aid planning. Failure to engage them in meaningful dialogue about their needs and capacities can prove frustrating and even dangerous. Yet many consultation exercises simply extract information rather than promote dialogue.

5.4 Constraints to effective disaster reduction

Some of the constraints to effective risk reduction quoted in the World Disasters Report (IFRC 2002) are:

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- Responsibilities for mitigating disasters are fragmented.
- Risk reduction is not an integral part of resource management and development.
- Risk reduction is viewed as a technical problem, and often the underlying factors that compel people to live in insecure conditions are ignored.
- Donors dedicate far fewer resources to risk reduction than to relief.
- While risk reduction technology and programmes are very important, the call is for enhanced responsibility for social risk and recognition of a number of basic economic, institutional, legal and commercial constraints to the achievement of effective risk management.

Undoubtedly, one of the most serious constraints to disaster reduction is the relatively low priority given by the international society. The Director of the Secretariat of the International Strategy for Disaster Reduction (ISDR 2005) refers to that disaster reduction remains a low priority programme in the UN; it is entirely dependant on extra-budgetary or voluntary contributions. The High-level Panel made a very minor recognition of the issue in a small paragraph and failed to identify the ISDR that was launched in 2000 and the recent second World Conference on Disaster Reduction (WCDR) and its substantive outcome, the Hyogo Declaration and Framework for Action.

Despite being one of the main obstacles for development in some countries, the annual Human Development Report of the UNDP has not yet addressed the issue. Moreover, despite it being essential for the achievement of each of the eight MDGs, it is referred indirectly in only one of the MDGs. According to ISDR, much greater priority continues

to be given to conflicts or so called 'complex emergencies' despite the fact that disasters triggered by natural hazards provoke much greater and recurrent damage to communities in many more countries. Another constraint is the prevailing fragmented approach to programming in the UN. In spite of continuous advocacy for joint programming by the ISDR, it continues to prove very difficult to implement. The importance of management and leadership in this regard, still requires greater attention (ISDR 2005).

At the national levels, national disaster plans may mention mitigation and preparedness, but often lack detail and dedicated resources. Social and macroeconomic pressures can undermine authorities' capacity to reduce risks. Cash-strapped central governments may simply abdicate their responsibilities, leaving disaster reduction to local government and NGOs, even though they lack the skills and resources to do so (IFRC 2002).

6 Examples of disaster reduction – lessons learned

6.1 Does disaster reduction help?

There are many good examples of communities that have learned to live and cope with natural hazards and that have gradually strengthened their capacity to prevent hazards turning into disasters. Their "survival strategy" is based on past experiences and utilising inherited traditional knowledge to build resilience. Taking a comprehensive, participative and systematic approach, building a culture of disaster prevention in all parts of society, and adopting it into the education system seem to be some of the intrinsic factors for success.

Some success stories:
Among the Pacific small island developing states (SIDS), there has been admirable progress of well-structured programmes for disaster reduction. Programmes are guided by regional consensus and championed by respected regional organizations. People have displayed a consistent regional approach of transforming policy objectives, public understanding and practical implementation related to disaster reduction. This has proceeded from the prior concentration on the needs for urgent disaster assistance during a crisis, to the ongoing identification and management of risks experienced by local communities, integrated into overall national development strategies. The emphasis has changed now to a more proactive approach of increasing awareness about natural hazards and preparing for them. The major challenge in this respect for the region has been to formulate and implement strategies to reduce community vulnerability. Throughout the region, governments have been encouraged to develop risk reduction strategies and local communities are becoming motivated through ongoing and consistent public education campaigns.

Another success story referred to by UN/ISDR (2004) is the cyclone preparedness programme in Bangladesh, despite the continuing large losses of life and property there. By coupling cyclone shelters and community-based preparedness measures, the Bangladesh programme dramatically reduced vulnerability from the 1970s to the still-high levels observed in the 1980-2000 reporting period.

Cuba is also often looked upon as a "model" for disaster prevention. In the seven years between 1996 and 2002, six major hurricanes hit Cuba, yet a total of only 16 people died. At the national level, Cuba's disaster legislation, public education on disasters, meteorological research, early warning system, effective communication system for emergencies, comprehensive emergency plan, and Civil Defence structure are important

resources in avoiding disaster. The Civil Defence structure depends on community mobilization at the grassroots level under the leadership of local authorities, widespread participation of the population in disaster preparedness and response mechanisms, and accumulated social capital. Disaster preparedness, prevention and response are part of the general education curriculum. People in schools, universities and workplaces are continuously informed and trained to cope with natural hazards. From an early age, all Cubans are taught how to behave as hurricanes approach the island. They also have, every year, a two-day training session in risk reduction for hurricanes, complete with simulation exercises and concrete preparation actions. This facilitates the mobilization of their communities at the local level when a hurricane hits Cuba (Thompson et al. 2004).

6.2 Lessons learned from country cases

6.2.1 Mozambique – evolution of a comprehensive disaster reduction system

A case study on Mozambique carried out by UNDP (2005) summarises the lessons learned from capacity building in disaster reduction and developing a comprehensive disaster reduction system. Throughout the 1980s, Mozambique's economy and infrastructure was decimated by civil war. The signing of a peace accord in 1992 and the resulting political stability facilitated a process of recovery and reconstruction. However, Mozambique is prone to a range of natural disasters, such as cyclones, drought, floods, epidemics, pest infestations and landslides occurring regularly. The country has lost over one million lives due to war and disasters, which affected over six million people over the last two decades.

The devastating floods of 2000 resulted in the loss of about 800 lives and the damage was estimated at over USD450 million. Like in many other countries, poverty in Mozambique is considered the key source of vulnerability and exposure to disaster risk. Mozambique has had a comparatively long experience with managing disasters, and the evolution of disaster reduction structures in Mozambique has been praised as a good practice. As early as 1981, Department for the Prevention and Combating of National Calamities was established with the objective of promoting early warning and mitigation activities. In the 1990s, a variety of mitigation measures were instituted.

Disaster reduction has undergone a transition from emergency response to a more comprehensive and integrated disaster reduction approach through the establishment of the National Institute for Disaster Reduction (INGC). The INGC has the role to coordinate all phases of disaster reduction, even though it’s functioning has been constrained to some extent by the fact that disaster reduction legislation is still pending for approval. Also established were an inter-ministerial council for coordinating disaster reduction bringing together about 15 ministers; and a multi-sector technical committee for Disaster

Management chaired by the National Director, Positive Impacts ensuring a coordination and collaboration in multi-sector planning of mitigation and response activities. Also Mozambique's practice with annual contingency planning has become a model in the Southern Africa Development Community (SADC) region, hosting numerous missions from other countries in the continent to learn from its experience. The National Contingency Plan is a yearly, multi-sector and multi-level plan carried out in a

participatory and consultative manner. The process begins at the sub-regional level with the establishment of a consensus on climate outlook for the coming seasons. Early warning information is then gathered from communities, districts and provinces with technical support from UNDP, other UN agencies and NGOs, and finally processed at the national level by the INGC. The analysis feeds into the National Contingency Plan which is carried out every year beginning of October simultaneously by different sectors and affected districts and provinces. Some of the key components in the plans are:

- Risk identification.
- Risk information management, including early warning.
- Linking of academic and research communities to institutions dealing with disaster reduction, carrying out joint activities such as flood risk reduction and flood hazard mapping.
- Training for awareness raising and information management targeting government institutions involved in disaster reduction at central, provincial and district levels, media and other stakeholders such as the community leaders.
- Public awareness programmes targeting local communities, with the involvement of NGO's, religious groups, community leaders and media.

The Mozambique case shows that the creation of comprehensive disaster reduction structures requires time and experience and may sometimes follow an almost "evolutionary path" from a focus on response to a more pro-active risk reduction oriented approach. The example also illustrates the need for basic stability in order to enable governments to move out of the "emergency mode". Even though there is high commitment within government towards the democratization process and decentralization of decision making to local authorities, progress with decentralization of disaster reduction functions has been slow. Provinces lack resources and technical capacity; communication between the centre and provinces needs strengthening; and structures at the district and community level remain relatively under-developed. Also the situation at the central level requires further investments in human resource capacities and financial resources to enable implementation of plans and policies already in place.

Experiences from the flood disaster in year 2000

The 2000 floods were the worst floods experienced in Mozambique, with disastrous effect. The following actions were taken by the government before, during and after the floods (Mozambique National Report on Disaster Reduction):

Before the floods: The weather forecast for the 1999/2000 rainy season indicated in October 1999 normal to above normal rains in central and southern Mozambique and below normal rains in the north. Based on these predictions the Technical Council for Disaster Management started to work on possible scenarios during the season, namely floods and cyclones. The Technical Council for Disaster Management prepared and submitted to the Coordinating Council for Disaster Management a contingency plan for the rainy season that included the following major components:

- Identification of areas likely to be affected by floods and/or cyclones and estimate of population at risk.
- Identification of safe areas for temporary shelter and resettlement of people to be evacuated from areas at risk.
- Mobilization of means for search and rescue operations in areas likely to be affected by floods.

- Estimation of food and non-food requirements for affected population.
- Pre-positioning of relief items for a three months period in areas likely to be affected or isolated.
- Dissemination of hydro-met updates to central, provincial and district authorities and local community in order to take precaution measures.
- Dissemination of warnings on eminent floods and actions to be taken to protect lives and property.
- During a week inaugurated by the Prime Minister in October 1999, the Technical Council carried out jointly with the Mozambican Red Cross a simulation exercises on the possible flooding scenarios.

During the floods: As indicated in the weather forecast, during the period from December 1999 to March 2000 heavy rains were reported in southern Mozambique and upstream in Botswana, Zimbabwe and South Africa resulting in floods in many river basins across central and southern Mozambique. In addition, central and southern Mozambique was hit by cyclones Connie, Eline, Gloria and Huddah, which brought more rains. The following actions were taken:

- Search and rescue of people stranded in isolated areas using aircrafts, boats and trucks with international assistance.
- Establishment of temporary shelters for the thousands of homeless and evacuees.
- Provision of humanitarian emergency relief, including food and non-food requirements in more than 100 temporary accommodation centres in radium of more than 1,000 km in five provinces.
- Monitoring of conditions in accommodation camps to prevent outbreak of diseases.
- Provision water purification equipment, sanitation and medical assistance in the camps.
- Preparation of humanitarian emergency appeals.

After the floods: The following actions were taken after the floods:

- Identification of safe areas for resettlement of displaced people and other people living in areas at risk of floods.
- Support to the resettlement process through provision of building materials and kitchen sets.
- Distribution of seeds and tools to displaced and affected population for them to resume agricultural activities.
- Preparation of the post –disaster reconstruction plan.
- Mapping of flood prone areas and resettlement of the vulnerable population.
- Rehabilitation of infrastructures that were destroyed by floods.

According to the national report, the lessons learned from trying to manage this disaster, is that the establishment of contingency plan proved a vital instrument that enabled the government to act quickly in the wake of the floods, although it overstretched the capacity of the government. In addition, people relocated in new areas are safer now and are aware of the negative effects of floods. As a result of the good experience of managing the 2000 floods, the following floods in 2001 in the Zambezi river basin, although they affected a wider area, their effects in terms of loss of lives and damage to infrastructures were negligible.

6.3 South Africa – Disaster Mitigation for Sustainable Livelihoods Programme

Disaster Management in southern Africa has been characterized by a legacy of emergency response and relief, which has often failed to support the local capacity of communities to sustainably reduce their risk through prevention and mitigation. The greatest reflection of this is that despite substantial resources being made available for sustainable development and for emergency response and relief, financial resources made available for the incorporation of risk reduction in developmental planning are far fewer. Currently, in southern Africa millions of dollars are being provided for food emergency assistance to an estimated 14 million people facing acute food insecurity, as a result of political, economic can climatic factors. However, securing comparable financial resources for prevention and mitigation is difficult, as risk reduction principles are not sufficiently incorporated into developmental plans or programmes Disaster Mitigation for Sustainable Livelihoods Programme (DiMP), University of Cape Town (2005).

Regional and national efforts to address this situation have included changes at a policy level with both the Southern African Development Community (SADC) and national governments making policy commitments towards an 'integrated and coordinated approach to disasters and risks that not only reduce disaster losses, but also have broader benefits to communities at-risk' (South African DM Framework).

The South African Disaster Management Act (2002) identifies disaster prevention and mitigation as its core principles in "achieving the goal of disaster reduction, in which vulnerabilities and disaster risks are reduced and sustainable development opportunities strengthened". At the centre of the South African Disaster Management Legislation is the incorporation of disaster prevention and preparedness into developmental policy, planning and programmes.

In light of this, the South African Disaster Management Act has stipulated that all government departments must integrate vulnerability reduction measures into ongoing programmes as part of their disaster management plans. At the local level, the incorporation of disaster risk principles into development plans is achieved through the Municipal Systems Act, which identifies disaster management plans as core components of Municipal Integrated Development Plans (IDP's). This is particularly significant, as disaster management is not mandated at the municipal level, and so allows for cross-sectoral funding of developmental and risk reduction programmes at the local level.

The challenges in achieving sustainable risk reduction at a community level:

Southern Africa faces the challenge of rapid urbanization, the effects of global climate change, the impact of HIV/Aids, challenges of emerging systems of democratic governance, challenges faced by post-war contexts in Mozambique and Angola, protracted droughts and increasing environmental degradation, all of which are increasing disaster risk at a staggering rate. In southern Africa there is an increasing awareness that small and medium scale events are increasing in frequency and magnitude, with losses being borne largely by poor and socially disadvantaged urban or rural communities. These communities are often unsupported by local, national or international agencies, except in times of a chronic emergency. As a result many communities develop local mechanisms for coping and adapting, such as social support networks or by diversifying their livelihoods. The challenge however, is that these practices are often not appropriate or sustainable, as they are seldom supported by local development plans and thus, force

communities into a situation of coping in times of an emergency as opposed to reducing their risk through ongoing prevention and mitigation.

At the centre of the South African Disaster Management Act is an explicit focus on the reduction in vulnerability of "disaster-prone areas, communities and households". In southern Africa this is particularly significant as the rapid rate of social change, driven largely by the fastest rate of urbanization in the world, means that the notion of communities is changing dramatically. As a result the concept of households at-risk has been introduced as it allows for a greater differentiation of risk between households. An example of this can be found in one of Cape Town's informal settlements, where there are over 29 'community' representatives. In this case it is more useful to work with the households most at-risk, than with the 'Wallacedene community' as a whole.

Achieving sustainable community based disaster management - lessons from southern Africa:

The notion that "community" based approaches build or enhance the local capacity of communities and households to reduce and manage their risk is increasingly recognised as a more effective approach of averting long-term disaster losses. This approach involves the active participation of communities in the design and implementation of programmes in collaboration with a wide range of stakeholders to ensure that communities and households take ownership of initiatives. Explored below are a number of key strategies to ensure the sustainability of community based disaster risk initiatives. These strategies are drawn from lessons learnt in southern Africa.

Cooperative governance: participation of a wide range of stakeholders: The active involvement of the private sector, non-governmental organizations, traditional leaders, technical experts, volunteers and the community is critical to ensure cooperative governance. In South Africa, increased co-operation and coordination between these stakeholders and different spheres of government should be achieved through proposed Disaster Management Advisory Forums. At a community level this may also involve establishing local committees or working with existing institutional structures. It is however, important that the roles of relevant stakeholders are clearly defined and that any committee or forum neither opposes nor duplicates existing institutional structures.

Inclusive of the most at-risk households: All risk reduction initiatives need to be inclusive of the most at- risk households. This may include households who are silent either due to social or political marginalisation and may include women, children or the elderly. In southern Africa the high incidence rate of HIV/Aids amongst young and adult populations has resulted in an estimated four million

Aids orphans in six countries alone, many of whom will have to assume the responsibility of heading the household. Child-headed households are most at-risk, as they may experience chronic food insecurity and will often adopt high-risk survival strategies such as transactional sex which places them in even greater risk.

Reduce the risk of recurrent small and medium scale events: In southern Africa there is a recognition that the number of small and medium sized disaster incidents are increasing. In the MANDISA database (Mapping and Monitoring of Disaster Incidents in South Africa) over 12,500 incidents were recorded for the Cape Town metropole between 1990 and 1999, with a high percentage of single dwelling fires in informal settlements and only six declared disasters. This illustrates the reality of "everyday risk", which is reflected in disaster losses triggered by small and medium scale recurrent. Given a disaster risk profile characterized by a high frequency of small and medium scale events, it is clear

that risk reduction efforts should focus on building the resilience at a community and households level.

Strengthen existing capacities within the community through active participation: In the majority of emergency situations communities are reliant solely on community coping strategies before relief aid arrives. The strengthening of these strategies is therefore critical in not only saving lives but securing assets, and therefore reducing disaster losses. In Mozambique, the German Technical Corporation (GTZ) in collaboration with the local district authorities and eight villages initiated an early warning and preparedness programme for cyclones. The programme has strengthened existing early warning systems, through improved communication of early warnings using the local radio station, river water markers and three different coloured flags to notify households of an encroaching cyclone. The active participation of all stakeholders is critical in strengthening the communities' capacity to not only improve early warnings and preparedness planning but, in addition to this, reduce long term risk through prevention and mitigation.

Strengthen regional cooperation: Disaster risk is not constrained by national boundaries and therefore disaster management plans need to be developed with a regional focus. At a regional level the Southern African Development Community (SADC), in collaboration with the UNDP, has developed a multi-sectoral disaster management strategy. One of the integrated strategies presented for managing droughts and floods in the SADC region has been the Water Sector Coordinating Unit, which assists in the development of cooperative agreements on shared river basins within the region. Such regional policies are particularly significant in cases such as the Mozambique floods in 2000. The failed notification of water being released from the Chikamaba Dam in Zimbabwe resulted in Mozambican riverine communities being flooded without adequate warning. In this case the regional cooperation agreements will include sharing of early warning information. Furthermore, the development of joint standards of practice across countries to ensure that there is uniformity in standards of humanitarian assistance and mitigation across the region is also included.

A new way forward: transferring risks into opportunities: Many households make conscious choices to live in conditions of known risk, having calculated an acceptable level of loss in relation to their livelihood opportunities. One case is of small-scale Mozambican farmers living and farming in close proximity to the river due to the high nutrient soils and easy accessibility to water. The risk of annual cyclone induced flooding is however high, with increasing efforts by local authorities to encourage farmers to move to higher ground. The consequences of relocating without adequate alternatives, such as irrigation, place these farmers at risk of drought, with direct consequences for their livelihoods. In such a situation empowering communities and households to manage and reduce their risk, can in turn assist them in seeking sustainable livelihood opportunities that otherwise may pose a potential threat.

6.3.1 Kenya – Drought Preparedness Programme

Kenya is exposed to regular extreme weather events which exacerbate rural poverty, with devastating impact on pastoralists and subsistence farmers in the arid and semi-arid regions of the country. In the last decade alone, a succession of drought periods and devastating floods in different parts of the country have been recorded. These phenomena have had the cumulative effect of reducing household food availability, purchasing power, and coping capacity, and impoverishing the rural population.

In the year 2000 Kenya suffered its worst drought in 37 years (IFRC, Africa Department 2005). The Government of Kenya (GOK) launched an urgent food appeal to feed 4 million Kenyans affected by famine as a result of the drought. The Kenya Red Cross Society (KRCS) participated actively in the response to the famine in 2000 and the authorities appointed the KRCS as lead agency in Machakos district to distribute relief food on behalf of the GOK, in partnership with the IFRC. The relief operation lasted for nine months with 260,497 beneficiaries, and gave the KRCS Machakos branch the opportunity to work closely with rural communities of Machakos. The KRCS Machakos Branch, together with the IFRC undertook an assessment at the end of the operation in order to review whether there was a need to continue the operation, as well as the underlying causes of the food crisis.

Machakos district has an estimated population of 906,644 people and the majority of the population (85%) derive their livelihood through farming. More than 50% of these people are categorised as the absolute poor (i.e. those who cannot afford to meet the basic minimum food requirement even after spending all their total incomes on food only). In 2001 the International Federation initiated a bilateral cooperation with the KRCS on a long term basis. The KRCS showed interest in implementing a Drought Preparedness Programme in Machakos District.

This programme focuses on developing branch capacities through training to enable the Machakos branch to mobilize volunteers, and through training to work closely with and "from within" rural communities. The three-year project, implemented by the KRCS Machakos branch with technical support from the IFRC, aims at strengthening the local and district capacities, through local and innovative mechanisms, to predict, cope with and recover from recurrent drought impacts (there is a drought episode every three-four years). The underlying idea is to build assets to be able to cope with regular droughts, rather than only acting when the emergency has already struck.

The project is structured into four major focal sectors, that incorporate different activities, and a cross-cutting issue that embraces different capacity building activities, advocacy and awareness campaigns that are directly or indirectly linked to drought consequences (Hygiene and Nutrition, HIV/AIDS and First Aid). The focal sectors are intended to encompass different types of actions related to drought, namely preventive (prior to drought), coping (during drought) and recovery (basically post-drought rehabilitation). Beneficiaries were selected amongst the poorest sectors of the poorest divisions in the district. Masinga and Katangi divisions harbour a great percentage of food aid beneficiaries from the former food relief operation (2000-2001).

The project concentrates the efforts on the most vulnerable women in rural communities, supporting local associations and giving priority to women-headed households with children. A second target group is the whole population, with the aim to promote, at communal level, simple water storing and irrigation systems, drought resistant crop farming and grain storage. Health education focusing on the most common diseases, normally related with safe water and environmental sanitation, and HIV/AIDS is also a component of the programme.

A participatory approach, based on Participatory Hygiene and Sanitation Transformation (PHAST) methodology, was used to identify the perceived needs of each community on health, water and sanitation. This mobilized the community to:

- Take part in the solution of their problems through setting up steering committees.

- Work through local associations to share the responsibility between individuals, and strengthen the social tissue and the associative structures.
- Mobilise and train volunteers at community level to take part and responsibility in the implementation of the project.
- Involve the local authorities in the project implementation, getting their support from the technical point of view, and their involvement on the management structures at the lowest possible level.

The activities were funded through micro-credits (a revolving fund) to create ownership and solidarity between all the vulnerable women. The activities included:

- Selection and training of Red Cross field officers at district level. Train them on the aims of the project and PHAST methodology, as well as micro-credits.
- Identify in each community the health, water and sanitation status, needs and perception, through a methodology based on PHAST put in place in each location a focal point for the development of the community based organization with 30 members elected through baraza system.
- Setting up of Red Cross sub-branches or reorganising the existing ones.
- Mobilisation of local communities, together with water department officials, to work on the construction of small-scale water systems with the participation of the community.
- Setting up of and training for water committees in order to ensure the management of the water systems.
- Community health education and sensitization on basic environmental health, sanitation and HIV/AIDS through public sessions conducted by Red Cross volunteers.
- Specific intervention in HIV/AIDS prevention, focused on training for youth in community-based first aid, training in counselling for peer educators and support to the establishment of Red Cross youth clubs
- Malaria prevention activities in collaboration with the Ministry of Health, mainly related with the utilization of mosquito nets.
- Agriculture components with the aim of promoting the farming of drought resistant crops and advocacy in storing as well as setting up seed banks at communal level.
- Provide local associations with funds and technical training to promote off-farm economic activities through micro-credits.
- Specific training and support to Kenya Red Cross Society at district level and local level in order to improve their capacity to manage and monitor the activities and to ensure their future sustainability.

The experiences and lessons learned from the programme are:

- In the year 2004, Kenya suffered again a drought but the communities where we were working with our development programme in Machakos were not affected. Two years back, they were the most affected and now they were able to cope with the drought.
- Promoting economic activities among the most vulnerable women helped them to reduce their vulnerability and increase their capacities.

- Promoting micro irrigation schemes will help the small farmers to grow more food, and with an increased security and independence from climatic variability.
- Increasing access to water sources accompanied with health education and community first aid training have a direct impact in the health status of the population at large, preventing common diseases, such as diarrhoea and malaria making their life more productive.
- Working with communities is the key to success in this type of programme.

6.3.2 The Philippines – community-based disaster prevention

The IFRC's World Disasters Report (2004) summarises the experiences from the organisation's community based disaster prevention (CBDP) projects. The purpose of the CBDP is to enable local communities to protect themselves from disaster.

From 1971 to 2000, natural disasters killed 34,000 Filipinos. From 1990 to 2000, 35 million people were severely affected by natural disasters. Recurrent disasters, together with smaller hazards such as typhoons, frequently destroy poor quality housing, cause outbreaks of disease and create shortages of food and medicine, driving up prices. Many people can not afford to invest in recovery, as income-earning opportunities are scarce following disaster. Disaster impacts aggravate pre-existing poverty, creating a downward spiral of vulnerability, arresting development.

Clearer assessments of the factors creating vulnerability (and resilience) to disaster could lead to better interventions and advocacy. Filipinos are vulnerable to disasters for three reasons. First, their livelihoods are vulnerable, due to shortage of jobs, low wages, declining natural resources, decreasing profitability of rice farming and inequitable tenancy arrangements. Second, patterns of natural resource use are changing, as urban development and commercial quarrying and logging degrade the environment. Third, people are poor and marginalized, making it difficult for them to access resources such as development loans or land.

Equally important is to understand how local people cope with and recover from disaster, and how different groups have different needs and capacities. During crises, many households eat cheaper home-grown produce such as bananas and root crops, rather than more valuable rice and fish. They call on family and friends for financial support or help finding work. They diversify their livelihoods - sometimes finding work abroad. They get involved in local cooperatives which offer low-cost goods, savings schemes and loans for micro-enterprise - as well as affordable credit in times of crisis.

The strategy to cope with the problems has shifted from disaster response to community disaster preparedness. Projects identify villages prone to typhoons, then train volunteers in disaster preparedness (DP). Village officials and DP trainees are encouraged to produce disaster action plans, which lead to small mitigation measures such as: mangrove and tree planting, seawall and river dike construction, clearing irrigation channels, sand-bagging sections of rivers, and building evacuation centres. Initiatives are planned with the participation of community members and local government units (LGUs). LGUs help meet the costs or technical requirements.

The recommendations for implementation of CBDP are:

- Analyse the root causes of vulnerability to disaster.
- Understand the strengths of local livelihoods and capacities.

- Listen to community perspectives and priorities.
- Include other actors to share the burden of risk reduction.
- Advocate around issues that the community itself cannot tackle, and
- Advocate the integration of risk reduction into development planning.

Difficulties associated with CBDP:

- Projects focus on short-term outputs, rather than long-term outcomes, due to funding constraints and pressure to provide quick evidence of project success.
- CBDP can be a burden, requiring participants to sacrifice time, energy and other job opportunities.
- Several factors compromise sustainability. Some volunteers migrate in search of employment within months of their DP training. Others forget their training if it isn't applied.
- Mitigation structures don't adequately address livelihoods. The hazard-based approach fails to focus on factors underlying vulnerability - leading to 'event-centric' mitigation.
- CBDP can be disempowering, by raising expectations without increasing local capacity to address root causes of vulnerability. Participants may be steered away from linking DP to bigger, politically contentious issues that drive vulnerability. Politicians may use CBDP to avoid responsibility for reducing vulnerability.

6.3.3 Summary of lessons learned

The lessons learned from the presented country cases can be summarized as follows:

1. The country examples show that it is possible to significantly reduce the vulnerability to natural hazards and disasters by taking a strategic and pro-active approach to risk management.
2. International and regional organisations can act as facilitators and catalysts in promoting and initiating disaster management at the regional as well as the national levels, but risk management strategies must be developed and adapted to each nation’s premises and needs.
3. The success factors are very diverse, but good governance, political awareness and commitment, combined with comprehensive strategies, seem to be very important “drivers”.
4. Development of disaster reduction systems takes time and should be performed stepwise, working towards defined and consented objectives. There is no quick fix.
5. Disaster reduction is a learning process. It should allow for continuous capacity building among all participants. Monitoring of performance and results is important in creating motivation and building political support.
6. Risk management strategies should be comprehensive and address all phases in the disaster reduction cycle; preventative (before), coping (during) and recovery (after).
7. Knowledge and information are key assets. There is a lot of existing knowledge among people on how to cope with disasters, knowledge that is derived from long-time experience. Traditional knowledge should be combined with scientific expertise.
8. Natural hazards and disasters affect all parts of society. An integrated, cross-sector and multi-stakeholder approach is therefore required in building resilience towards

natural hazards. Risk reduction measures should be incorporated in development policies, plans and programmes.

9. Most strategies espouse decentralized implementation of disaster reduction interventions with focus on the communities. The communities and households play a key role in disaster reduction at the operational level. The communities and households have built-in systems for coping with "every-day" natural hazards, which should serve as a basis for further development. Community based approaches also make it possible to pay special attention to marginal groups, which may include i.e. children, women, elderly and disabled.
10. Disasters are not restricted to national borders. Regional cooperation is necessary to cope efficiently with trans-border disasters and in establishing early warning systems. It will also facilitate exchange of knowledge and development of standards and best-practices for risk reduction.
11. Risk may also have a "positive" side. Risk reduction strategies should include strategies for turning risk into opportunities, i.e. through diversification of livelihoods and introduction of more sustainable resource management practices. It should provide incentives for people to manage and reduce their own susceptibility towards natural hazards.
12. It is necessary to address the underlying root causes of vulnerability, i.e. how the natural resources are managed. This is necessary in order to achieve sustainable solutions to risk reduction.
13. Natural hazards and disasters are increasing and pose a threat to development. Combined efforts are required. Integrated, collaborative approaches in disaster reduction should therefore be encouraged, including participation from the private sector, NGOs, traditional leader and the scientific expertise (Universities etc.).

7 The tsunami disaster

7.1 The tsunami disaster in the Indian Ocean

The tsunami disaster in the Indian Ocean is one of the worst natural disasters in modern times. Well over 200,000 people died and more than 1.5 million people lost their homes and often their livelihoods. Losses are estimated to total more than USD7 billion. Private assets, including housing and business equipment, account for the largest share of the losses. In the largest countries, the impact on GDP is likely to be minimal, but the damage in the affected areas is extreme and poor people were disproportionately affected (World Bank 2005).

The scale of the tsunami was overwhelming and many countries in the region were severely impacted. Many visiting tourists from western countries also died. The tsunami was a huge story in terms of lives lost, but the numbers are still small compared with the number of people killed in conflicts like those in Sudan and Congo, or dying from preventable diseases every year. This reminds us that it is important not to forget the "silent" catastrophes around the world that happens "every day", but that do not receive much media coverage and international attention.

7.2 Sri Lanka - one of the most affected countries

Sri Lanka was one of the countries most affected by the tsunami – together with Indonesia. The following statistics may illustrate the magnitude of the tsunami disaster in Sri Lanka (PLAN 2005):

- Deaths:	31,299
- Missing:	4,093
- Injured:	23,189
- Fishing craft affected:	16,500
- Houses fully damaged:	35,100
- Houses partly damaged:	47,500

A high level of international interest in this disaster led to the provision of massive amounts of much-needed relief supplies in Sri Lanka together with most of the other severely affected countries. Even if much of this aid was highly demanded, it also contributed to exacerbating many problems traditionally experienced during large-scale disasters that receive high levels of media attention (www.reliefweb.int – 2005).

Figure 7.1 Devastated houses in the Hambantota town and destroyed infrastructure in the Tangalle fishing harbour, Sri Lanka - after the tsunami. Photo: Harsha Ratnaweera, NIVA.

As is the case in the aftermath of any disaster, the affected communities themselves were the first and primary actors in the early relief efforts. However, it was recognized that these communities were not consistently consulted on important aspects of the relief and recovery work once organized national and international relief operations got under way. Their involvement in needs assessments, planning and implementation of emergency assistance programs was not prioritized, although it should have been. For example: a survey of tsunami survivors indicated that after housing, people prioritise their needs clearly in the following order: livelihood, education, and psychosocial support. However much of the provided relief and rehabilitation were not in accordance to these priorities (PLAN 2005).

Eight weeks after the tsunami, a national post-tsunami workshop was arranged in Sri Lanka. The workshop was attended by more than 75 stakeholder representatives from the Government sector, the NGO's, the communities, the donors and the private sector. It concluded that even though the tsunami was an exceptional event, the most important step to take now was to learn from what has transpired and make recommendations for improvement to deal with current and future issues (www.reliefweb.int – 2005).

The outcome of the workshop was a set of recommended strategies and concrete actions in future management of natural hazards. Examples of identified *weaknesses* and selected strategies/actions were:

- *Inadequate legal framework and lack of institutional readiness*: Set up an institutional framework and develop a five year plan for disaster reduction.
- *Lack of early warning mechanism*: Develop a multi-hazard disaster preparedness system.
- *Lack of public awareness about disaster risks*: Target schools, universities, public administration bodies for awareness raising education and workshops.
- *Variable quality of disaster response:* Coordination was identified as the single most critical issue. Have a single recognised source of information at each level of administration (national, district, division). Develop robust processes and mechanisms able to withstand the demands of a complex emergency.
- *Inadequate information flow:* Develop information protocols and streamline information sources.

- *Protection and gender issues:* While this subject was not dealt with in depth, it was recognised that during this type of complex emergency some groups will be more at risks than others. There have been a range of incidents negatively affecting both women and children, both at the time of the tsunami and in the following weeks as certain social conditions deteriorated. Government and UN agencies responsible for protection, should review procedures and processes currently in place to ensure that all possible measures are taken to minimize risk.

The workshop recognises the need for improving both the national framework for disaster reduction in Sri Lanka - and for a decentralised system of disaster preparedness, involving the communities and the stakeholders in the process. Ensuring equity and transparency with all communities was emphasised as an important guiding principle.

7.3 Case study: The post-tsunami aid delivery system in three coastal communities in Sri Lanka - a community perspective

The findings below refer to three village studies that were conducted by in September 2005 as part of a study on the impact of tsunami aid in Sri Lanka.[3] One of the aspects of the aid that the study examines is how local communities respond to the incoming aid flows. The communities reported from here are located in Jaffna in the North, which is war affected, and Galle and Hambantota in the South. The latter two are Sinhalese and not affected by the war. The report below does not aim to compare the three communities, but presents the commonalities that apply to the three communities, although to a varying degree. The communities belong to the most affected in these three districts, but it should be kept in mind that communities from the most heavily affected Eastern coast are not included.[4]

Two of the communities relied primarily on fishing and fishing related businesses before the tsunami, while in one of the communities the women in particular were actively involved in tourism. Other important livelihoods were the transport business, retail, money lending, foreign remittance, government jobs, masonry, carpentry, tailoring and casual labour.

1. All the three communities had received support from the first day of the tsunami. During the first two weeks after the tsunami, aid was primarily provided by people in the immediate environment; relatives (45.5%), neighbours (37.2%), the temple (31.9%), church (15.1%) and the mosque (8.2%).[5] Thereafter, local NGOs were quick to step into action, as were local level government officials, and both actors have continued to play a role throughout the relief and rehabilitation process.
2. During the first two weeks, 27.9% say that they received support from NGOs, the percentage increased to 48.1 in the following weeks. The findings from the community studies show that the contribution of the local NGOs continue to be significant. They are also perceived to be close to the population. The appreciation of the work of NGOs, both in terms of quantity (significance) and closeness (mental and

[3] This study is funded by the Norwegian Embassy in Colombo.
[4] Studies conducted in late October and early November 2005.
[5] Household survey: NIBR tsunami study.

emotional) is a result of the role which they played in the provision of temporary housing, and later on in providing permanent housing.

3. A large number of agencies, between 20 and 30, have been involved in some form of aid provision in the communities. They included government agencies, civil society organisations, including national and local NGOs, as well as international agencies. The agencies perform a wide range of services: provision of relief items, provision of temporary and permanent housing, distribution and repair of boats, livelihood support, delivery of fresh water, provision of health and sanitation, credit programmes, a number of training activities from driving lessons to evening classes for children, rebuilding of public facilities etc.
4. The Government provides a number of grants for affected people. In addition to Rs. 200 (NOK 13) in cash and Rs. 175 (NOK 11) in kind pr. family member pr. month, most families had received Rs. 5000 (NOK 320) twice after the tsunami. Persons whose family members died in the tsunami were paid Rs. 15 000 (NOK 965) towards funeral expenses. The government also provides housing grants in instalments towards rebuilding of damaged houses and building of new houses.
5. Overall, people report that they were happy with what they have received, although some had complaints about insufficient quantities, the quality of the goods delivered (in particular the flour provided as part of government dry ration package is said to be of sub-standard quality) and about standardisation which does not allow people to adapt for example dry rations to their needs, or to make adjustments to new houses to make them more culturally and practically suitable for individual families.
6. Although people found that the village level administrative officials had made a very significant contribution, they had their reservations about them and the trust in local officials was low. However, their role in conducting surveys and in the government's relief distribution was appreciated. Other government administrative levels were seen to play a minor role, although he role of the Divisional Secretary in providing government assistance and in coordinating with NGOs was also noted by people.
7. Corruption and bribery are problems in the government, political and civil society sector. Bribery happens in a number of ways. For example, people are added to or deleted from lists of beneficiaries that are prepared by the local government agencies (the Divisional Secretaries). If you did not own a boat, but aim to obtain a boat from an agency, you can pay a sum of money, say Rs. 5000 Rs. to the local government representative, and you are added on to the list of people who owned boats. Similarly, you may pay bribes and be added to the list of people who are eligible for housing support. In other cases lists are manipulated by local politicians who strike people who are not party members off the lists, subsequently adding people who were not affected by the tsunami. The end result is that there is a lack of reliable information for allocation of benefits and services in the communities. Both the government and the non-governmental sector rely on the lists for allocation to beneficiaries. In the NGO sector people complained that there is a discrepancy between actual building costs for temporary housing and the budgeted cost and that the difference is pocketed by contractors and NGO staff. The same applies to a number of other items, such as machinery.
8. A common complaint was inequity in distribution, in particular of valuable items; i.e. boats, bicycles, houses. For example, while some people had been allocated a number of new boats, in addition to having their old boats repaired, others had been given no boats at all. Families who had had their old house repaired were also provided with new houses. Some families, such as relatives of leaders of community based organisations (CBOs), supporters of politicians or board members of cooperatives

would be given a number of bicycles, while others were not given any. (This complaint must be understood within a context in which the cost of a bicycle is equivalent to the lower salary range of a middle income family). Heavily affected people would in general find it more difficult to mobilise the resources necessary to interact with NGOs and state officials to access resources. In other words, inequity manifests itself in gaps and overlaps in distribution.

9. One way of tackling inequities in distribution has been to display lists of beneficiaries in public place. For example, housing lists are displayed on the outside walls of local administrative officers. However, is some cases, lists have not been displayed, or this has not been a sufficient mechanism to ensure that action is taken.
10. Hardly anybody had participated in collective protests, but many had sought redress individually by lodging complaints in writing or person to government authorities. In spite of perceptions of serious inequity in distribution and widespread corruption and bribery, people stated several reasons as to why they were not interested in taking part in collective protests. Firstly, many quoted fear of intimidation and death. This factor related to the fear of unpredictable local strong men. Secondly, people did not want to disturb the incoming flow of relief by appearing to be ungrateful or troublesome. Thirdly, others pointed out that people had become more individualistic and hence were pursuing their own interests, and many were successful at it. Community interests were diverse and had become even more diverse following the tsunami.
11. The findings from the three community studies, particularly from two of them, suggest that the degree of inter and intra-household competition, suspicion and ill feelings were on the increase. 'Before we used to exchange food, now we believe others want to give us poison.'[6] People themselves blamed the situation on the inequity and randomness in relief distribution. If you are in the right place at the right time and in addition know the right people you may be able to access substantial resources, whilst if you are not, you lose out compared to the others in the village. In this manner, the distribution system itself set people against each other. The situation immediately after the tsunami was characterised by a feeling of togetherness and unity in the communities. The household survey demonstrates this very clearly. This sense of unity was lost in the following months.
12. Changes in socio-economic positions of different strata in the villages had taken place. Groups who managed to make use of new opportunities for work (cash for work, job opportunities created in the construction sector) or to access aid from a number of agencies, or individual philanthropists, had benefited. Sometimes small groups of 'pushy' people had formed in the village, in an ad hoc manner, formally calling themselves a CBO, in order to access resources. In one of the communities in which many of the villagers had made an income from tourism before the tsunami, people had developed a number of ways of accessing resources from tourists who approached the village to offer their help. One popular asset that they had acquired was so called 'three wheelers' which are used as taxis.
13. Others had lost out, for example because they were second generation households living within an extended family household. In principle only one new house would be provided although several families were living within the household. The concern raised was that the new house provided would not be large enough to accommodate extended families. For some business opportunities had dwindled for example

[6] No doubt that people felt very emotional and that some felt highly aggrieved by the experiences after the tsunami. We experienced fist fights in one of the work shops held in one of the communities and in another community relations between some of the people were clearly hostile.

because their customers had gone elsewhere (as an example people who had provided lodging for others lost that income), nets did not need repair because everybody had got new nets, money that they had lent out to deceased people could not be recovered, boat owners could not employ their crew men because they now had been given their own boats.

14. People were generally happy with the ways in which they were consulted by NGOs. Yet, information flows were not always perfect, and in particular people required advance warning about training programmes in the villages, about delays in the delivery of inputs to restart their livelihoods or progress made in housing projects. People were particularly pleased with NGOs that had set up offices close by and which were seen to be accessible.
15. People's main concern was the lack of permanent housing, without which they found that it would be difficult to put many of the other pieces in the puzzle in place. Permanent houses were being built by Sri Lanka NGOs in two of the three communities, and in the third community, an international NGO had promised to build houses.

Conclusion:

Given the scale of the tsunami relief operation it is not surprising to find that a multitude of agencies had been involved in relief and rehabilitation in the communities and that there is a lot of ongoing work, even in complicated sectors such as housing. Maybe more surprising, given the context of heavy criticism voiced against the inefficiency and ineffectiveness of the tsunami-aid operation, people were overall appreciative of the NGO response, and they were even positive towards some aspects of the work done by the government.

The main policy concern that emerges from the three community study is the targeting issue; how can resource distribution become more equitable? Much work is done to coordinate the work of the government with the work of NGOs and international agencies, at the district and divisional level. Yet, at the level of the village, there are no effective mechanisms to ensure fair and equal distribution. At the moment there is a scramble for resources going on, pitting families against each other. Improved monitoring by non-governmental organisations and international agencies, efforts for better coordination of aid delivery at the village level, as a clamp down on corruption and bribery are measures that could improve the situation.

8 Disaster reduction in Norwegian development cooperation

8.1 Rationale for Norwegian involvement in disaster reduction

Norway as international donor has a responsibility to ensure that all activities and programmes carried out under the development cooperation do not make the recipient countries more vulnerable to natural hazards or contribute to intensifying the negative impacts when disasters strike.

Several of Norway's partner countries are among the most affected by natural disasters. From a development perspective, the persistent impacts of natural disasters are a drag on economic growth, limiting the efficacy of long-term strategies to achieve broader development goals including the UN's Millennium Development Goals (MDGs). Activities aiming at disaster reduction can therefore be seen as an investment towards development and poverty reduction.

As such, disaster reduction can be said to be in conformity with main purpose of Norwegian development cooperation, which is "to contribute towards lasting improvements in economic, social and political conditions for the populations of developing countries, with particular emphasis on ensuring that development aid benefits the poorest people". The five goals of the cooperation are listed below and the linkage towards disaster reduction is explained for each of the goals:

1. *To combat poverty and contribute towards lasting improvements in living standards and quality of life, thereby promoting greater social and economic development and justice nationally, regionally and globally. In such development, priority must be given to employment, health and education.*	The impacts of natural disasters are affecting developing countries the most, and it is the poor that suffers the greatest losses. Thus, working to reduce the impacts of disasters will also help combating poverty.
2. *To contribute towards promoting peace, democracy and human rights.*	Many disasters are triggered or exacerbated by war and conflict and vice versa. The cumulative impacts can undermine democracy and human rights and therefore need to be addressed concurrently. Bringing opposed parties together in the fight towards natural disasters or rebuilding communities

	after a catastrophe, can also be looked upon as an opportunity for reconciliation.
3. *To promote responsible management and utilisation of the global environment and biological diversity.*	Environmental degradation is one of the main underlying causes of natural disasters and at the same time disasters can have detrimental effects on the environment in countries that are particularly exposed to hazards. The knowledge about the environment-disaster nexus is, however, still fairly limited and needs to be further looked into.
4. *To contribute towards preventing hardship and alleviating distress arising from conflicts and natural disasters.*	Disaster reduction can be regarded as a tool for achieving sustainable development and is directly related to goal no. 4, since it aims at preventing and mitigating the negative impacts from natural hazards on the society and on human livelihood.
5. *To contribute towards promoting equal rights and opportunities for women and men in all areas of society.*	Women are especially vulnerable to the impacts of natural disasters due to their responsibilities and function in society. They often have to face targeted gender-based violence and exploitation in the aftermath of disasters. At the same time women do have a key role in providing assistance to the family and the community in prevention activities as well as during disasters.

Norway should be well placed to contribute, because we already play a prominent role in various related fields, such as the in the environment and in promoting peace, democracy and human rights. Several of Norway's partner countries in development cooperation are also among the most affected by natural disasters. Thus we have clear responsibility in ensuring that supported development programmes and projects do not increase the partner-country's vulnerability to natural hazards, but rather contributes to strengthen resilience. Norway could also take on a more pro-active role in directing resources towards areas that can help prevent disasters and strengthen resilience towards natural hazards.

In addition to being in a good position and having the resources, Norway possesses a comparatively high level of expertise on a number of relevant issues that can make a significant contribution to the international know-how as well as at country level. This is further elaborated upon in chapter 8.4.

8.2 Norwegian assistance to disaster reduction

Norwegian assistance to disaster reduction may utilise various channels depending on the purpose and type of activities. The main channels are 1) multilateral and bilateral assistance provided through the international organisations, i.e. as part of the Framework Agreements with different UN organisations, the World Bank etc.,2) bilateral assistance to the partner countries, either as budget support or to programmes and projects, and 3)

the support scheme for NGOs, which cover priority topics such as humanitarian aid, human rights, democracy development and long-term development cooperation. The support scheme also includes prevention of natural disasters and strengthening of local capacity and resilience. The voluntary organisations, such as the Red Cross, are acting as official partners in emergency situations, and receive most of the allocated funds for humanitarian aid related to natural disasters (www.evalueringsutvalget.no – 2005)

At the UN high-level meeting in September 2005 it was agreed to establish a new global emergency aid fund. This will reduce the dependency on pledging that often has to be initiated after major disasters in order to raise sufficient funds. The purpose is to improve the international humanitarian response capacity trough means that the UN can utilise in a non-bureaucratic way in disaster situations. In addition to emergencies, the fund will also cover humanitarian efforts in "forgotten crisis". Establishing a similar fund for disaster reduction, with focus on prevention and preparedness, should also be considered. This would facilitate more long-term planning and make it easier to coordinate actions.

8.2.1 Partnerships with international organisations

Building partnerships with the international organisations and networks that play an important role in disaster reduction is a route by which Norway can promote disaster reduction principles in the programmes and projects that they fund, as well as to support the agencies that work on disaster issues. The international and multilateral organisations play an increasingly important role in development cooperation, which was further encouraged by the recent Paris Declaration on Aid Effectiveness (March 2005), aiming at achieving better coordination, integration and more harmonised approaches between sectors and donors in search for holistic and more sustainable solutions. Hence, multilateral and multi-bilateral support also continues to constitute an increasingly larger part of the Norwegian development assistance.

A substantial amount is presently channelled through United Nations (UN). A number of UN organisations are involved in various aspects of disaster reduction. The United Nations Development Programme (UNDP), hereunder the Bureau for Crisis Prevention and Recovery (BCPR) and its Disaster Reduction Unit (DRU) plays a central role. The mandate of the BCPR is to enhance UNDP's efforts for sustainable development, working with partners to reduce the incidence and impact of disasters and violent conflicts, and to establish the solid foundations for peace and recovery from crisis, thereby advancing the MDGs on poverty reduction. Furthermore, the UN International Strategy for Disaster Reduction (ISDR), is responsible for coordinating disaster reduction strategies and programmes and serves as facilitator among partners. It also serves as an international information clearinghouse on disaster reduction, developing awareness campaigns and producing articles, journals, and other publications and promotional materials related to disaster reduction.

The United Nations Environment Programme (UNEP) is also well positioned to work with disaster reduction, since there are strong inter-linkages between the environmental condition and the risk of natural disaster. UNEP primary functions related to disaster reduction are the promotion of sound environmental management that takes into account prevention of natural disasters, but also in assessment of environmental damages and environmental rehabilitation after a natural disaster has occurred.

Other UN organisations involved in various aspects related to natural hazards and disaster reduction are the World Health Organization (WHO), the United Nations Educational, Scientific and Cultural Organization (UNESCO), the Food and Agricultural Organization

(FAO), the United Nations Centre for Regional Development (UNCRD), the United Nations Human Settlements Programme (UN Habitat), and the United Nations Office for the Coordination of Humanitarian Affairs (OCHA), the World Food Programme (WFP), the World Meteorological Organization (WMO), and the International Labour Organization (ILO).

The international development banks are also important actors. The World Bank (WB) (with its Hazard Management Unit), the Asian Development Bank (ADB), the African Development Bank (AfDB) and the Inter-American Development Bank (IDB) all have strategies and programmes related to disaster reduction. Earlier, the role of the banks was mainly to invest in the rehabilitation phase after disasters, but focus is now gradually shifting towards more investment in prevention and preparedness.

Other key organisations are the Organisation for Economic Co-operation and Development (OECD), the World Conservation Union (IUCN), and the International Federation of the Red Cross and Red Crescent Societies (IFRC). The IFRC is first and foremost known for its humanitarian work during relief operations, but does also involve actively in disaster response, disaster preparedness, and health and community care.

At the regional level, a number of inter-governmental and other organisations are doing work on disaster reduction, i.e. the Asian Disaster Reduction Center (ADR), Asian Disaster Preparedness Center (ADPC), the African Union/New Partnership for Africa's Development AU/NEPAD, The Southern African Development Community (SADC), and the Coordination Center for the Prevention of Natural Disasters in Central America (CEPREDENAC).

There are also many relevant international initiatives and policy forums in which commitment to disaster reduction can be demonstrated and priority actions agreed. These include the OECD-DAC, the Commission for Africa and the follow-up to the January 2005 World Conference on Disaster Reduction (WCDR).

8.2.2 Bilateral cooperation with the partner countries

In addition to channelling support through the international organisations, Norway could take on a pro-active role in promoting and supporting a risk reduction agenda amongst its development partners, especially in those countries that are most affected by natural disasters and where they can pose a real threat to development. Norway's partner-countries are listed in table 8.1

The focus should be on enhancing the recipient country's capacity and willingness to ensure integration of disaster reduction into its own development and environmental management policies, develop legislation, strengthen environmental and natural resource management and in developing and implementing contingency plans.

The cooperation must be targeted at handling disaster reduction in a comprehensive and integrated way. It is, however, important to adapt to the risk profiles of the countries, since various types of natural hazards may require different approaches. In order to ensure commitment and progress, the strategies should be time-bound for making disaster reduction a central concern of development policy and programming.

Statistics indicate that several of Norway's partner countries are severely affected by natural disasters. Table 8.2 shows the most affected partner countries and the types of hazards that have the greatest impacts.

Table 8.1 *Norway's partner countries in development cooperation.*

	Africa	**Asia**	**Latin America**
Main partner countries	Tanzania	Bangladesh	
	Mozambique	Nepal	
	Uganda		
	Zambia		
	Malawi		
Other cooperating countries	Angola	Afghanistan	Guatemala
	Ethiopia	Indonesia	Nicaragua
	Eritrea	China	
	Kenya	Pakistan	
	Madagascar	Sri Lanka	
	Mali	Vietnam	
	Nigeria	East Timor	
	South-Africa	The Palestinian Areas	

Table 8.2 *The most affected partner countries in ranked order based on relative numbers of affected people per 1 million, 1994-2003. Significant types of hazards are indicated (data from www.unisdr.org – 2005).*

Countries	**Affected people per 1 million**	**Hazard profile**
Zimbabwe	150 713	Epidemic, drought, flood
China	111 053	Flood, storm, earthquake
Kenya	70 826	Epidemic, flood, drought
Malawi	68 319	Flood, epidemic, drought
Ethiopia	66 924	Flood, drought, epidemic
Eritrea	66 796	Drought, flood
Zambia	55 874	Epidemic, drought, flood

The countries listed are among the 25 most affected countries globally (based on relative number of affected people). 6 out of the 7 most affected partner countries are African and 3 are among Norway's main partner countries (Mozambique, Zambia and Malawi). The most significant types of triggering natural hazards are flood, drought and epidemic.

Two of the partner countries are also on the list of countries with the highest number of fatalities due to natural disasters (1994-2003): Nicaragua (76.54 dead per 1 million) and Afghanistan (55.21 dead per 1 million). More detailed information about number of fatalities (absolute numbers) in each partner country related to various natural hazards (1990-2005)[7].

The Poverty Reduction Strategy Papers (PRSP) is the main policy instrument in bilateral cooperation and as such they are the main entry point for donor-government consultations related to disaster reduction. A survey (NORAD, draft 10.03. 2005) was recently conducted in some of the countries in order to find out to what extent the PRSPs include plans for prevention and contingencies related to natural hazards. The survey covered the following countries: Asia: Bangladesh, Nepal, Sri Lanka, Vietnam; Africa: Ethiopia, Madagascar, Malawi, Mozambique, Tanzania, Zambia, Uganda; Latin America: Nicaragua. Countries not covered are: Pakistan, Indonesia, Mali, Eritrea, Guatemala, Angola, Palestine, China, South-Africa, Nigeria, Afghanistan and East Timor. The latter 6 do not have PRSP. A summary of the results are presented in table 8.3.

Table 8.3 *Summary of results from PRSP survey. Source: NORAD.*

Comprehensive presentation of plans for prevention and contingency	**Limited plans for disaster prevention and contingency presented**	**No plans for disaster prevention and contingency**
Bangladesh (2004: focus on floods)	Ethiopia (2002: focus on food security)	Kenya (2004: no reference, will develop plans)
Malawi (2002: focus on floods and food security)	Mozambique (2001: focus on floods, will develop plans)	Madagascar (2002: no ref.)
Nicaragua (2003: several types of hazards covered)	Uganda (2004: several types of hazards, new policy will be developed)	Nepal (2003: no ref.)
		Sri Lanka (2002: disasters mentioned, no specific plans)
		Tanzania (2004: disasters mentioned, plans will be developed)
		Zambia (2002: no ref.

[7] See Appendices (1-3) for further information on number of affected people and fatalities by country and type of natural hazards.

The results indicate considerable differences between the various countries with regard to the status of natural disaster reduction. Very few (if any) countries seem to have a comprehensive "multi-hazard" system already in place, but several countries have initiated contingency planning or are involved in different stages of the planning process.

8.3 Activities and actions in disaster reduction

A pro-active stand to reduce the toll of disasters requires a comprehensive approach that encompasses both pre-disaster reduction and post-disaster recovery. Such an approach involves the following set of activities:

- Risk analysis to identify the kinds of risks faced by people and development investments as well as their magnitude.
- Prevention and mitigation to address the structural sources of vulnerability.
- Risk transfer to spread financial risks over time and among different actors.
- Emergency preparedness and response to enhance a country's readiness to cope quickly and effectively with an emergency.
- Post-disaster rehabilitation and reconstruction to support effective recovery and to safeguard against future disasters.

The UN international Strategy for Disaster Reduction (ISDR) is the main instrument for promoting concerted action towards natural disaster reduction at the international level, whereas the Hyogo Declaration/Framework for Action (2005-2015) draws up the priorities for the next decennium. (Cf. **Appendix 4** for listing of priority actions).

Capacity building – in the broad sense - is required at all levels. This includes awareness programmes, education, training, research etc. – activities aimed to develop human skills within government organisations, communities and other stakeholder groups needed to reduce the level of risk. The UN Disaster Management Training Programme (DMTP) provides a learning platform addressing crises, emergencies and disasters for the UN Member States, the UN System and international and non-governmental organisations. In extended understanding, capacity building also includes development of institutional, financial, political and other resources, such as technology at different levels and sectors of the society.

At the international level, development of early warning systems (global and regional) is required. At present, Norway participates in the development of a regional early warning system in the Indian Ocean under the coordination of UNESCO's Intergovernmental Oceanographic Commission (IOC). Other specific actions include i.e. strengthening of the information management, better systems for monitoring and auditing, prevention and mitigation of trans-boundary hazards, and building partnerships between authorities, NGOs, research institutions and the private sector.

The Hyogo Declaration/Framework for Action also calls for development of national action plans for disaster reduction as a framework for further advancement. Development of such plans will usually begin with carrying out basic activities such as risk assessment, developing an information and knowledge base, identifying the stakeholders and clarifying roles and responsibilities, and creating consensus about goals and objectives. The risk assessment should not only take into account the big disasters, but also deal with the cumulative effects of the smaller every-day incidents that may have more serious

impacts on the communities in the longer run. National strategies should comprise both mainstreaming of disaster reduction into the sector policies, addressing the underlying root causes of disasters, i.e. through improved natural resources management and protection of environmental buffers, better land-use practices, urban and regional development – as well as strengthening coping capacity and resilience towards disasters at the local, community level.

With regard to emergency preparedness and response, there is a need to strengthen the communication and information-sharing logistics between agencies, aid workers and other involved institutions. The experiences from the 2004 Tsunami disaster also emphasise the importance of closer consultation with those who have been affected, better systems for monitoring and auditing of aid operations, and improved access to technology. The UN Under-Secretary for Humanitarian Affairs, Jan Egeland (in a recent interview in the newspaper "Aftenposten"), refers to the need to strengthen capacity in certain fields during emergency and relief operations. He especially mentions the lack of capacity in fields such as water and sanitation and emergency housing (providing shelters for those who have lost their homes).

8.4 Agenda for action

8.4.1 Defining a strategy/agenda for action

Incorporating disaster reduction in Norwegian Development cooperation, taking a proactive stand, will require development of a comprehensive strategy/agenda for action. This implies formulation of a conceptual framework; disaster reduction as a cross-cutting and multi-dimensional issue needs to be defined, linking it with the various sector programmes and themes in Norwegian development cooperation. An organisational position and space for natural hazards and disasters need to be established with clarification of roles and responsibilities. An important part of the agenda is policy formulation; deciding on the key themes and the geographical and regional focus, and development of an operational work-plan with objectives, priority activities and indicators.

Activities to strengthen the internal capacity on disaster reduction will be required, including training and competence building, strategic recruitment of staff, and development of support systems, such as guidelines and tools for information handling, quality assurance, monitoring and evaluation. Collaboration with research institutions is recommended for further expanding the knowledge base on disaster reduction and to learn from the experiences of other agencies and countries' work related to the topic.

A two-sided approach is suggested for carrying out the strategy/agenda, aiming at an integrated and coordinated use of bilateral and multilateral channels and systems; first by pursuing the agenda through the work of the embassies in direct bilateral dialogue with development partners; and second by enhancing the role of the Norwegian Directorate for Development Cooperation (NORAD) and the Norwegian Ministry of Foreign Affairs (MFA) as influencers i.e. through the multilateral system, in dialogue with other key donors, and with NGOs, private sector, or other institutions concerned.

8.4.2 Suggested activities

The following sections present some ideas on suggested activities for practical formulation and implementation of the strategy/agenda for disaster reduction.

Defining a conceptual framework

A conceptual framework, addressing disaster reduction as a cross-cutting and multi-dimensional issue, needs to be defined, linking it with the various sector programmes and themes in Norwegian development cooperation.

Some suggested activities:

- Establish explicit definitions of key terms - such as hazards, disasters, risk, resilience, vulnerability, coping - and disaster reduction as an integrated element of the new Environment Work Plan – elements to be included also in NORAD's Handbook with a focus on distinguishing hazards, disasters, risk, uncertainty etc.
- Define a disaster reduction framework conceptually and operationally that links risk to vulnerability and preparedness etc.
- Establish an organisational position and space for natural hazards and disasters - both in NORAD and MFA – and clarify the roles and responsibilities between different divisions in NORAD and MFA – including the Embassies – on who should do what.
- Consider to divide policy, technical advice and oversight functions for this area.
- Establish relevant conceptual and organisational links between disaster reduction and key related themes such as governance, poverty reduction, natural resources management, urban development, and environmental management.
- Consider increasing the (staff) capacity within NORAD/MFA by recruiting relevant staff and/or improve internal learning.
- Develop a basic orientation and learning program for staff in disaster reduction with training materials, courses and workshops (Cf. i.e. www.worldbank.org/hazards).
- Initiate a dialogue and find ways to improve capacity at Regional Departments and Embassies – strengthen their access to required information about disaster reduction, tools and instruments.

Strengthen disaster reduction in strategies and policy dialogue

Multilateral and bilateral involvement in disaster reduction must be based on a coherent Norwegian policy, with clear priorities that are harmonised with the other sector policies. Some of the policy issues are: to what extent Norway should play an active (or passive) role in disaster reduction; if disaster reduction should be treated as a "stand-alone" issue or be incorporated in the other sector policies; the balancing between disaster prevention and preparedness versus emergency relief and rehabilitation; geographical/regional/national focus; main themes and topics, type of support (budget support, technical assistance and/or investments), etc.

Some suggested activities:

— Consider to develop a strategy paper that defines goals and ways forward for mainstreaming disaster reduction – incorporate these dimensions more systematically into policy and operational programmes.

— Ensure that risk reduction underlies all development programmes and projects and that they do not lead to increased risk or vulnerability. This implies development of internal requirements for reviewing internal processes, development of indicators, and development of guidelines, handbooks etc. At the level of individual programmes and projects there is a range of mechanisms by which disaster mitigation considerations may be integrated into the process of project identification, appraisal and design.

— Ensure disaster reduction to become firmly integrated in the follow-up of MFA's new Environment Work Programme.

— Determine a work programme for disaster reduction – including prioritized thematic areas, focus countries.

— Work to increase attention to disaster reduction as a cross-cutting theme across the board; in research and knowledge creation, in programme planning, in operations, and in monitoring, learning and quality control.

— Start to identify and promote relevant guidelines, tools, methods and approaches for inclusion of disaster reduction in operational work.

— Start to ensure consistent and systematic attention to disaster reduction across regions.

— Introduce disaster reduction as a key theme in country programming and policy dialogue.

— Engage more systematically key multilateral agencies – as well as NGOs or other stakeholders – in support of policy dialogue and in-country capacity building.

— Identify ways of strengthening in-country capacity building at all levels – national, local government, civil society, and community.

Work to incorporate disaster reduction in NORAD and MFA programs and projects

Disaster reduction should be an integral part of programmes and projects. Eventually, all development activities have the potential to increase risks from natural hazards. On the other hand, careful planning based on systematic knowledge can prevent or reduce risk.

Some suggested activities:

— Work to introduce the use of risk assessment in relevant programmes and projects – initially in a few pilot countries.

— Coordinate with other related activities, such as oil spill contingency planning. Avoid building parallel structures.

— Develop a broader agenda for disaster reduction within NORAD/MFA.

— Consider to develop and introduce simple and practical screening procedures (guidelines/checklists) for disaster reduction.

— Develop systems to handle high risk sectors or countries in planning, design, operations, evaluations and reporting.

— Develop key indicator systems for measuring effects of natural hazards, tracking and reporting systems (quality assurance) for senior management.

— Promote collaboration and coordination in developing relevant tools and methods with other bilateral and multilateral donors – to install preventive measures or make programmes to address risks or disasters more efficiently.

— Provide specialised quality enhancement inputs to Embassies and regional departments engaged in planning and operations and project reviews and quality assurance.

— Engage in county-level dialogues on increasing awareness, knowledge, and capacity about disaster reduction.

— Consider to increase investment for standalone disaster reduction in projects in urban and rural areas – as pilot exercises – initially with a focus on capacity building.

— Screen for and adopt good practices and spread information and knowledge.

— Relate community-level perspectives to macro-perspectives on risk reduction.

— Work to reinforce participatory and community-level approaches to risk.

Enhance analytical work and learning; work on capacity building on natural hazards/risk reduction

Engaging in international cooperation and country-level dialogues will require in-house competence in NORAD/MFA. Deciding on the level and type of competence needed will depend on the priorities and ambitions. An active stand would require strategic development of competence, including recruitment of personnel for fulfilling defined objectives and developing competence in connection to thematic priority areas, while a more defensive strategy would be to develop knowledge in an incremental manner based on immediate needs.

Suggested activities:

— Ensure ways to internalize the work on natural hazards/disaster reduction by learning from other (international) organisations – e.g. concepts, analytical frameworks, guidelines, strategies, operational approaches, policy and capacity building.

— Identify key themes for research and development in order to strengthen operational and policy aspects – focus in particular on policy, community-development, and capacity building.

— Screen work by other agencies to strengthen focus on in-country capacity building – both at national and communal levels.

— Carry out research/or learn from other agencies/countries about what creates national level commitment to engage in broad-based systems for disaster reduction.

— Strengthen links and networks from NORAD to external think tanks and international agencies.

— Consider to establish an external "help desks" on disaster reduction – initially for a limited period (i.e. 3 years) - to help strengthen input in operational processes – for NORAD, regional departments, Embassies and NGOs – possibly as an element of on-going institutional agreements.

8.5 Norwegian expertise in relation to natural hazards and risk reduction

Norway has experience and expertise in a number of areas related to natural hazards and disaster reduction that can make a significant contribution to the international know-how. In some areas this expertise might be an asset in the international cooperation and a "comparative advantage" that puts Norway in the forefront as international actor. In bilateral cooperation, the expertise can be offered to the partner countries to supplement their own competence. The actual use of Norwegian expertise will, however, depend on the Norwegian policy, the competence requirements, and the specific needs and demands of the partner countries.

Examples of areas where Norway has developed special expertise related to natural hazards and risk reduction:

- Contingency planning (i.e. oil spill contingency).
- Early warning
- Environmental surveillance and risk assessment.
- Geo-hazards.
- Environmental Impact Assessment (EIA) and damage assessment.
- Medico-legal issues (i.e. identification of disaster victims).
- Good governance.
- Integrated Coastal Zone Management (ICZM).
- Integrated Water Resources Management (IWRM) and flood control.

Disaster reduction requires comprehensive expertise based on inter-disciplinary approaches. The relatively newly established Norwegian Directorate for Civil Protection and Emergency Planning (DSB) has expertise on contingency planning and risk reduction in general. The mandate is to promote measures which prevent accidents, crises and other undesired incidents and ensure sufficient emergency planning and efficient management of accidents and crises. The competence centres appointed by NORAD may take upon an advisory and/or coordinating responsibility in putting together teams of experts that can handle various aspects related to disaster reduction. The ministerial directorates and governmental agencies, the research institutions, the universities, the consultancy companies and the NGOs, (in some instances also in the county and municipal administrations) are relevant contributors.

The NGOs have a very central position in Norwegian development cooperation and many of them are involved in humanitarian aid, environmental protection and natural resources management – work that are often closely related to disaster reduction. More than 70 voluntary organisations have established framework agreements with the NORAD. Many

of these institutions have long experience in development cooperation within their strategic areas, while some can offer specialised competence. They also often have a well developed network with other civil society organisations in the partner countries. Examples of organisations that are relevant contributors to disaster reduction and in emergency operations are: The Norwegian Red Cross, Norwegian Church Aid, Save the Children, WWF-Norway, Forum for Environment and Development, and the Development Fund www.norad.no -2005[8].

The Norwegian Police, including "KRIPOS" (a special unit for combat of crime), have also been involved in relief and recovery operations after disasters in collaboration with other Norwegian (and international) expertise. The recent work carried out by the disaster victim identification-team after the tsunami in Thailand serves as a good example of a specific type of expertise that Norway has developed and which is in great demand internationally.

The Norwegian Defence Authorities constitute a significant resource in handling emergencies caused by natural disasters. Their main assets are the huge work capacity, the advanced technology, the wide range of operations, and their logistics. At present, the Norwegian Defence is involved in humanitarian and peace-keeping operations in Afghanistan and Iraq on request by NATO and the UN. This involvement, is however, highly controversial, and it emphasises the need for clear distinctions between roles.

8.6 The need for further research

As earlier pointed out, the lack of empirical knowledge poses a constraint to efficient disaster reduction. Research is required to further improve the knowledge base for disaster reduction. For example the linkages between natural disasters and vulnerability on the one hand, and preventive strategies to reduce vulnerability on the other, are not well established.

The research will require interdisciplinary collaboration to address the complex issues associated with disaster reduction. Most of the Norwegian research institutions already have established close working relationships through consortiums and networks, which also include institutional collaboration with partners in developing countries. The research may take advantage from areas where Norway already have high level of relevant expertise, adapting and developing it further in accordance with the needs and demands.

[8] Overview of organisations and competence profiles can be found on the following we-page: www.norad.no/om bistand/samarbeidspartnere/frivillige organisasjoner.

Useful websites

Africa Regional Strategy for Disaster Risk Reduction	www.unisdrafrica.org
Asian Disaster Reduction Center	www.adrc.or.jp/top.php
Caribbean Disaster Emergency Response Agency (CDERA)	www.cdrea.com
Coordinating Centre for the Prevention of Natural Disasters in Central America (CEPREDENAC)	www.cepredenac.org
DERA - The Disaster Preparedness and Emergency Response Association	www.disasters.org
EM-DAT, Emergency Disasters Data Base	www.em-dat.net
IASC Humanitarian Early Warning Service (HEWS)	www.hewsweb.org
Integrated Regional Information Networks (IRIN)	www.irinnews.org/aboutirin.asp
Inter-American Committee for Natural Disaster Reduction (IACNDR)	www.crid.or.cr/crid
International Federation of Red Cross and Red Crescent Societies (IFRC)	www.ifrc.org
International Tsunami Information Centre (ITIC)	www.tsunamiwave.info
Provention Consortium	www.proventionconsortium.org
Reliefweb	www.reliefweb.int
Southern African Development Community (SADC)	www.sadc.int
Secretariat of the United Nations Convention to Combat Desertification (UNCCD)	www.unccd.int

Secretariat of the United Nations Framework Convention on Climate Change (UNFCCC)	www.unfccc.int
Southern Africa Humanitarian Information Management Network for a coordinated disaster response (SAHIMS)	www.sahims.net
UN Disaster Reduction Unit (DRU)	www.undp.org/bcpr/disred
UNESCO Earth Science Programme	www.unesco.org/science/earth
UNESCO Water portal	www.unesco.org/water
UN-HABITAT	www.unhabitat.org
United Nations Environment Programme (UNEP), Floods and Droughts	www.freshwater.unep.net
United Nations International Strategy for Disaster Reduction (ISDR)	www.unisdr.org
World Conference on Disaster Reduction	www.unisdr.org/wcdr/thematic-sessions/cluster1.htm
World Meteorological Organization (WMO)/Global Water Partnership (GWP), the Associated Programme on Flood Management (APFM)	www.wmo.ch/apfm

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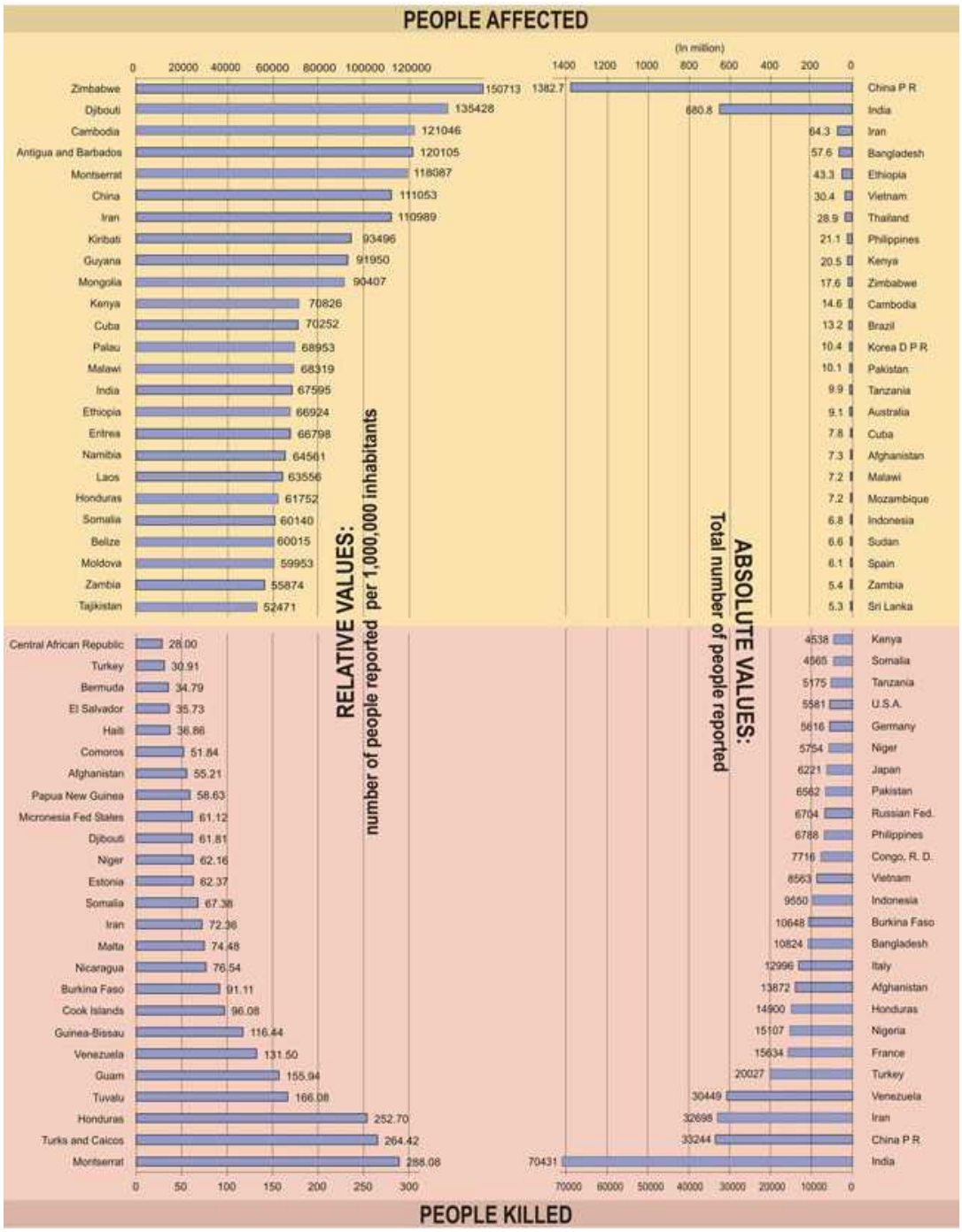
Appendix 1: *Top 25 countries in relative and absolute values of people killed and affected per 1 million. 1994-2003. Source: www.unisdr.org.*



Appendix 2: *Number of people killed by various natural hazards in the main partner countries.1990-2005. Source: EM-DAT 2005.*

	Bangladesh	Malawi	Mozambique	Nepal	Tanzania	Uganda	Zambia	Total
Drought	0	500	18	0	0	115	12	645
Earthquake	31	0	0	0	3	7	0	41
Epidemic	3732	1440	2183	3164	5691	855	496	17561
Extreme Temperature	1721	0	0	108	0	0	0	1829
Famine	0	0	0	0	0	0	0	0
Flood	2953	557	976	3100	467	154	11	8218
Slides	0	0	87	844	13	20	0	964
Wave / Surge	3	0	0	0	10	0	0	13
Wild Fires	0	0	0	88	0	0	0	88
Wind Storm	143510	0	269	26	4	0	0	143809
Total	151950	2497	3533	7330	6188	1151	519	173168

Appendix 3: *Number of people killed by various natural hazards in the other partner countries. 1990-2005. Source: EM-DAT 2005.*

	Af.stan	Angola	China	E.Timor	Eri-trea	Ethi-opia	Guate-mala	Indo-nesia	Kenya	Mada-gascar	Mali	Nica-ragua	Nigeria	Paki-stan	South Africa	Sri Lanka	Viet Nam	Total
Drought	0	58	0	0	0	0	42	672	85	0	0	0	0	223	0	0	0	1022
Earthquake	8633	0	980	0	0	0	22	5250	0	0	0	186	0	473	27	0	0	15571
Epidemic	3828	689	1482	22	0	794	604	2863	2820	1652	1279	27	15732	204	271	3	519	32100
Extreme Temp	551	0	241	0	0	0	0	0	0	0	0	0	78	1127	30	0	0	2027
Famine	0	0	0	0	0	0	0	260	29	200	3615	0	0	0	0	0	0	4104
Flood	2511	154	20258	4	0	798	89	1837	352	45	24	53	456	5383	407	341	3305	35863
Insect Infestation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Slides	629	13	1649	0	0	39	197	969	16	0	0	29	32	167	34	65	317	4143
Volcano	0	0	0	0	0	0	0	135	0	0	0	0	0	0	0	0	0	135
Wave / Surge	0	0	79	0	0	0	0	165708	1	0	0	0	0	0	0	35399	0	201187
Wild Fires	0	0	52	0	0	0	0	63	0	0	0	0	0	0	68	0	0	183
Wind Storm	110	0	6542	0	3	0	392	4	0	1161	0	3429	100	1091	85	5	5524	18446
Total	16262	914	31283	26	3	1631	1346	177761	3303	3058	4918	3724	16398	8668	922	35813	9665	315695

Appendix 4: *Examples of prioritised actions for strengthening disaster reduction. Sources: WCDR 2005, IFRC 2005.*

Disaster prevention – preparedness – mitigation.	**Emergency relief – rehabilitation – recovery.**
• Disaster management planning/contingency planning. • Carry out risk assessments. • Strengthen national institutional and legislative frameworks for disaster reduction. • Capacity building. • Develop early warning systems. • International and regional cooperation to address trans-boundary hazards. • Public awareness campaigns. • Strengthen education and training. • Improve knowledge base, strengthen research and innovative development • Develop (adapt) land-use planning and other technical measures for prevention and mitigation. • Promote community participation in disaster reduction. • Apply disaster reduction in environmental and natural resources management. • Apply disaster reduction in social and economic development practices.	• Systematic co-ordination, improved working methods for joint assessments and planning. • Establish information-sharing partnerships. • Systems for improved damage assessment. • Develop systems for needs assessment, considering the medium- and long-term needs of beneficiaries. • Employ consultative and participatory methodologies in assessment and programming. • Identify and build upon coping mechanisms, use local material and resources and take measures that regenerate livelihoods and local economies. • Develop systems for monitoring and auditing of relief operations and rehabilitation schemes. • Ensure better access to technology for vulnerable communities. • Strengthen the capacity in specific fields (relief operations): water and sanitation, emergency housing/sheltering.