



**Global Platform
for
Disaster Risk
Reduction**

**First session
Geneva, Switzerland
5-7 June 2007**

NOT FOR CIRCULATION

10 May 2007



United Nations
International Strategy for Disaster Reduction

High Level Dialogue

Information Note N° 1 Linking Disaster risk Reduction, Climate Change and Development

The ISDR secretariat commissioned three papers to guide discussions at the High Level Dialogue of the first session of the Global Platform for Disaster risk Reduction. The notes are provided as background information relative to the three selected topics. The authors of the notes were requested to introduce the topics briefly, to provide some excerpts of cases studies, with figures, as well as highlighting some pressure points that could be addressed by the ISDR system.

The three notes are:

1. Linking Disaster risk Reduction, Climate Change and Development
2. Urban and Megacities Risk – What is at stake and what should be done
3. Costs and Benefits of Disaster Risk Reduction

Session documents are available on the Global Platform website
<http://www.preventionweb.net/globalplatform>

1. Linking Disaster Risk Reduction, Climate Change and Development at the Global Platform

Contributors

Carmen Schlosser

Silvia Llosa

Reid Basher

John Harding

Linking Disaster Risk Reduction, Climate Change and Development at the Global Platform

1. Purpose of this document

This document is intended to provide background information for the panelists of the high-level dialogue on 'Implementing the Hyogo Framework for Action to reduce disaster risk and adapt to climate change' of the Global Platform for Disaster Risk Reduction. It provides an overview of the links between climate change adaptation, disaster risk reduction and development. It also identifies the key messages that it is hoped panelists will convey in the high-level discussion.

The key messages proposed in this document can be summarized as follows.

- ✓ Our vulnerability to disasters is on the rise especially as more poor people settle in high-risk areas and are affected by multiple stresses that multiply the impacts of climate-related hazards.
- ✓ Climate-related hazards are increasing and will continue to do so as detailed in the Fourth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) released in February 2007.
- ✓ The 'Hyogo Framework for Action 2005 – 2015: Building the Resilience of Nations and Communities to Disasters' provides the guide to protect our societies and economies from current hazards but also to initiate the planning process to adapt to changes that will take place in the coming decades.

2. Overview of contents

The document starts with some basic terms of disaster risk reduction and climate change. Facts and figures, both from disaster risk reduction and from climate change sources, are then provided to corroborate the problem at hand, that is, the current and projected increase in disaster risk, stemming from both increasing vulnerability and climate-related hazards.

The next section presents the relation between climate-related disasters and development. It is followed by a discussion on the link between disaster risk reduction and adaptation to climate change from both perspectives.

The document concludes with practical proposals for action by States, regional and international organizations, and donors.

Five annexes supplement the document:

Annex I: contains further information on the findings of the IPCC Fourth Assessment Report.

Annex II: indicates how measures undertaken under the Hyogo Framework for Action can strengthen adaptation to climate change.

Annex III: outlines possible stakeholder roles in implementing climate-related risk reduction.

Annex IV: presents the sources of funding for adaptation linked to the United Nations Framework Convention on Climate Change (UNFCCC).

Annex V: lists some of the needs for future research.

If Australia represents the dry end of the adaptation spectrum in the developed world, New Orleans and the Gulf Coast may well represent the wet end. The region is still struggling to recover from hurricanes Katrina and Rita in 2005. The tragedy surrounding those two storms underlines just how maladapted major population centers in the region are to today's conditions, let alone those that might hold in 2050 or 2100. (Time to 'adapt' to climate change? Peter N. Spotts, Christian Science Monitor, February 13, 2007.)

Basic concepts as defined by ISDR

Vulnerability: The conditions determined by physical, social, economic and environmental factors or processes, which increase the susceptibility of a community to the impact of hazards.

Risk: The probability of harmful consequences, or expected loss of lives, people injured, property, livelihoods, economic activity disrupted (or environment damaged) resulting from interactions between natural or human induced hazards and vulnerable conditions.

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

The disaster risk reduction framework is composed of the following priorities for action, as adopted in the Hyogo Framework for Action 2005 – 2015 ‘Building the Resilience of Nations and Communities to Disasters’ by 168 governments in January 2005 in Kobe, Hyogo, Japan.

1. Ensure that disaster risk reduction is a national and a local priority with a strong institutional basis for implementation
2. Identify, assess and monitor disaster risks and enhance early warning
3. Use knowledge, innovation and education to build a culture of safety and resilience at all levels
4. Reduce the underlying risk factors
5. Strengthen disaster preparedness for effective response at all levels

Adaptation to climate change: Adjustment to climate change (including climate variability and extremes) to moderate damages, to take advantage of opportunities, or to cope with consequences (adapted from IPCC). In practice, reducing vulnerability to, managing and reducing risks from, known natural climate-related hazards that will increase in intensity and frequency entails the same priorities for action as outlined in the Hyogo Framework for Action e.g. good governance, early warning systems, public education, protection of critical infrastructure, disaster preparedness and response.

Under the *United Nations Framework Convention on Climate Change*, a significant step in the work related to adaptation was achieved by the adoption of the Nairobi Work Programme on Impacts, Vulnerability and Adaptation to Climate Change. This programme will work towards improving the understanding and assessment of impacts, vulnerability and adaptation; as well as informed decisions on practical actions and measures to respond to climate change

3. Facts and figures

Findings of IPCC Fourth Assessment Report:

- The warming of the climate system is unequivocal and likely due to human activities;
 - Anthropogenic warming has had a discernible influence on many physical and biological systems.
 - It is very likely that hot extremes, heat waves and heavy precipitation events will continue to become more frequent. It is very likely that there will be more precipitation at high latitudes and likely less precipitation in most subtropical land regions.
 - It is likely that tropical cyclones (typhoons and hurricanes) will become more intense.
 - Adaptation will be necessary to address impacts resulting from the warming which is already unavoidable due to past emissions.
- Adaptation to current weather extremes can increase resilience to climate change.
 - A wide array of adaptation options is available, but more extensive adaptation than is currently occurring is required to reduce vulnerability to future climate change.
 - Vulnerability to climate change can be exacerbated by other stresses.
 - One way of increasing adaptive capacity is by introducing consideration of climate change impacts in development planning, for example, by:
 - including adaptation measures in land-use planning and infrastructure design
 - including measures to reduce vulnerability in existing disaster risk reduction strategies.

During the last three decades the number of disasters caused by natural hazards and of affected populations has increased in both developed and developing countries. The

majority of these disasters are hydro-meteorological, or weather related.¹

*The total number of people at risk of displacement or migration in developing countries is very large. This ranges from the millions of people at risk of malnutrition and lack of clean water to those currently living in flood plains. Worldwide, nearly 200 million people today live in coastal flood zones that are at risk; in South Asia alone, the number exceeds 60 million people. Women are particularly vulnerable to the effects of natural disasters with women and children accounting for more than 75% of displaced persons following natural disasters.*³

The relevance for international security of mass migration and conflict linked to deterioration of local climate and last-resort adaptation were evidenced by the UN Security Council high level meeting held in April 2007.

Global losses from weather-related disasters amounted to a total of around \$83 billion during the 1970s, increasing to a total of around \$440 billion in the 1990s with the number of 'great natural catastrophe' events increasing from 29 to 74 between those decades. The combined economic loss in the 1990s was eight times greater than that of the 1960s². The costs of extreme weather events such as storms, floods, droughts, heat waves, alone could reach 0.5 – 1% of world GDP by 2050³.

Conversely, the US Geological Survey and the World Bank estimated that an investment of US\$ 40 billion would have prevented losses of US\$ 280 billion in the 90s³. Some examples include³:

China: the \$3.15 billion spent on flood control between 1960 and 2000 is

¹ Centre for Research on the Epidemiology of Disasters (CRED), 2006. See <http://www.unisdr.org/disaster-statistics/introduction.htm>

² Living with Risk, ISDR, 2004.

³ Stern Review : The Economics of Climate Change, 2006.

estimated to have averted losses of some \$12 billion;

Brazil: the Rio flood reconstruction and prevention project yielded an internal rate of return exceeding 50%;

India: disaster mitigation and preparedness programmes in Andhra Pradesh yielded a benefit/cost ratio of 13:3.

*For low-income countries, major natural disasters today can cost an average of 5% of GDP.*³

4. How climate-related disasters impact development

The impact of previous extreme events provides insights into the potential consequences of climate change. Multiple factors including geographic exposure, low incomes, rapid population growth and urbanisation, HIV/AIDS, malnutrition and greater reliance on climate-sensitive sectors such as agriculture increase climate-related impacts on developing countries and also lower their adaptive capacity. It is known that recurring disasters pose an obstacle to poverty reduction. They also reverse hard-won development gains, threaten the achievement of Millennium Development Goals (MDGs) and the longer term sustainability of development progress.

*Climate-related disasters are and will continue to impact society at all levels and exacerbate existing vulnerabilities such as lack of education and gender inequalities. This unfortunate situation results in lost opportunities when there is evidence that better-educated farmers absorb new information quickly, use unfamiliar inputs, and are more willing to innovate. An additional year of education has been associated with an annual increase in farm output of between 2 to 5%.*³

Moreover, some short-term strategies to manage climate-related risks can jeopardize longer term recovery prospects, for instance by forcing the poor to sell their assets or lowering their income.

- In North-Eastern Ethiopia, drought-induced losses in crop and livestock

were during 1998 to 2000 of \$266 per household—exceeding the annual average cash income for more than 75% of households in the study region,⁴

- In Ecuador the 1997-98 El Niño contributed to a loss of harvest of poor farmers and a rise in unemployment among agricultural workers that together increased poverty incidence by 10 percentage points in the affected municipalities.⁵

In the same way, some development policies and practices can increase vulnerability to the impacts of climate change, such as development in high-risk areas. This is known as maladaptation. It is commonly caused by a lack of information on the potential external effects of policies and practices on other sectors, or a lack of consideration given to these effects.

Development gains can be safeguarded by integrating disaster risk reduction and adaptation to climate change into existing poverty reduction and development instruments, including Poverty Reduction Strategies Papers (PRSPs), Common Country Assessment (CCA) and United Nations Development Assistance Framework (UNDAF), National Sustainable Development Strategies (NSDS), and Millennium Development Goals (MDGs).

The conclusions of the Commission on Sustainable Development Intergovernmental Preparatory Meeting also recognize the linkage between climate change adaptation and disaster reduction and call for support of early warning, risk management and disaster reduction and response measures for developing countries, particularly the most vulnerable, to address climate change (CSD-15 2007).

⁴ Shocks, sensitivity and resilience: Tracking the economic impacts of environmental disaster on assets in Ethiopia and Honduras, M.R. Carter, P.D. Little, T. Moguees, W. Negatu, October 2004

⁵ Economic and social effects of El Niño in Ecuador, 1997-1998, R. Vos, M. Velasco, E. de Labastida, IADB, 1999

5. The link between disaster risk reduction and adaptation to climate change

From the disaster risk reduction perspective:

There is growing recognition of two key ideas:

- the practical application of adaptation to climate change is risk reduction, and
- disaster risk reduction needs to take climate change into account.

Many measures to adapt to climate change come from the same toolkit disaster planners and development agencies use today, for example using drought-resistant crops, developing early warning systems or improving flood defences. In many instances, adaptation will mean doing the things done now to reduce climate-related risks but doing them better and systematically.

The Hyogo Framework for Action 2005 – 2015: Building the Resilience of Nations and Communities to Disasters calls on countries to reduce underlying risks by integrating risk reduction measures and climate change adaptation. This will enable current and future efforts for climate change adaptation to benefit from practical experience in disaster risk reduction.

The risk of not taking action now to incorporate climate change in policies for public services, such as natural resource protection and disaster risk reduction, may leave a significant public liability either because the private sector will no longer carry the risk, for example by refusing to offer flood insurance, or because of the sharply rising costs of disaster recovery and public safety. Land-use planning and performance standards to cite but two should enable and encourage both private and public investment in buildings, long-lived capital and infrastructure to take account of climate change.

The benefits of disaster risk reduction are known: “In some cases, even relatively simple structural measures could yield both short and long-term benefits to climate variability and change, such as bracing and

securing roof trusses and walls using straps, clips or adhesives to reduce hurricane damages. Property-owners in the US Gulf States who implemented all the recommended hurricane protection methods suffered only one-eighth of the damages from Hurricane Katrina than those that did not implement such methods. The result was that investment by property-owners of \$2.5 million avoided damages of over \$500 million. This is a prime example of cost-effective adaptation.”¹

From the adaptation to climate change perspective:

The international climate change regime under the *United Nations Framework Convention on Climate Change (UNFCCC)* supports disaster risk reduction activities through several of its decisions (including 5/CP.7 and 1/CP.10). The activities to be undertaken as part of the recently adopted Nairobi Work Programme on Impacts, Vulnerability and Adaptation to Climate Change clearly relate to the priority actions of the Hyogo Framework for Action, and the ISDR system has been recognised as a major partner in the implementation of the Nairobi Work Programme.

Under the UNFCCC, least developed countries have undertaken National Adaptation Programmes of Action (NAPAs) to identify immediate and urgent needs with regard to adaptation to climate change. To date 15 countries have submitted their NAPAs. A preliminary review of available NAPAs showed that about half the selected

projects are relevant to the Priorities for Action of the Hyogo Framework for Action and that more than half recognize the links between NAPA activities and disaster management planning or disaster risk reduction. The NAPA process required countries to take into account national development goals, relevant national plans as well as other multilateral environmental agreements.

Until recently, UNFCCC and its Kyoto Protocol have focused mainly on reducing greenhouse gas emissions, neglecting adaptation issues, which has cost us precious time. Fortunately this has changed and it is now acknowledged that **adapting to the changing climate by building resilient societies and fostering sustainable development has to go hand in hand with cutting emissions to secure a future for humans on a warming planet**. The early signals of climate change will be experienced as extreme weather events, such as summer heat waves or storms. These will trigger adaptive actions alongside the dissemination of knowledge and information. One of the challenges posed by climate change adaptation is the event of abrupt weather changes. Attention has to be paid to the measure of habit and custom, as well as local market conditions involved in adaptation decisions on short-time scales and scant resources, based on responding to past climate patterns, as well as on extrapolations from historic weather data.

Risk reduction/adaptation examples:

The UK Environment Agency has set up the Thames Estuary 2100 project to develop a flood risk management strategy for the next 100 years and explicitly factor in adaptation to climate change using a risk-based decision-testing framework. The project is developing decision pathways to retain flexibility over the timing and types of flood management measures as understanding about climate change increases. For example, introducing non-structural measures, such as flood storage, could delay more intrusive and expensive measures, such as construction of a new barrier, which could cost several billion. (See www.thamesweb.com)

The latest draft of Louisiana's master plan for a "sustainable coast" contains several provisions that are a direct response to the prospects for rising sea levels, increased hurricane intensity, and other effects of global warming. (See www.louisiana.coastalplanning.org)

New Zealand is pairing engineers with local governments to strengthen infrastructure such as city drainage systems to withstand more intense rainstorms. Tiny Burkina Faso in Western Africa is researching new drought-resistant millet and sorghum to grow as rainfall decreases. (Cited in "US lags on plans for climate change", Beth Maley, Boston Globe, April 5, 2007).

6. Conclusion

Scaled-up efforts are necessary to meet the unparalleled and unprecedented challenge of increased hazard risk associated with climate change. Adaptation efforts both in developed and developing countries must be accelerated. Indeed, the solution to the challenge of building resilience is climate-related risk reduction, that is, integrating longer term adaptation to climate change with immediate disaster risk reduction activities into sectoral development planning.

The poorest and most vulnerable countries will be hit earliest and hardest by climate change, even though they have contributed

little to causing the problem. The international community should support them in adapting to climate change. Without such support there are serious risks that development progress will be undermined.

The prompt implementation of the Hyogo Framework for Action will enable societies to reduce the risks posed by unavoidable climate change. Investment should target climate-related risk reduction with the highest social, economic and environmental benefits at low cost.

Adaptation to climate change is not a “stand alone” agenda. It also needs to be integrated into development policy-making and planning, including in the context of national plans, such as Poverty Reduction Strategies (Declaration on integrating climate change adaptation into development co-operation, Adopted by Development and Environment Ministers of OECD/Member Countries on 4 April 2006)

7. Proposals for action

Panelists may wish to promote the following actions by States, regional and international organizations, and donors.

1. ***Accelerate the implementation of the Hyogo Framework for Action and support the Nairobi Work Programme and NAPAs.***
 - Countries should prioritize their HFA implementation and assist the most vulnerable to anticipate and adapt to the risks posed by climate variability and climate change, for instance, by developing people-centered early warning systems.
2. ***Develop climate change adaptation plans using the relevant guidance of the Hyogo Framework for Action.***
 - States, communities, organizations and companies should examine how climate change will impact them and develop their plans to adapt now.
3. ***Integrate climate-related risk reduction in sectoral development policies and planning,*** both within governments at various levels and in activities undertaken with multilateral, bilateral and regional partners.
4. ***Coordinate and jointly develop activities among climate change and disaster institutions.***
 - Include climate change organizations in disaster risk reduction national platforms.
 - Include disaster risk reduction representatives in climate change coordinating mechanisms.
 - Ensure collaboration also with environment and development organizations.
5. ***Engage with IPCC to prepare an IPCC special report on climate change and disaster risk reduction*** that builds on and deepens the findings of the IPCC’s Fourth Assessment Report.

ANNEX I

Additional information on the findings of IPCC Fourth Assessment Report

WG I: The Physical Science Basis

Observations

- Atmosphere and ocean temperatures have risen, snow and ice is melting worldwide and the sea level is rising;
- Precipitation has increased significantly in parts of North and South America, northern Europe and northern and central Asia, while the Sahel, the Mediterranean, southern Africa and parts of Southern Asia are becoming drier.

Projections

- Average temperature will continue rising and **could by the end of the century be 1.8 –4 degrees Celsius warmer than today**. Sea level will rise between 18 and 59 cm this century. Oceans will become more acidic.

WGII: Climate Change Impacts, Adaptation and Vulnerability

- Many natural systems are being affected by regional climate changes;
- Other effects of regional climate changes on natural and human environments are emerging, although many are difficult to discern due to adaptation and non-climatic drivers;
- Some adaptation is occurring now, to observed and projected future climate change, but on a very limited basis
- Other stresses that exacerbate vulnerability to climate change include from current climate hazards, poverty and unequal access to resources, food insecurity, trends in economic globalisation, conflict, and incidence of disease such as HIV/AIDS.
- Future vulnerability also depends on development pathways
- Sustainable development can reduce vulnerability to climate change, and climate change could impede nations' abilities to achieve sustainable development pathways
- A portfolio of adaptation and mitigation can diminish the risks associated with climate change
- Future research: Factors that determine the synergy between adaptive capacity and sustainable development, as well as on how policies to enhance adaptive capacity can reinforce sustainable development and vice versa ; further understanding of adaptation likely to require learning-by-doing approaches, where the knowledge base is enhanced through accumulation of practical experience; adaptation costs and benefits.

Examples of effects on natural and human systems : mountain settlements at risk from glacier lake outburst floods; detrimental effects on crops from warmer and drier conditions in Sahelian region; longer dry seasons and more uncertain rainfall in southern Africa; losses of coastal wetlands and mangroves and increasing damage from coastal flooding due to sea-level rise and human development.

Key information from IPCC WGII report

Water

Drought-affected areas will likely increase in extent. Heavy precipitation events, which are very likely to increase in frequency, will augment flood risk. Adaptation procedures and risk management practices for the water sector are being developed in some countries and regions that have recognised projected hydrological changes with related uncertainties.

Ecosystems

Resilience of ecosystems likely to be exceeded by climate change disturbances (flooding, droughts, wildfire ...) and other global change drivers (land use change ...).

Food

Increased risk of hunger at lower latitudes (dry and tropical regions) Increases in the frequency of droughts and floods are projected to affect local production negatively, especially in subsistence sectors at low latitudes.

Coastal systems and low-lying areas
Increasing risks exacerbated by increasing human-induced pressures on coastal areas. Coastal wetlands and mangroves to be negatively affected. Many millions more people projected to be flooded every year due to sea-level rise by the 2080s. Numbers affected largest in the mega-deltas of Asia and Africa while small islands are especially vulnerable.

Industry, settlement and society
Negative net effects. Most vulnerable industries, settlements and societies are those in coastal and river flood plains, those whose economies are closely linked with climate-sensitive resources, and those in areas prone to extreme weather events, especially where rapid urbanization is occurring. Where extreme weather events become more intense and/or more frequent, economic and social costs to increase. Impacts to spread from directly impacted areas and sectors to other areas and sectors through extensive and complex linkages.

Health
increased deaths, disease and injury due to heat waves, floods, storms, fires and droughts; factors such as education, health care, public health prevention and infrastructure and economic development will be important in level of impacts.

Africa
Africa is one of the most vulnerable continents to climate variability and change because of multiple stresses and low adaptive capacity. Some adaptation to current climate variability is taking place, however, this may be insufficient for future changes in climate.

Asia
Climate change is projected to impinge on sustainable development of most developing countries of Asia as it compounds the pressures on natural resources and the environment associated with rapid urbanisation, industrialisation, and economic development

Australia and New Zealand
The region has substantial adaptive capacity due to well-developed economies and scientific and technical capabilities, but there

are considerable constraints to implementation and major challenges from changes in extreme events.

Europe
Nearly all European regions are anticipated to be negatively affected by some future impacts of climate change and these will pose challenges to many economic sectors. Adaptation to climate change is likely to benefit from experience gained in reaction to extreme climate events, by specifically implementing proactive climate change risk management adaptation plans.

Latin America
Some countries have made efforts to adapt, particularly through conservation of key ecosystems, early warning systems, risk management in agriculture, strategies for flood drought and coastal management, and disease surveillance systems. However, the effectiveness of these efforts is outweighed by: lack of basic information, observation and monitoring systems; lack of capacity building and appropriate political, institutional and technological frameworks; low income; and settlements in vulnerable areas, among others.

North America
Current adaptation is uneven and readiness for increased exposure is low.

Small islands
Small islands, whether located in the Tropics or higher latitudes, have characteristics which make them especially vulnerable to the effects of climate change, sea level rise and extreme events.

IPCC WGII AR4 in its section 20.5 states that ‘The International Decade for Natural Disaster Reduction (IDNDR) (1990-1999) led to a fundamental shift in the way disasters are viewed: away from the notion that disasters were temporary disruptions to be managed by humanitarian responses and technical interventions and towards a recognition that disasters are a function of both natural and human drivers (ISDR, 2006 and UNDP, 2004). The concept of *disaster risk management* has evolved; it is defined as the systematic management of administrative decisions, organisations, operational skills and abilities to implement policies, strategies and coping capacities of society or individuals to lessen the impacts of natural and related environmental and technological hazards (ISDR, 2006). This includes measures to provide not only emergency relief and recovery, but also *disaster risk reduction* (ISDR, 2006); *i.e.*, the development and application of policies, strategies and practices designed to minimize vulnerabilities and the impacts of disasters through a combination of technical measures to reduce physical hazards and to enhance social and economic capacity to adapt. Disaster risk reduction is conceived as taking place within the broad context of sustainable development (ISDR, 2006).

It also states that ‘there is an increasing recognition of the linkages between disaster risk reduction and adaptation to climate change since climate change alters not only the physical hazard but also vulnerability’. It presents the ‘great opportunity for collaboration in the assessment of current and future vulnerabilities, in the use of assessment tools (Thomalla *et al.*, 2006), and through capacity building measures. Incorporating climate change and its uncertainty into measures to reduce vulnerability to hazard is essential in order for them to be truly sustainable (O’Hare, 2002), and climate change increases the urgency to integrate disaster risk management into development interventions (DFID, 2004)’.

ANNEX II

Measures undertaken under the Hyogo Framework for Action that can strengthen adaptation to climate change

Implementing the Hyogo Framework for Action will reduce people's vulnerability to climate-related hazards. Below are some possible actions to be undertaken under the Priorities for Action of the Hyogo Framework for Action.

Priority for Action 1: Ensure that disaster risk reduction is a national and local priority with a strong institutional basis for implementation

Possible actions

- **Encouraging a core ministry** with a broad mandate, such as finance, economics or planning, to be fully involved in mainstreaming adaptation and serve as a national 'champion' on disaster, development and climate risk management efforts.
- **Organizing a national high-level policy dialogue to launch the preparation of an adaptation strategy** to facilitate the integration of policies and measures for climate-related risk reduction and build climate-aware and responsive development.
- **Coordinating climate-related risk reduction activities**, ensuring collaboration between agencies working on climate change, disaster risk reduction, environment and development.
- **Ensuring greater gender equality** so that women and communities participate in impacts, vulnerability and adaptation assessments and feed their knowledge into the adaptation process at crucial points.

Priority for Action 2: Identify, assess and monitor disaster risks and enhance early warning

Possible actions

- **Ensuring** access to, and dissemination of, **high-quality information** about climate hazards and their impacts over time and carrying out **vulnerability assessment**.
- Disseminating such **information in a format friendly to decision-makers**.
- Ensuring that **information gathered at local level is fed back into national policies**.

Investing in health and education raises the responsiveness of communities and individuals to changing climates. This includes knowing why and how they should adapt in ways which effectively integrate climate risks into the development process.

By encouraging technology transfer and supporting flows of knowledge better climate forecasts can be delivered, and information about climate resilient crop varieties and irrigation schemes spread. Regional Climate Outlook Forums for example, provide guidance on the probabilities of rainfall to farmers in Africa and South America. 1

Priority for Action 3: Use knowledge, innovation and education to build a culture of safety and resilience at all levels

Possible actions

- **Ensuring people** are well informed about measures they can take to **reduce vulnerability to climate-related hazards**
- **Training the media and educators** on climate-related issues.

Priority for Action 4: Reduce the underlying factors

Possible actions

- **Integrating climate-related information in** all national, sub-national and sectoral development planning processes and macro-economic projections.
- **Encouraging synergies with environmental and natural resource management** including issues related to biodiversity and desertification. Helping to protect the resilience of natural systems to support the livelihoods of poor people, for example by restoring wetlands to buffer floods impacts.

Governments can make long-term infrastructure more climate resilient, for example through building codes and regulations, land-use zoning, river management, and warning systems. Without increased climate resilience, people will have to live with less reliable infrastructure. Higher maintenance costs for basic infrastructure may be required. Additional protective investments such as flood barriers and sea walls may also be required.

- Encouraging the **incorporation of climate-related risks in land use and human settlements planning and practices** (including urban and rural planning) and engineering.
- **Encouraging the incorporation of knowledge of climate-related risks in livelihoods strategies**, to avoid deterioration of traditional risk-sharing and coping mechanisms jeopardized by recurrent disasters striking families and households in entire regions.
- **Creating opportunities for the involvement of the private sector**, especially to facilitate access to micro-insurance, micro-credit and develop innovative market-based instruments such as weather-based derivatives.
- Encouraging the **consideration of climate change in recovery planning**.

Priority for Action 5: Strengthen disaster preparedness for effective response at all levels

Possible actions

- **Preparing and improving operational practices for timely and effective response to the increase in climate-related events** to enable people to become more resilient to climatic shocks.

ANNEX III

Defining roles to implement climate-related risk reduction

Role of Governments

Governments' role is to provide a clear policy framework to guide effective climate-related risk reduction in the short and long-term. This includes support for:

- High-quality climate information such as regional climate forecasts, particularly for rainfall and storm patterns;
- Integration of climate-related risk reduction in sectoral development planning and implementation;
- Private and public investment in buildings, long-lived capital and infrastructure to take account of climate variability and change (land use planning and building codes);
- Policies for climate-sensitive public goods, such as natural resources protection, coastal protection, and disaster risk reduction, including through wider use of traditional knowledge and practices in understanding and managing climate-related risks;
- Financial safety net to help the poorest in society who are most vulnerable and least able to afford protection (including insurance);
- Raising awareness of populations on climate-related issues;
- Assisting developing countries to cope with, and adapt to, present and future climate variability and change.

Role of the UN system

The UN's role is to articulate the urgent need for systematic actions to reduce the exposure and vulnerability of communities, and to build the resilience of nations and communities to natural hazards, which are mostly climate related. This can be done through:

- Providing consistent and coherent leadership to get the disaster risk reduction, climate change adaptation and development communities to work closely towards climate aware and responsive action. This should reflect the pre-eminent role of the UNFCCC for dealing with climate change and of the Hyogo Framework for Action for addressing disaster risks, and the provision of incentives to mainstream disaster risk reduction and climate change adaptation in the UN system's messages, policies and practices;
- Convey the message about the benefits of disaster risk reduction policies: protecting us now and preparing us for the future, the ready availability of disaster risk reduction policies and tools for use as measures to adapt to longer-term climate change, and the value of the Hyogo Framework for Action as the vehicle for policy and action on reducing disaster risks;
- Emphasize the priority of urgently advancing adaptation including support to disaster risk reduction initiatives already being implemented under the Hyogo Framework for Action, in particular in LDCs and Small Island Developing States;
- Encourage increased support for action on adaptation, including the development and implementation of NAPAs and their integration in national development strategies to achieve the MDGs and sustainable development goals;
- Assessing implications for international security;
- Advancing approaches to conflict prevention that take account of specificities of conflict originating in population movements or scarcity of natural resources resulting from changing weather and climate patterns.

Role of multilateral, regional and bilateral donors

Donors' role is to support developing countries, and particularly least developed among them, to cope with, and adapt to, present and future climate variability and change. This includes:

- Supporting capacity development and providing resources to allow developing countries to implement the Hyogo Framework for Action, and participate in major international programmes and processes, such as the Nairobi Work Programme and NAPAs;
- Promoting the integration of climate-related risk reduction in development assistance frameworks, such as CCA/UNDAF and PRSPs;
- Promoting the integration of climate-related risk reduction in development assistance programmes;

- Supporting capacity development to assist countries to prepare climate-related risk reduction project proposals for funding, in particular translate the NAPA project profiles into fundable project proposals;
- Promoting an environment that encourages a culture of insurance in developing countries, including through public and private partnerships to spread out climate-related risks, reduce insurance premiums, expand insurance coverage.

Role of regional organizations and institutions

Regional organizations' role is to define clear and precise strategies for particular regions of interest and enhance momentum for national coordination: by breaking down the issues climate change becomes more manageable, and improvements more real. This includes:

- Sharing information and learning from each others' experiences;
- Facilitating access to regional climate data and supporting investment in, and capacity development to use, tools and methodologies for impacts, vulnerability and adaptation assessments;
- Pooling resources and capacities on climate-related risk to enhance regional initiatives with a view to decrease pressure on national capacities;
- Ensuring that disaster risk reduction regional collaborative centers address climate-related risk reduction.

Role of NGOs/civil society and individuals

NGOs are important intermediaries to build trust at the community level and feed back information into national policies as well as to implement initiatives on the ground. Individuals can, by changing their behaviour, enforce desired policies and actions to reduce their vulnerability to climate-related risks. The media has a key role in disseminating the information required to understand and act on the problem. This involves:

- Including climate-related risk reduction in NGO advocacy programmes/projects for better disaster risk reduction policies and practices;
- Including climate-related risk reduction in NGO programmes and projects to educate local communities about the potential impact of natural hazards, and assist them in identifying possible ways to minimize their adverse consequences through collective and preventive action;
- Including climate change concerns into toolkits for participatory vulnerability and risk assessment, as well as community-based preparedness;
- Scaling up community-based adaptation through sharing of information and experiences, replicating successful projects, sharing resources to build capacities (the Global Network of NGOs for community resilience to disasters will be an essential vehicle to achieve the above objectives);
- Acting on advice to reduce individual vulnerability to extreme weather events and longer-term weather patterns, especially as provided by insurance companies or public awareness campaigns;
- Setting up networks of 'adaptation champions' to communicate the threats of changing weather patterns and the need to start adapting now and how;
- Training media and educators on climate-related issues

ANNEX IV
Adaptation Funding
Excerpt from *Tiempo Climate Newswatch*⁶

The Marrakech Accords include new funding for adaptation activities under the United Nations Framework Convention on Climate Change. *Tiempo* editor Saleemul Huq reports.

One of the most significant achievements of the eleventh Conference of Parties to the United Nations Framework Convention on Climate Change (UNFCCC), and first Meeting of Parties to the Kyoto Protocol held in Montreal, Canada, at the end of 2005 was the adoption of the Marrakech Accords. These were originally negotiated in Marrakech, Morocco, during the seventh Conference of the Parties in 2001. They included several new funds for supporting adaptation activities in developing countries. The funds are all managed by the Global Environment Facility (GEF).

The Least Developed Countries Fund (LDCF) is already functioning. It contains voluntary contributions from several Annex 1 countries (industrialized countries that have signed the UNFCCC). It has already supported the development of National Adaptation Programmes of Action (NAPAs) by the Least Developed Countries (LDCs) using guidelines drawn up by the LDC Expert Group.

The NAPAs are supposed to identify urgent and immediate adaptation actions needed in each country and provide a prioritized list of adaptation projects. In Montreal, four LDCs submitted their completed NAPAs – Mauritania, Bangladesh, Samoa and Bhutan – and the rest are expected to complete and submit their NAPAs during the coming year.

The Special Climate Change Fund (SCCF) is for all developing countries and covers adaptation and other activities such as technology transfer, mitigation and economic diversification. The operating rules for the fund have been agreed, and funding for adaptation is classed as a 'top priority' activity. Although no adaptation projects have yet been funded, several candidate projects are being developed.

The Adaptation Fund (AF) is meant to support 'concrete adaptation' activities. It was established under the Kyoto Protocol, whereas the first two funds were established under the UNFCCC. As the Montréal meeting was the first Meeting of the Parties to the Kyoto Protocol, the fund has been dormant until very recently. The fund was discussed in Montréal but operating rules were not agreed. Developing countries feel that it should not be managed by the GEF, while developed countries would like the GEF to manage it. Decision-making was postponed to the next Meeting of the Parties.

The Strategic Priority on Adaptation (SPA) was also recently established by the GEF. It contains US\$50 million from the GEF's own trust funds to support pilot adaptation activities over three years. The fund is already supporting several adaptation projects, but it is unclear whether it will continue after the pilot phase. Projects must also pass the GEF test of 'global environmental benefits' to be eligible for funding.

⁶ Please see <http://www.cru.uea.ac.uk/tiempo/newswatch/report060401.htm>

ANNEX V

Needs for further research

- More quantitative and disaggregated information on the costs and benefits of economy-wide adaptation. The costs of implementing adaptation, particularly the transition and learning costs associated with changes, have not been clearly evaluated;
- Stronger capacity for economic analysis and inclusion of socio-economic aspects in studies;
- Better understanding of decision making and the motivation and obstacles to action;
- Better understanding of the impacts of 'ordinary weather events' on local economies;
- Research on consequences of abrupt weather changes;
- Research on cultural/social factors involved in perception of climate-related risks, and their weight in behavioral changes;
- More time and attention communicating to the media because of its ability to reach and influence people's behaviours;
- Research on impacts of climate-related disasters on gender, as well as access to education, and education levels;
- Assessment of the potential role of traditional practices in managing climate-related disaster risks;
- Analysis of barriers and opportunities for accelerating development progress.

Some key questions to answer as suggested by Ajaya Dixit and Marcus Moench (**Adapting to climate change, climate variability and increased disaster risk: Linking concepts, policies and field realities. Presentation at the 2nd International workshop on community based adaptation to climate change, Dhaka, Bangladesh, 24 to 28th February 2007**).

- **Can communities respond to changes outside historical norms?**
- Can community level strategies be effective under projected changes?
- Will diversification and risk reduction reduce vulnerability or increase it in relation to projected risks (frequency and scale are issues here)?
- Can 'hard adaptation' be effective in relation to maximum projected variability?
- When do thresholds suggest fundamental restructuring rather than incremental change in strategies will be essential?