ON BETTER TERMS

A Glance at Key Climate Change and Disaster Risk Reduction Concepts

CONSULTATION VERSION 2006

A Product of the Working Group on Climate Change and Disaster Risk Reduction of the Inter-Agency Task Force on Disaster Reduction (IATF/DR)

United Nations

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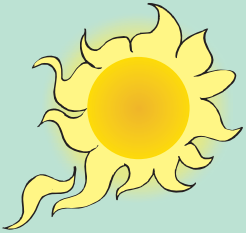
Please send comments and corrections to Silvia Llosa at isdr@un.org referencing the booklet's title in the subject line.

DISCLAIMER

The views expressed in the booklet are those of the writers and do not necessarily reflect the views of the United Nations Secretariat.

Any errors or misconceptions are the authors' responsibility.

Geneva, Switzerland.



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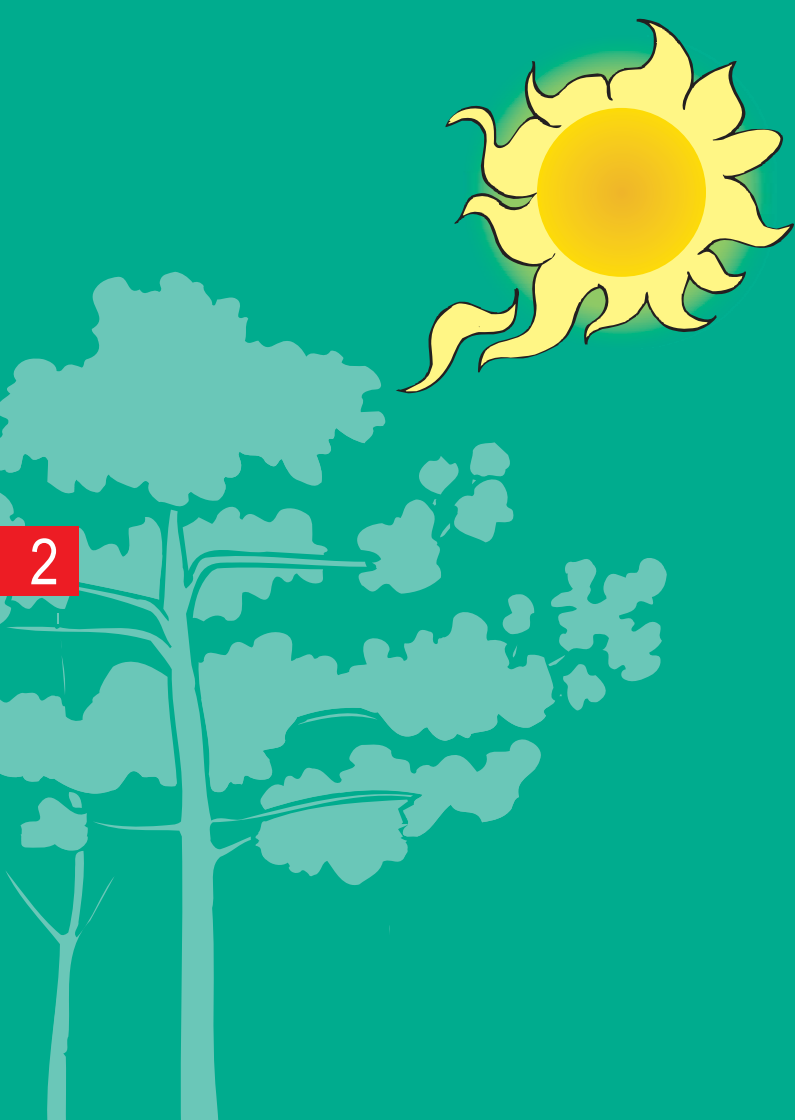
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WHY do we need this booklet?

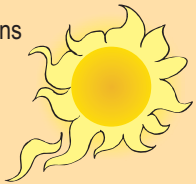
Disaster risk reduction practitioners are concerned: In the past three decades, climate- and disaster-related risks have increased significantly, affecting developing countries disproportionately and reversing hard-won development gains. Simultaneously, as evidence of global warming impacts continues to mount, climate change experts, policy makers and practitioners are now convinced of the urgent need to respond to these changes by enabling governments and communities to adapt to their potential impacts.

The disaster management community has developed a significant body of knowledge and tools over the past decades for managing climate-related risks associated with natural variability in the climate system, such as for storms, floods, droughts and extreme temperature conditions that will be the most significant outcomes of a changing climate. It has also important experience in making the case to decision makers about the benefits of preventive action and in "mainstreaming" such action into development and sustainable processes. In parallel, climate change scientists continue to improve models that predict the impacts of a changed climate under various scenarios—information of enormous value to those working at reducing disaster risk from weather events. The issue of climate change also enjoys global international attention and is supported by binding legal agreements.

However, the terminology used to define emerging experiences is interpreted in vastly different ways by practitioners engaged in managing climate and disaster related risks. It is also found that the interpretations of the terminology used, change over time. The result has been some confusion and duplication of

meanings and practices. For practitioners engaged in disaster risk reduction and policy experts dealing with climate change, the challenge to understand each other in the face of such differences is significant. Clarifying concepts that each discipline deals with is an important step towards determining the terms of future interaction and collaboration.

This booklet aims to lay down the foundation for such collaboration by making sure practitioners from both disciplines understand each other. As the two disciplines evolved separately, so did the terminologies employed by each, inadvertently distancing the two. This booklet aims to clarify possible sources of confusion on just a few terms that both communities use and that are particularly important to the conceptual framework of each discipline, as a means of introduction. It also clarifies terms that are often used and sometimes differently used by the two communities to explain points of similar conceptual emphasis.



The booklet benefits from the important body of work and the thoughtful, substantive discussion on terminology in which many climate change and disaster risk reduction experts have engaged. This booklet does not aim to add depth to that debate; rather it aims to engage a broader audience in the discussion. It does not purport to be definitive or to represent broad agreement but, through debate, promote integration of disaster risk reduction and climate change adaptation.

WHAT concepts and terminologies does the booklet deal with?

The booklet explains a few key concepts on the basis of an *a priori* understanding of how climate change and disaster risk reduction knowledge and practices have evolved and presently interact with each other. The list remains far from comprehensive, and other key terms, such as *resilience, impacts* and *hazards* could be included in future versions of the booklet. The selection of key concepts discussed in this booklet include:

- Vulnerability
- Risk and Disaster Risk Reduction
- Risk Assessment and Climate Change Impact Assessment
- Mitigation
- Adaptation, Adaptive Capacity and Coping Capacity

The booklet cites the definitions listed by the Intergovernmental Panel on Climate Change (IPCC) glossary of terms used by Working Group II: Impacts, Adaptation, and Vulnerability in its Third Assessment Report and the International Strategy for Disaster Reduction (ISDR) Terminology of Disaster Reduction, as they represent broadly consulted and well-researched glossaries in each field. Many other excellent sources exist. The CD-ROM contains additional glossaries and some of the resources that have influenced discussions on the disaster risk reduction and climate change interface in the past decade.

Climate change agenda: a brief introduction to where it came from and how it operates

Growing concern that human activities may affect the climate system led to the establishment of the Intergovernmental Panel on Climate Change (IPCC) in 1988. The Panel assesses scientific, technical and socio-economic information and produces assessments based mainly on peer reviewed and published scientific/technical literature on climate change, its potential impacts and options for adaptation and mitigation. Its first assessment report served as the basis for the 1992 United Nations Framework Convention on Climate Change (UNFCCC), which entered into force in 1994 and now includes 189 countries, known as “Parties” to the Convention.

The UNFCCC is an international treaty to reduce the greenhouse gas emissions that cause climate change “to a level that would prevent dangerous anthropogenic interference with the climate system”. The Convention established an association of all the States that are Parties to the Convention, referred to as the Conference of the Parties (COP), and endowed it with the highest decision-making authority. In the Convention, Parties agreed on the principle of “common but differentiated responsibilities” in achieving this goal. Developed-country Parties also agreed to take the lead in combating climate change and its adverse effects given their greater historical contribution to climate change, their generally higher per capita emissions and their greater financial and technological resources. The Convention established two subsidiary bodies—the Subsidiary Body for Scientific and Technological Advice (SBSTA) and the

Subsidiary Body for Implementation (SBI) to advise the COP, a secretariat and a financial mechanism.

It soon became clear that the Convention needed to be strengthened through emission limitation targets and associated timetables. At the third session of the COP in Kyoto, Japan, in 1997, Annex-I countries[1] agreed to take binding commitments to reduce their emissions by at least five percent from their 1990 levels. The Kyoto Protocol went into effect in February 2005 and includes a fund for adaptation. The COP, which meets every year, has traditionally focused its efforts on obtaining political agreement and the mechanisms to enable emissions limitations. Since 2000, the agenda to adapt to climate change has gained new importance. COP-10 set up two tracks for adaptation: under SBSTA, the development of a structured five-year programme of work on the scientific, technical and socioeconomic aspects of vulnerability and adaptation to climate change and the identification of adaptation needs, and under the SBI, the implementation of tangible adaptation activities, technology transfer and capacity building. In 2001, Parties also recognised the specific needs of 48 Least Developed Countries[2] and invited them to prepare National Adaptation Programmes of Action, which are designed to convey urgent and immediate adaptation needs – those for which further delay could increase vulnerability or lead to increased costs at a later stage.

1 Annex-I countries: see full text of Convention in attached CD-ROM or: http://unfccc.int/resource/docs/convkp/conveng.pdf

2 Least Developed Countries, see: http://unfccc.int/cooperation_and_support/ldc/items/2666.php

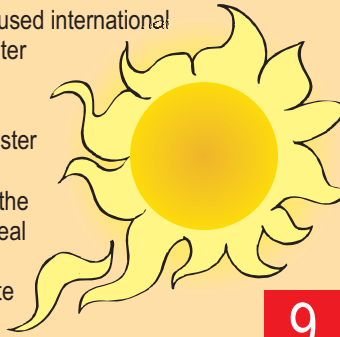
Disaster risk reduction agenda: a brief introduction to where it came from and how it operates

It is increasingly recognised that while humanitarian action to respond to disasters will always be of vital importance, the global community faces another critical challenge: how to better anticipate, reduce and manage disaster risk by integrating risk reduction measures into sustainable development planning and policies.

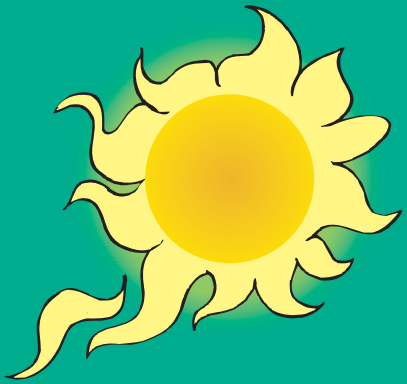
Disaster risk reduction employs measures at all levels to curb disaster losses, through reducing exposure to different hazards, and enhancing coping and adaptive capacities of vulnerable populations. Thus, effective disaster risk reduction practices take a systematic approach to reduce the human, social, economic and environmental vulnerability to natural hazards. Prevention, mitigation, preparedness, response, rehabilitation and recovery are crucial entry points for risk reduction, with the aim of building resilience to future hazards.

The shift in focus in recent decades from disaster response to disaster risk reduction has been motivated by the mounting toll of disasters: even as deaths from disasters have been declining, their cost in lost livelihoods and economic assets has been tremendous. Given increasing concerns about disaster impacts and the need to promote capacity and knowledge to deal with disaster events, the UN General Assembly declared 1990-1999 the International Decade for Natural Disaster Reduction (IDNDR). The Yokohama Strategy and Plan of Action for a Safer World, conceived at the first World Conference on Natural Disaster Reduction in Yokohama in 1994, stressed that every country had the sovereign and primary responsibility to protect its people,

infrastructure and national, social and economic assets from the impact of disasters. The successor to the IDNDR is the International Strategy for Disaster Reduction (ISDR), founded in 2000 by the UN General Assembly. The ISDR—a coalition of Governments, UN agencies, regional organizations and civil society organizations—was established to sustain a strong and focused international agenda for the implementation of disaster risk reduction.



The second World Conference on Disaster Reduction in Kobe, Hyogo, Japan, 18-22 January 2005, further promoted the need to invest in preventive action to deal with current disaster trends. The Conference recognised progress to date but it was clear that much remains to be done. In response, Governments and agencies agreed on the *Hyogo Framework for Action 2005-2015: Building the Resilience of Nations and Communities to Disasters*, which identifies three goals and five priorities for action. Priority 4, "Reduce the underlying risk factors" calls on States to integrate disaster risk reduction strategies with climate change adaptation. International action to implement the Hyogo Framework is being supported by the strengthening of the ISDR System, which includes the Global Platform for Disaster Risk Reduction. A dedicated fund is also being strengthened to support international action for disaster risk reduction.



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VULNERABILITY

Key Definitions:

- The degree to which a system is susceptible to, and unable to cope with, adverse effects of climate change, including climate variability and extremes. Vulnerability is a function of the character, magnitude, and rate of climate change and variation to which a system is exposed, its sensitivity and its adaptive capacity (Source: IPCC).
- The conditions determined by physical, social, economic and environmental factors or processes, which increase the susceptibility of a community to the impact of hazards. For positive factors, which increase the ability of people to cope with hazards, see definition of 'capacity'. (Source: ISDR).

The concept of vulnerability is central to disaster risk reduction. All individuals and communities are to varying degrees vulnerable to hazards—and all have intrinsic capacities to reduce their vulnerability. In view of this understanding among disaster risk reduction practitioners, there are different dimensions of vulnerabilities according to the elements at risk – physical, social, economic, and environmental. *Physical* vulnerability refers to susceptibilities of the built environment and may be described as “exposure”. *Social* factors of vulnerability include levels of literacy and education, health infrastructure, the existence of peace and security, access to basic human rights, systems of good governance, social equity, traditional values, customs and ideological beliefs and overall collective organizational systems. *Economic* vulnerability characterises people less privileged in class or caste, ethnic minorities, the very young and old, the disadvantaged, and often women who are primarily responsible for providing essential shelter and

basic needs. The poor and predominantly female and elderly populations are characterised by higher economic vulnerability as they suffer proportionally larger losses in disasters and have limited capacity to recover. Similarly, an economy lacking a diverse productive base is generally more vulnerable to disasters in the sense that it is less likely to sustain recovery from disaster impacts and will perhaps also lead to forced migrations. *Environmental* vulnerability refers to the extent of natural resource degradation. Contaminated air, water and inadequate sanitation increase vulnerability. Diminished biodiversity, soil degradation and water scarcity threaten food security and health.

What does this mean in practice? Often, when disaster risk reduction practitioners assess vulnerability, they wish to ascertain the intrinsic 'condition' of people—the physical, social, economic and environmental factors that determine people's capacity to reduce the potential impacts of a hazard event and cope with its occurrence. Thus, disaster risk reduction practitioners are concerned with increasing exposure to hazards and seek to address it by influencing a society's intrinsic capacity to cope with, and adapt to, changing environments and shocks.

Many climate change experts coincide with this disaster risk reduction perception of vulnerability. Others largely view vulnerability as an exogenous influence, that is, the biophysical 'effect' of an event. When climate change practitioners assess vulnerability, they are often interested to determine if a particular climate hazard will impact a particular locale, including the population living in that locale. In other words, for many managers working on climate change, if a climate impact, such as sea-level rise will affect a particular coastline, including its population and ecosystems, the area is considered vulnerable.

Disaster risk reduction practitioners, on the other hand, are likely to assess the intrinsic characteristics of the affected population – and how these elements at risk might influence/ contribute to the probable outcome. This difference perhaps also bears significance on the estimated time over which the outcome is expected to emerge. Disaster risk reduction practitioners usually assess vulnerability and capacities to respond to hazard events expected in the next season or years (e.g., hurricane seasons); whereas climate change experts are more likely to consider the long term impacts, in decades and centuries, of climate variability and change as well as related environmental change (e.g., degradation of coastline and sea level rise).

Regardless of differences in perception, practitioners of both communities are similarly concerned with addressing the probable *outcomes* of vulnerability to climate-related hazards -- both present and future. The concern with outcomes can range from the fate of species to loss of coastlines or wetlands, loss of livelihoods, human mortality, economic losses, infrastructure damage, human health, etc. The conceptual emphasis of this term unites practitioners seeking to address vulnerabilities across different contexts. Further, there are some common factors that influence the outcomes and concern practitioners in both communities alike: the entities (people, wildlife, buildings, etc. that can experience the outcome); specific causal factors that will lead to, or away from, the probable outcome (identifying endogenous and exogenous factors that influence and can be influenced) and estimated time over which the outcome is expected to emerge. For instance, the same climate conditions will contribute to completely different outcomes depending on where the event occurs (e.g., Gobi desert or New York city) and when its impact unfolds (e.g., seasonal hurricanes or once-in-a hundred-years major tsunami).

RISK

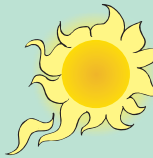
Key Definitions:

- 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. (Source: ISDR).
- Function of probability and magnitude of different impacts (Source: IPCC).

The ISDR definition describes risk as comprising biophysical as well as social vulnerability components but the IPCC definition does not include vulnerability. Other climate change glossaries, do consider vulnerability a part of risk. No doubt, the integration of the two approaches—the latter, based on assessing the probable impacts and the former, on identifying and reducing vulnerabilities—is desirable if we are to address the numerous threats that human systems face as a result of climate variability and change.

Global trends indicate that at present it is growing vulnerability that is driving the increase in disaster risk. As the effects of climate change become increasingly felt, it will be essential to assess vulnerability as an integral part of the causality of risk and to recognise that addressing vulnerability will lead to an effective, holistic "risk management strategy" for practitioners from both disciplines. The disaster risk reduction approach understands risk comprehensively: "Disaster risk reduction is a conceptual framework of elements considered with the possibilities to minimise 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" (Source: ISDR).

RISK ASSESSMENT and CLIMATE CHANGE IMPACT ASSESSMENT



Key Definitions:

- Risk Assessment: a methodology to determine the nature and extent of risk by analysing potential hazards and evaluating existing conditions of vulnerability that could pose a potential threat or harm to people, property, livelihoods and the environment on which they depend. The process of conducting a risk assessment is based on a review of both the technical features of hazards such as their location, intensity, frequency and probability; and also the analysis of the physical, social, economic and environmental dimensions of vulnerability and exposure, while taking particular account of the coping capabilities pertinent to the risk scenarios. (Source: ISDR).
- Climate Impact Assessment: the practice of identifying and evaluating the detrimental and beneficial consequences of climate change on natural and human systems (Source: IPCC WG II).

Risk assessment forms the core of the disaster risk management process and results in the identification of potential risk reduction measures. As might be expected, assessing vulnerability and capacity is as important as identifying and assessing the potential impact of hazards. The process includes:

- identifying the nature, location, intensity and probability of a threat;
- determining the existence and degree of vulnerabilities and exposure to those threats;
- identifying the capacities and resources available to address or manage threats; and
- determining acceptable levels of risk.

"The analysis of the damages experienced in disasters constitutes a major source of information for vulnerability/capacity identification. As opposed to the inductive analysis used in GIS techniques – where level of risk is inducted by integrating layers of information – an historical analysis of disaster data provides the information to deduce levels of risk based on past experiences. In addition, historical disaster databases are essential to identify the dynamic aspects involved in vulnerability, providing the criteria to assign relative weights to different dimensions of vulnerability in risk assessment exercises." (ISDR 2004, p.71)

The approaches of climate change assessments and those for disaster risk seem to be converging. Climate change studies have traditionally focused on "climate scenarios derived from general circulation models and applied to biophysical impacts models. These impacts were then carried forward to economic sectors (for example, agriculture, forestry, water resources), after which adaptation was considered. Second generation studies begin by examining the relationship between current climate variability and current adaptation before considering future climate and adaptation in the broad context of environmental stressors, socio-economic change and sustainable development." (UNFCCC 2003, p. 3)

The impact models developed by the climate change community would greatly benefit disaster risk managers in preparing for such impacts and adapting current disaster risk strategies. For instance, climate change experts could share information regarding the disappearance of particular glaciers providing water to specific communities, which in the short term is expected to cause increased water supply and severe water shortages in the long term. Similarly, the historical disaster record (particularly for hydrometeorological hazards) used by the disaster risk reduction managers and their robust vulnerability-and-capacity assessment tools would inform the work of climate change policy makers.

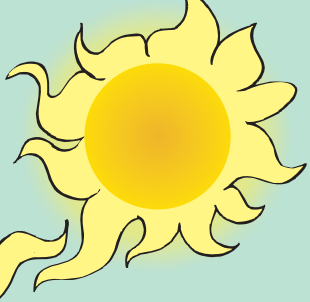
MITIGATION

Key Definitions:

- Structural and non-structural measures undertaken to limit the adverse impact of natural hazards, environmental degradation and technological hazards. (Source: ISDR).
- Mitigation is a human measure to reduce the sources or enhance the sinks of greenhouse gases (Source: IPCC).

Much like the vulnerability debate, there has been an evolution of approaches relevant to mitigation within the disaster risk reduction and the climate change practice areas. They have evolved over the past decades from a response focus to engineering solutions to vulnerability and capacity assessments, and more recently to more integrated risk reduction approaches. Yet the same term "mitigation" describes very different practices in the disaster risk reduction and climate change contexts. In fact, many disaster mitigation activities would be considered climate change adaptation activities.

Climate change mitigation measures recognise that the amount of greenhouse gases in the atmosphere will influence the rate and magnitude of climate change. Therefore it is within the capacity of humans to influence their exposure to change. Climate change mitigation measures include energy conservation measures, implementing land use plans, strengthening institutional and legislative mechanisms, energy efficiency measures, waste management, substituting fossil fuels with renewable energy sources and measures in the transport and agricultural sectors, as well as sequestering carbon biologically through reforestation or geo-physically (inside the earth's core). These activities contribute to reducing disaster risk by reducing expected climate change impacts.



Disaster mitigation activities relate to environmental management, land use and urban planning and the engineering protection of critical facilities. Specific examples include reforestation to avoid landslides and the re-establishment of corals to limit the damage of tsunamis. Other examples of good practice in disaster mitigation include the training of masons to develop earthquake-resilient buildings and community partnerships to enhance the understanding of risk. A drought reduction strategy may be to build water reservoirs and improve agricultural practices to conserve water. The climate change community would term these disaster mitigation activities *adaptation*, although these activities would represent only one type of adaptation, namely reactive adaptation. The term adaptation to climate change embraces broader and more comprehensive activities (please see next section).

ADAPTATION, ADAPTIVE CAPACITY and COPING CAPACITY

Key Definitions

- Adaptation: Adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities. Various types of adaptation can be distinguished:

  Anticipatory Adaptation—Adaptation that takes place before impacts of climate change are observed. Also referred to as proactive adaptation.

  Autonomous Adaptation—Adaptation that does not constitute a conscious response to climatic stimuli but is triggered by ecological changes in natural systems and by market or welfare changes in human systems. Also referred to as spontaneous adaptation.

  Planned Adaptation—Adaptation that is the result of a deliberate policy decision, based on an awareness that conditions have changed or are about to change and that action is required to return to, maintain, or achieve a desired state.

  Private Adaptation—Adaptation that is initiated and implemented by individuals, households or private companies. Private adaptation is usually in the actor's rational self-interest.

  Public Adaptation—Adaptation that is initiated and implemented by governments at all levels. Public adaptation is usually directed at collective needs.

  Reactive Adaptation—Adaptation that takes place after impacts of climate change have been observed. (Source: IPCC)
- Adaptive Capacity: The ability of a system to adjust to climate change (including climate variability and extremes) to moderate potential damages, to take advantage of opportunities, or to cope with the consequences. (Source: IPCC)
- Coping capacity: The means by which people or organizations use available resources and abilities to face adverse consequences that could lead to a disaster. In general, this involves managing resources, both in normal times as well as

during crises or adverse conditions. The strengthening of coping capacities usually builds resilience to withstand the effects of natural and human-induced hazards. (Source: ISDR)

A cursory survey of glossaries reveals that disaster risk reduction glossaries use the terms coping and coping capacity more often than climate change glossaries to describe conditions of social vulnerability. Some disaster risk reduction practitioners use the concept of coping, and the term coping capacities in particular, to describe the use of mechanisms to reduce the adverse consequences and effects of disasters. Coping activities might include measures to develop economic and social safety nets, such as diversifying sources of income, as well as preparedness measures, such as stockpiling emergency supplies. Other disaster risk reduction managers, particularly those working in the interface with climate change issues, see a fundamental difference between coping and adapting. In this perspective, coping may involve survival strategies that come at a high cost for individuals and communities, such as reductions in food intake to survive drought. In such a case, people are coping and may survive but they may not be able to outlive another drought. Therefore, they have not successfully adapted. This disaster risk reduction understanding of adaptation—as the ability of a system to withstand external disruptions without degrading key parameters—coincides with the IPCC's definition.

In some cases climate change experts use the term adaptation to denote approximately the same concepts covered under “coping”/”coping strategies” (as denoted by the disaster risk reduction community). Yet many in the climate change community also differentiate between coping and adapting, similarly to the variety of views among disaster risk reduction practitioners. Coping is used for short-term (or reactive) adjustments while adapting for long term (or proactive) ones. Some in the climate change community employ the term coping but with reference to a “coping range”; a limit of climate impacts up to which the outcomes are determined as being beneficial or harmful.

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United Nations International Strategy for Disaster Reduction "Terminology of disaster risk reduction". Available at: http://www.unisdr.org/eng/library/lib-terminology-eng%20home.htm The ISDR's *Terminology of Disaster Risk Reduction* aims to promote a common understanding on the subject, for use by the public, authorities and practitioners. The terms are based on a broad consideration of different international sources. It represents a continuing effort responding to a need expressed in several international venues, regional discussions and national commentary. Feedback from specialists and other practitioners to improve these definitions is most welcome.

In both the climate change and the disaster risk reduction fields the academic community has developed papers on each field's terminology and conceptual approach. Some researchers have also explored the disconnect between the climate change and disaster risk reduction terminologies and conceptual frameworks. Please see references and articles in the enclosed CD-ROM.

The attached CD-ROM includes internet links or PDF files for the following documents:

A. Glossaries

A1. Climate Change Focus

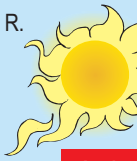
- Climate Change Hub Gateway, Broad glossary of climate change terms, with a focus on the science of the greenhouse effect.
- Intergovernmental Panel on Climate Change, Glossary of terms used by Working Group II: Impacts, Adaptation, and Vulnerability in the Third Assessment Report in 2001
- International Petroleum Industry Environmental Conservation Association, Comprehensive glossary of climate change terms in its third edition (2001), including policy terms and scientific definitions.
- Organisation of Economic Co-operation and Development, Draft Paper (March 2006) containing key adaptation concepts and terms that have entered the UN Framework Convention on Climate Change lexicon.
- Organisation of Petroleum Exporting Countries, Detailed glossary containing references to the articles and mechanisms of the UNFCCC. Emphasis on energy terms.
- United Nations Environment Programme, Glossary of environmental terms, accompanied by a list of common abbreviations.
- U.S. Environmental Protection Agency, Comprehensive glossary of climate change terms with a focus on technical and scientific definitions.
- Wikipedia, Glossary of commonly used terms in climate change, with many of the terms linking to other Wikipedia articles.

A2. Disasters Focus

- European Commission Humanitarian Aid Office, A short glossary of terms used in the humanitarian arena
- International Institute for Disaster Risk Management (IDRM)
- Glossary of Disaster Risk Management Terminology
- United Nations Development Programme, Short glossary of terms appended to the publication Reducing Disaster Risk: A Challenge for Development.

- United Nations International Strategy for Disaster Reduction, Compendium of disaster risk reduction terms, compiled from a broad range of resources.
- United Nations Office for the Co-ordination of Humanitarian Affairs, Definitions and distinctions of disaster reduction compiled for the Integrated Regional Information Networks.
- United Nations University – Institute of Environment and Human Security, Core terminology of disaster reduction compiled by Katherine Thywissen, assessing how different sources have defined the same term.

B. Key Climate Change Texts



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- Kyoto Protocol
- Multi Agency, Poverty and Climate Change: Reducing the Vulnerability of the Poor through Adaptation (2003)
- Smit, B. and Pilifosova, O., From Adaptation to Adaptive Capacity and Vulnerability Reduction
- UNDP-GEF, Users Guide to the Adaptation Policy Framework (2003)
- United Nations Framework Convention on Climate Change, Convention text.
- World Bank, Look Before You Leap: A Risk Management Approach for Incorporating Climate Change Adaptation in World Bank Operations.

C. Key Disasters Texts

- Buckle, P., Re-defining community and vulnerability in the context of emergency management (1998)
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- Cardona, O. et. al., Notions of Disaster Risk: Conceptual Framework for Integrated Management (2003)
- Tearfund, Mainstreaming disaster risk reduction: A Tool for Development Organisations (2005)
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- UN-ISDR, Hyogo Framework for Action (2005)
- UN-ISDR, Living with Risk: A Global Review of Disaster Reduction Initiatives (2004)
- UNDP, Reducing Disaster Risk: A Challenge for Development (2005)

D. The Links between Disasters and Climate Change

- Brooks, N., 'Vulnerability, risk and adaptation: a conceptual framework' (2003).
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