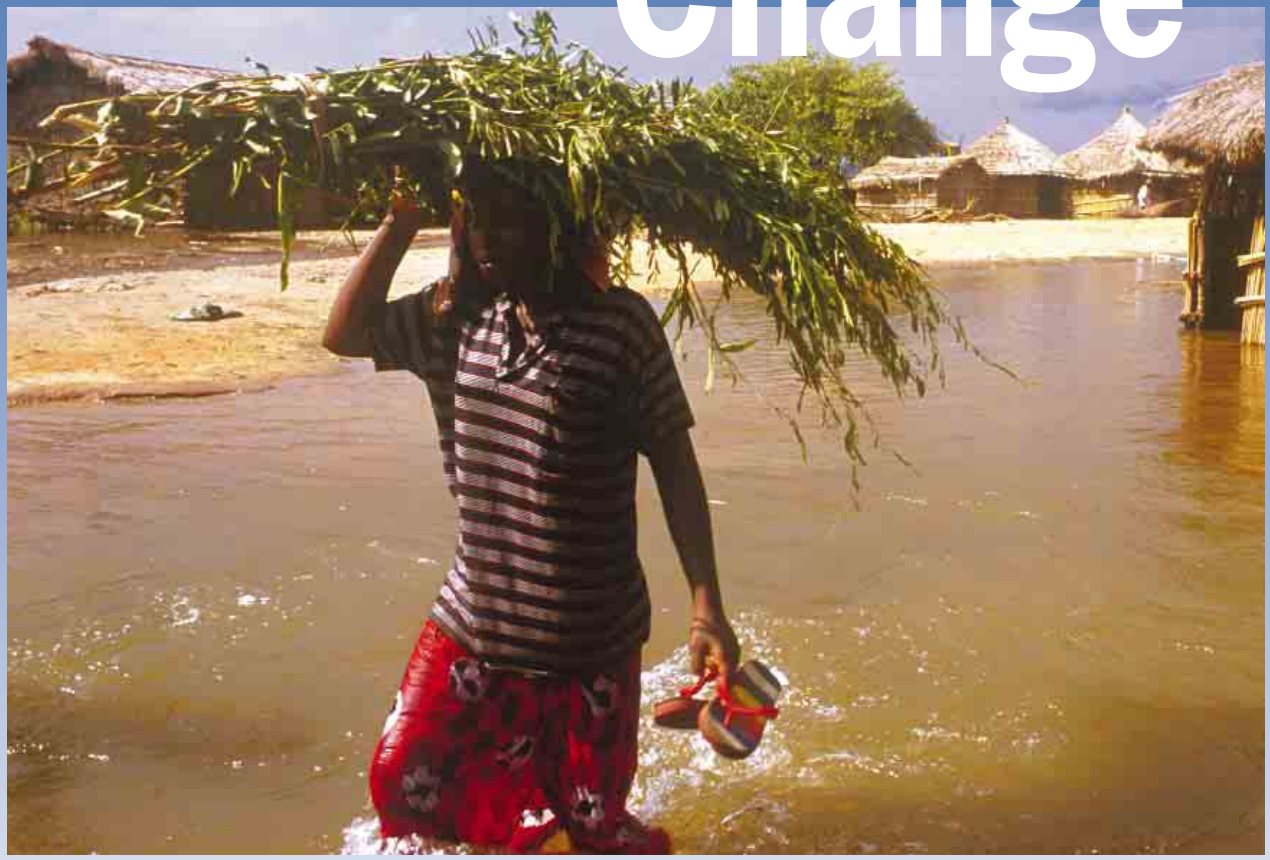
Livelihoods and Climate Change



Combining disaster risk reduction, natural resource management and climate change adaptation in a new approach to the reduction of vulnerability and poverty

A Conceptual Framework Paper Prepared by the Task Force on Climate Change, Vulnerable Communities and Adaptation

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This paper has been prepared by the International Institute for Sustainable Development (IISD), IUCN – The World Conservation Union and Stockholm Environment Institute – Boston Centre (SEI-B), as part of their joint initiative on Climate Change, Vulnerable Communities and Adaptation. Guided by a multi-disciplinary international Task Force, the project seeks to strengthen the role of ecosystem management and restoration activities in reducing the vulnerability of communities to climate change and climate-related hazards. The writing team consisted of Task Force members Ian Burton, independent scholar and consultant, John Soussan from the Water and Development Group at SEI – York Centre, and Project Team member Anne Hammill from IISD's Climate Change and Energy Team.

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Preface

From the Co-Chairs of the Task Force on Climate Change, Vulnerable Communities and Adaptation

While government representatives negotiate international policy frameworks to limit greenhouse gas emissions, and researchers continue to debate the science and impacts of climate change, climate-induced changes to physical and biological systems are already being detected. Retreating glaciers, longer growing seasons, shifting eco-zones and thawing permafrost have all been observed in different regions around the world. Compounded by human pressures and modifications to the environment, these changes threaten to further entrench global inequities, as those with the least stand to suffer the most. There is a pressing need to develop response measures that will address current development disparities and protect vulnerable communities from the longer-term impacts of climate change.

In 2001, IUCN – The World Conservation Union, the International Institute for Sustainable Development (IISD) and the Stockholm Environment Institute (SEI) joined forces to launch an international research and policy initiative on Climate Change, Vulnerable Communities and Adaptation. Guided by a multi disciplinary Task Force, this initiative represents a confluence of four distinct, yet decidedly relevant, communities working on vulnerability reduction in the face of climate change. These experts—from the fields of disaster risk reduction, climate change, conservation and poverty reduction—first met following the release of the IPCC Working Group II's latest assessment of climate change impacts, adaptation and vulnerability and the conclusion of the Marrakech Accords to the United Nations Framework Convention on Climate Change (UNFCCC). In view of the expanding body of knowledge on climate change impacts and new funding opportunities for climate change adaptation, the Task Force set in motion a collaborative effort to inform and influence how the world undertakes and invests in climate change adaptation.

The Task Force believes that adaptation must be rooted in reducing vulnerabilities, and some of the greatest opportunities for this lie in ecosystem management and restoration activities. By protecting and enhancing natural services, we help to secure the livelihoods of the world's most vulnerable communities and improve their capacity to deal with the impacts of climate change.

How can activities such as watershed restoration in India, the rehabilitation of mangrove plantations in Vietnam, or agroecological practices in Honduras enable local communities to adapt to the impacts of a changing climate? How do they address current gaps in adaptation policies? How do we integrate these activities into national climate change adaptation strategies? This publication provides a basis for answering these and other questions by articulating the conceptual foundations of the IUCN/IISD/SEI project and the issues that will be addressed through the work program.

We hope this paper is useful in providing a framework for those researchers, policy-makers and community groups seeking to take action on adaptation. The partnering institutions and Task Force members look forward to working with all stakeholders in finding innovative and sustainable ways of responding to our changing global climate.

H.E. Lionel Hurst,
Ambassador of Antigua and Barbuda to the U.S. and Organization of American States

Achim Steiner,
Director General, IUCN – The World Conservation Union

March 2003

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The International Institute for Sustainable Development

The International Institute for Sustainable Development contributes to sustainable development by advancing policy recommendations on international trade and investment, economic policy, climate change, measurement and indicators, and natural resource management. By using Internet communications, we report on international negotiations and broker knowledge gained through collaborative projects with global partners, resulting in more rigorous research, capacity building in developing countries and better dialogue between North and South.

IISD's vision is better living for all – sustainably; its mission is to champion innovation, enabling societies to live sustainably. IISD receives operating grant support from the Government of Canada, provided through the Canadian International Development Agency (CIDA) and Environment Canada, and from the Province of Manitoba. The institute receives project funding from the Government of Canada, the Province of Manitoba, other national governments, United Nations agencies, foundations and the private sector. IISD is registered as a charitable organization in Canada and has 501(c)(3) status in the United States.

IUCN – The World Conservation Union

Founded in 1948, The World Conservation Union brings together States, government agencies and a diverse range of non-governmental organizations in a unique world partnership: over 980 members in all, spread across some 140 countries.

As a Union, IUCN seeks to influence, encourage and assist societies throughout the world to conserve the integrity and diversity of nature and to ensure that any use of natural resources is equitable and ecologically sustainable.

The World Conservation Union builds on the strengths of its members, networks and partners to enhance their capacity and to support global alliances to safeguard natural resources at local, regional and global levels.

Stockholm Environment Institute

SEI is an independent international research institute, working at local, national, regional and global levels to clarify the requirements, strategies and policies for a transition to sustainability. The mission of the Institute is to support decision-making and induce change towards sustainable development around the world by providing integrative knowledge that bridges science and policy in the field of environment and development. Headquartered in Stockholm, the Institute includes permanent centres in Boston (USA), York (UK), and Tallinn (Estonia), as well as offices in Brussels (Belgium), Bangkok (Thailand) and Oxford (UK), and a network structure of permanent and associated staff in over 20 countries.

Executive Summary

Whatever happens to future greenhouse gas emissions, we are now locked into inevitable changes to climate patterns. Adaptation to climate change is therefore no longer a secondary and long-term response option only to be used as a last resort. It is now prevalent and imperative, and for those communities already vulnerable to the impacts of present day climate hazards, an urgent imperative.

Successful adaptation must be accomplished through actions that target and reduce the vulnerabilities poor people now face, as they are likely to become more prevalent as the climate changes. This approach calls for a convergence of four distinct communities who have long been tackling the issue of vulnerability reduction through their respective activities—disaster risk reduction, climate and climate change, environmental management, and poverty reduction. Bringing these communities together and offering a common platform—and a shared vocabulary—from which to develop an integrated approach to climate change adaptation can provide an opportunity to revisit some of the intractable problems of environment and development.

The starting point for this convergence is a common understanding of the concepts of adaptation, vulnerability, resilience, security, poverty and livelihoods, as well as an understanding of the gaps in current adaptation approaches. Taken together, they indicate a need—and an opening—for adaptation measures based on the livelihood activities of poor and vulnerable communities. This places the goal of poverty reduction at the centre of adaptation, as the capabilities and assets that comprise people's livelihoods often shape poverty as well as the ability to move out of poverty.

This "bottom-up" approach therefore requires an understanding of how livelihoods are conducted and sustained—that is, how resources are mobilized to earn an income and meet basic needs. Central to both the definition of livelihoods and household resilience are livelihood assets, i.e., the means of production available to a given individual or group that can be used to generate material resources sufficient enough to reduce poverty. The greater and more varied the asset base, the more sustainable and secure the livelihood. There are generally five forms of livelihood assets: natural capital, social-political capital, human capital, physical capital and financial capital. Taken together, these assets largely determine how people will respond to the impacts of climate change, and should therefore form the basis of adaptation strategies.

While all of these assets are important, natural resources are particularly important for the poorest and most vulnerable communities in the world. The poor are more heavily dependent on ecosystem services and therefore most severely affected by deteriorating environmental conditions and factors limiting resource access. While climate change is not the only threat to natural resources and livelihoods, climate-induced changes to resource flows will affect the viability of livelihoods unless effective measures are taken to protect and diversify them through adaptation and other strategies. For the poorest and most vulnerable, these strategies should include ecosystem management and restoration activities such as watershed restoration, agroecology, reef protection and rangeland rehabilitation. In fact, these activities can represent "win-win" approaches to climate change adaptation, as they serve immediate needs and bring immediate benefits to local communities while also contributing to longer-term capacity development that will create a basis for reducing future vulnerabilities.

If adaptation strategies should reflect the dynamics of peoples' livelihoods, then adaptation must be seen as a process that is itself adaptive and flexible to address locally-specific and changing circumstances. The responsibility for adaptation lies with those who stand to gain the most. While those with the least capacity to adapt are the most vulnerable, they are also the most likely and most motivated to take conscious adaptation actions. For the poor and vulnerable, the actions that they take will be constrained by their limited assets and capabilities, but they will also be the most appropriate given the specific local manifestations of climate change impacts. These actions should be supported by external agencies to build up the asset base of the poor.

Moreover, adaptation should be mainstreamed into wider development processes rather than separated into isolated measures funded and executed discretely. Institutional capacity must be strengthened in order to lessen the gaps between local and national processes, and between formal and informal patterns of economic activity and resource management. Addressing these disconnections will help to ensure the effective participation and empowerment of poor communities in key adaptation decisions, allowing for the inclusion of non-structural approaches rooted in community-based patterns of resource management in these decisions.

For poor people and poor countries dealing with many urgent needs and many immediate problems that demand attention and investment, we must offer a process for identifying those "win-win" options that address current realities and assist with long-term adaptation to climate change. This process can be based on three general steps: 1) understanding vulnerability-livelihood interactions; 2) establishing the legal, policy and institutional framework through which adaptation measures can be implemented; and 3) developing a national climate change adaptation strategy, including reform measures and investment options.

I
What Can Adaptation Really Achieve?

The debate over climate change has now reached a stage where all but the most extreme contrarians accept that, whatever happens to future greenhouse gas emissions, we are now locked into inevitable changes to climate patterns. Many, including the scientists working with the Intergovernmental Panel on Climate Change, (IPCC), have concluded that these changes are already underway. The emergence of this consensus has led to increasing attention being paid to the issue of how to respond. In the early years of the new millennium the idea of adaptation has caught the attention of scientists, environment and development specialists, diplomats and negotiators, and, increasingly, many civil society organizations. The use of adaptation offers a chance to bring a fresh and more successful approach to some of the key problems of the global environment and the needs and problems faced by the world's poorest people. The opportunity must be seized and promoted if any significant part of this promise is to be realized.

This paper describes and explains this newfound enthusiasm for adaptation, specifically within the context of climate change, and gives clarity to key concepts in what is potentially an area where misunderstanding and confusion abound. In doing so, the paper challenges the very macro-perspective that is implicit in many people's thinking on these issues. For too long the whole climate change debate has focused at the global level, both in terms of global climate and in relation to the global economic and political system. When considering adaptation, starting from this perspective misses the point. Adaptation is about—and must build from—the actions of people, especially the poorest people who are the most vulnerable and most likely to actively adapt. It is this perspective—the human experience—that drives the analysis in this paper.

The paper itself reflects the discussions held through a Task Force meeting organized in November 2001 by IUCN – The World Conservation Union, the International Institute for Sustainable Development (IISD) and the Stockholm Environment Institute (SEI). The Task Force was formed as a non-governmental response to the emergence of adaptation as the leading issue in the global climate change debate. It seeks to inform and challenge conventional wisdom in this field, and in particular, to bring together the different perspectives needed for successful adaptation. These perspectives come from four main constituencies—disaster reduction, climate change action, biodiversity conservation and poverty alleviation—each with their own understandings of and responses to the climate change dilemma. Drawing from each of their experiences and emerging priorities, the Task Force identified the need for an integrated approach to climate change adaptation based on the livelihoods of vulnerable communities.

The Task Force specified the following objectives:

1. To make and demonstrate a compelling case for an alternative approach to climate change adaptation based on vulnerability reduction.
2. Specifically, to promote natural resource-based approaches for the reduction of vulnerabilities. These approaches should provide multiple benefits: they should generate immediate economic returns to poor people, sustain and diversify their livelihoods, conserve ecosystems and, where possible, sequester carbon.
3. To offer convincing demonstrations of how on-the-ground livelihood activities can link with policy processes to reduce existing and future climate-related vulnerabilities that poor people face in different parts of the world.
4. To identify multi-stakeholder, participatory processes that form the basis for the selection, implementation and appraisal of adaptation strategies. It is assumed that national governments, multilateral and bilateral development

agencies and banks, the private sector, the scientific community, civil society and other stakeholders will participate in the implementation process.

5. To critique the prevalent policy approach for addressing adaptation, especially the artificial distinction between climate change and climate variability, and the assumption that adaptation needs to focus on global rather than local processes.

Continuous contour trenches with plantation in the dry month of February after 2 years of drought, Darewadi, India (2003). Photo: Heike Junger for WOTR

These objectives will be met through a three-year work program involving analysis, consultations, and policy and advocacy efforts. This paper serves as an introduction to the Task Force's program, elucidating the conceptual underpinnings that inform its activities. Broadly speaking, we situate the IUCN/IISD/SEI initiative within the ongoing climate change adaptation debates and identify the institutional niche we seek to fill.

Our starting point for this discussion is adaptation, an idea that in itself is not new. The concept has a long pedigree in the natural sciences going back at least to Charles Darwin's *The Origin of Species*. It has also been used extensively in the social sciences as a synonym for response to social, economic and technical as well as environmental change. There is therefore a considerable body of established knowledge as well as ongoing research into adaptation, although it is not always identified by that name. This knowledge can provide a basis for a new vision of development in which adaptation is seen not as an unfortunate necessity in the face of adversity but as a positive embracing of opportunity for beneficial change.

What is new today is the understanding that adaptation can be used as a key and a lever to help open and drive a new effort with renewed motivation. It also captures the idea that adaptation for development and poverty reduction is everybody's business. There is a role for international development assistance in adaptation, but the fundamental drive must come from those who do the adapting. The appeal of adaptation is that it puts the responsibility in the hands of those who stand to gain the most, whether that be individuals, families, communities or nations. The role of development assistance and of global environmental agreements must be to facilitate adaptation, to help build capacity and to share in the removal of obstacles. Adaptation therefore requires partnerships; capacity building; the involvement of a wide range of stakeholders; motivation at all levels; and, above all, political will.

Of course, adaptation itself is a term that has been given many different meanings. This is discussed in Section II. The focus of our approach is that adaptation to climate change must start today, through actions to target and reduce the vulnerabilities that poor people now face. The concept of vulnerability itself is also variously used and interpreted. It is similarly elaborated in the next section. Suffice it to say here that exposure to climate-related hazards such as the threat of floods, droughts, cyclones and mudslides, as well as the impacts of variable and unpredictable rainfall, declining access to resources from aquatic ecosystems and others, contribute to vulnerability. Vulnerability in the face of climate hazards is widespread. The impacts of present day climate hazards are already considerable, and they pose immediate and formidable challenges. These are likely to become even more prevalent as the climate changes. This sets the context within which adaptation to climate change must be considered: the widely-shared and adopted view is that poverty eradication and vulnerability reduction are the priority concerns. This requires the improved management and reduction of the risks to which all people, including the poorest, are exposed.

The current growth of interest in adaptation began with the use of the term in the UNFCCC signed in Rio de Janeiro in 1992. For most of the 1990s, the negotiations under the Convention focused upon the need to reduce greenhouse gas emissions and the stabilization of greenhouse gas concentrations in the atmosphere, leading to the signing of the Kyoto Protocol, which still awaits

final ratification before coming into force. During these negotiations, it became increasingly clear that some climate change cannot be avoided and that the target of stabilization will be difficult to achieve in the short or medium term even if the targets of the first commitment period of the Kyoto Protocol were to be achieved in full and on time. At the same time, IPCC reports have confirmed that climate change is now being detected. The view of adaptation has now therefore changed. It is no longer a secondary and long-term option to be used only as a last resort. Adaptation is now everywhere an imperative, and in some places an urgent imperative.

From the beginning of the climate negotiations, it has been accepted that adaptation has some role to play in reducing vulnerability to climate change. Initially this was thought to be quite small and limited, but as understanding of the implications of climate change has grown, the perceived role of adaptation has correspondingly increased. Adaptation is not a substitute for mitigation (the stabilization of greenhouse gas concentrations), but it is now understood to include adaptation to climate variability and extremes as well as long-term change in climate means. It is also recognized that, to be effective, adaptation to climate change should be integrated into national economic and social development, and that it should be harmonized at policy and practical levels with other environmental management activities especially in the areas of land and water management, health, the conservation of biodiversity and the protection and development of the earth's wetlands, forests and drylands.

Such objectives are easy to state but difficult to achieve in practice. The applied research and development activity formulated in this document by the IUCN/IISD/SEI Task Force is in direct response to this need and proposes a "learn by doing" approach in which policy analysis and the identification and assessment of climate change adaptation measures are associated with practical and ongoing development activities. This approach is shaped by the concepts and relationships presented in the subsequent discussion. Accordingly, Section II defines and elaborates some of the key concepts in the debates, including "vulnerability," "resilience" and "security." Section III briefly outlines the emerging climate "regime," that is the institutions, programs and agreements now in place and being developed especially at national and international levels. It is shown that agreements hammered out at the international level and supported financially and technically have often fallen short of expectations, and threaten to continue to undermine the best intentions. Section IV takes up the question of livelihoods and explains how it can be linked with adaptation to help create empowerment, capacity and motivation for development. Section V characterizes some of the main elements in the adaptation process and provides a provisional diagnosis of the issues and the obstacles that must be addressed. This is followed by a strategic framework for adaptation in Section VI, which offers a three-stage process for developing adaptation strategies. We then end the discussion in Section VII with some final thoughts.

Adaptation is not proposed as a panacea for the world's ills. We are convinced that it does offer a new opening to revisit some long-standing problems of environment and development in an innovative way. The consortium of organizations involved in this initiative is committed to the vigorous pursuit of this opportunity and invites others to engage in the effort.

Vietnam Makong Delta Floods (November 2000). Photo: Viet Tank/International Red Cross

II
The Keystone Concepts

Continuous contour trenches, Chincholi, India (December 1998). Photo courtesy of WOTR

In this section, we define the core concepts needed to understand how poor and vulnerable communities are able to adapt to variable and changing climate patterns. Indeed, even this first sentence contains several concepts that need to be explained very clearly if we are to see more light and less heat in this debate. As stated earlier, clarity is needed in part because the issues we discuss here have traditionally been discussed by four distinct communities:

1. **Disaster Risk Reduction:** people and institutions involved in preparedness, mitigation and prevention activities associated with extreme events. These include hazard forecasting and immediate relief efforts for major disasters resulting from floods, cyclones and, in some cases, pollution events. This community is being enlarged to include specialists in the longer-term strategy of disaster prevention by anticipatory actions such as improved land-use planning, the establishment and enforcement of higher building codes, and modes of cost sharing such as insurance.
2. **Climate and Climate Change:** initially this was constituted by the world's meteorological community and has now expanded to include a wide range of biological and geophysical scientists, social scientists, economists and others. This community now includes people concerned with current weather variability and extremes as well as the projected changes in long-term climate.
3. **Environmental Management:** this community includes a wide-ranging set of people and institutions that deal with overall environmental issues and specific aspects of environmental management such as water resources and the conservation of forests. One characteristic of this set of stakeholders is that it is itself extremely disparate and fragmented. Foresters do not communicate sufficiently with water managers, and even within a sector such as water, many individuals and institutions (within and out of government) often have little contact with each other. It is more evidence of the well-known phenomena of the division of labour and the growth of specialization, which is itself an adaptation to the complexity of the contemporary world.
4. **Poverty Reduction:** also engages a wide and diverse spectrum of specialists. Recently the greater focus on poverty in national and donor policy agendas has led to specific initiatives such as the Poverty Reduction Strategy Papers that are led primarily by economic agencies and that are instrumental in defining the context in which many other aspects of policies aimed at the needs and vulnerabilities of poor people are set.

All four of these communities are central to the issues being discussed here. Each community has its own perspectives, its own processes and its own usage of many of the key concepts involved in any discussion of adaptation by poor communities to climate change. A common conceptual framework along the lines of what we propose is required to bring them together and, in particular, to help facilitate the key goal of ensuring that adaptation is mainstreamed into their respective sets of activities. The framework is one that reflects the need to build adaptation from the micro-, human level, rather than from the macro-, structuralist perspective that has dominated thinking in much of the climate, disaster and resource management fields. This framework is premised on the

belief that addressing existing vulnerabilities is the most effective way to address the impacts that climate change is likely to bring. The starting point is a convergence in the common vocabulary for the keystone concepts of adaptation, vulnerability, resilience, security, poverty and livelihoods.

Adaptation is the ability to respond and adjust to actual or potential impacts of changing climate conditions in ways that moderate harm or takes advantage of any positive opportunities that the climate may afford. It includes policies and measures to reduce exposure to climate variability and extremes, and the strengthening of adaptive capacity. Adaptation can be anticipatory, where systems adjust before the initial impacts take place, or it can be reactive, where change is introduced in response to the onset of impacts.

Adaptation takes place at all levels, from changes to global systems through changes at national or regional levels to adaptations made by local communities and individuals. The development of adaptation strategies needs to recognize this and define the appropriate mix of actions at these different levels. It can be planned, where pre-meditated decisions that reflect an awareness of impacts are made, or it can be autonomous, where people or natural systems adjust to climate impacts without conscious planning decisions. Understanding these autonomous responses is particularly important in defining the best approach to adaptation, as in many cases they will significantly change our expectations of what will happen in the future. They also represent major policy opportunities that must not be neglected, as policies such as stimuli to markets or the dissemination of technology opportunities can be more effective, less expensive and far less demanding on limited institutional capabilities than approaches that solely rely upon planned interventions.

Holling (2001) introduces the idea of the adaptive cycle, which links different time and spatial frameworks within which adaptation should take place. Holling identifies three core characteristics that shape the cycle, and can therefore shape the responses of ecosystems and people to crisis. These properties are:

- The **inherent potential** of a system that is available for change. This defines the range of possible options for the future and can be thought of as the inherent "wealth" of the system;
- The **internal controllability** of the system, which reflects the degree of connectedness between internal controlling variables and processes, along with the degree of rigidity or flexibility of these controls. According to Holling, this property determines the degree to which a system can control its own destiny; and
- The **adaptive capacity**: the resilience of the system to unpredictable shocks. Holling sees this as the opposite of the vulnerability of the system.

Adaptation strategies should be based on these three general properties—wealth, controllability and adaptive capacity—as they relate to different scales and contexts. They should include local actions taken by the poor themselves in response to changing market or environmental conditions

Box 1

Mangrove Rehabilitation in Vietnam

In Vietnam, tropical cyclones have caused a considerable loss of livelihood resources, particularly in coastal communities. Although managing coastal resources has great social and economic importance, the country has a limited ability to protect coastal areas against weather hazards. In future decades, climate change may increase the risk of tropical storms as well as their frequency and severity. The relative uncertainty surrounding anticipated climate change impact, however, makes it difficult for decision-makers to justify increased costs for protection. Under such circumstances, it is important to adopt precautionary adaptation approaches that minimize future risk and reduce existing vulnerability.

Mangrove ecosystem rehabilitation along much of Vietnam's coastline represents such an approach. Mangrove wetlands provide enhanced physical protection from storms and are a reservoir for carbon sequestration; they also provide a resource base for local livelihoods and income generation. Since 1994, the Vietnam National Chapter of the Red Cross has worked with local communities to plant and protect mangrove forests in northern Vietnam. Nearly 12,000 hectares of mangroves have been planted. The benefits have been staggering. Although planting and protecting the mangroves cost approximately US$1.1 million, it saved US$7.3 million per year in dike maintenance. During the devastating typhoon Wukong in 2000, project areas remained unharmed while neighbouring provinces suffered huge losses in lives, property and livelihoods. The Vietnam Red Cross estimates that some 7,750 families have benefited from mangrove rehabilitation. Family members can now earn additional income from selling crabs, shrimp and mollusks while increasing the protein in their diets.

Source: International Federation of Red Cross and Red Crescent Societies 2001. World Disasters Report: Focus on Reducing Risk. Geneva: IFRC.

For poor people, vulnerability is both a condition and a determinant of poverty, and refers to the (in)ability of people to avoid, cope with or recover from the harmful impacts of factors that disrupt their lives and that are beyond their immediate control.

supported by larger-scale, planned responses by government or other institutions that provided adaptation measures that are beyond the control or capabilities of local communities.

The need for and scale of adaptation reflects the *vulnerability* of people and natural systems to disruption from changes that reflect the impacts of climate conditions. Vulnerability is a term that is used in many different ways, usually describing a condition of susceptibility shaped by exposure, sensitivity and resilience (Kasperson *et al.* 1995). For poor people, vulnerability is both a condition and a determinant of poverty, and refers to the (in)ability of people to avoid, cope with or recover from the harmful impacts of factors that disrupt their lives and that are beyond their immediate control. This includes the impacts of shocks (sudden changes such as natural hazards, war or collapsing market prices) and trends (for example, gradual environmental degradation, oppressive political systems or deteriorating terms of trade).

The resilience of poor people represents their ability to withstand the impact of the trends and shocks described above, absorbing them while maintaining function.

In relation to climate change, vulnerability relates to direct effects such as more storms, lower rainfall or sea level rises that lead to displacement, and to indirect effects such as lower productivity from changing ecosystems or disruption to economic systems. With the poor being more directly dependent on ecosystem services and products for their livelihoods, the vulnerability of natural systems has profound implications. Any consideration of the need for adaptation to help poor communities to adjust to the effects of climate change must take account of all of these different forms of vulnerability. Of course, exactly how climate change impacts will affect different people in different places is largely unknown—one of the many uncertainties that surround the climate change debate. This is because of the uncertainties inherent in specifying these impacts and because the vulnerability of people will be affected by many things beyond climate change.

This does not mean that nothing can be done until certainty replaces uncertainty, for by then it is generally too late. Assessments of the likelihood of some impacts can be made, with these useful in guiding decisions on adaptation measures, but in many cases this will not be adequate. Rather than trying to ameliorate specific impacts, the general principle should be to reduce the overall vulnerability of poor people to the shocks and trends that are the consequence of variability in climate conditions.

Central to the understanding of vulnerability is the concept of *resilience*. The resilience of poor people represents their ability to withstand the impact of the trends and shocks described above, absorbing them while maintaining function (Folke *et al.*, 2002). Resilience varies greatly from household to household even in one locality. It is determined by two characteristics of peoples' livelihoods: the assets they possess and the services provided by external infrastructure and institutions. Both the assets and the services are extremely broad in their scope. Assets include the amount and quality of knowledge and labour available to the household, the physical and financial capital they possess, their social relations and their access to natural resources. External services includes those provided by flood control, coastal protection and other infrastructure, transport and communications, access to credit and financial systems, access to markets, emergency relief systems and others.

For many poor people in developing countries, access to these external services is extremely limited, so that their resilience is in large part a reflection of the local asset base. Strategies to strengthen the resilience of communities, and especially poor communities, should be based on the most effective combination of measures to secure and enhance the community's asset base and measures to provide improved external services. What is the best balance in any one place needs to be determined through effective assessments of local needs and capabilities.

Girot (2002) quotes Folke *et al.* (2002) to identify three defining features of resilience in integrated human-ecological systems:

1. The amount of disturbance a system can absorb and still remain within the state of domain of attraction;
2. The degree to which the system is capable of self-organization versus the lack of organization, or organization forces by external factors; and
3. The degree to which the system can build and increase the capacity for learning and adaptation (page 12).

This reflects a further characteristic of discussions on resilience. It can be risk-specific: for example, the existence of cyclone shelters or the ability of a farming system to withstand drought. Strategies to enhance such specific resilience have been the focus of much attention in adaptation, and tend to take place where the severity of the risk can clearly be identified and the investments in specific adaptations shown to be worthwhile. Resilience can also be general: the ability to withstand the impacts of shocks and trends that disrupt lives and

livelihoods. Examples of this are the overall health or economic status of households, the diversity of livelihood sources, access to savings or credit or the existence of strong social networks that are supportive whatever the problem. Targeting improvements to general resilience is likely to be most effective where either demonstrating investments in reducing the threat of specific but unpredictable risks (such as possible changes to future climate in specific places) is difficult or where households and communities face multiple vulnerabilities, including ones not connected with climate or natural resources. In these cases, it may well be more effective to improve overall resilience rather than trying to reduce specific vulnerabilities.

Taken together, the reduction of vulnerabilities and the improvement of resilience of poor people to withstand the impacts of climate change will improve their *security*: that is, the extent to which they can live their lives and conduct their livelihoods free from threats. These threats have many forms. They can be to the very lives of people, with the incidence of more climate-related disasters likely to increase in many parts of the world and particularly an issue in tropical regions where most of the world's poor live. Changing climate conditions and rising sea levels are also likely to make many places uninhabitable unless concerted and effective adaptation measures are taken, which could displace many vulnerable people with devastating consequences for their livelihoods and social relations.

Climate change and associated ecological changes also pose threats to the viability of many economic and social structures, even where people are not displaced or in serious physical risk. This is particularly true where they will lead to decline in the availability or quality of natural resources such as water or land on which the livelihoods of many poor people are based. This is the ultimate goal of adaptation processes: to provide security to people who face greater threats because of changes to the climate conditions in which they live.

Adaptation, vulnerability, resilience and security are core ideas familiar to many in the climate and disaster communities, but often with different meanings. These concepts are further developed in the rest of this paper. They are discussed below in relation to the dynamics of the livelihoods of the poor, with clear definitions given for both livelihoods and poverty. These two concepts, poverty and livelihoods, are not normally in the lexicon of adaptation discussions but are essential if the real meaning of people-based adaptation is to be understood.

Traditional approaches to *poverty* see it as simply an economic condition (often expressed in relation to "living on less than $1 or $2 a day for individuals, or as per capita GNP for nations"). These views have been replaced by approaches that see poverty as something that is complex, variable, multi-dimensional and dynamic. The United

Security: the extent to which they can live their lives and conduct their livelihoods free from threats.

Community contribution - plantation of continous contour trenches, Kauthe Kamleshwar, India (October 1999). Photo courtesy of WOTR

Nations Development Programme's "Human Poverty Index" sees poverty as a lack of basic human capabilities, with the index consisting of the following indicators: life expectancy, access to safe water and to health services, literacy and the proportion of children underweight aged five and under. A similar vision is reflected in the UN's Millennium Development Goals, which stress health, education, gender and environmental sustainability.

The World Bank's approach since 2000 stresses the multi-dimensional character of poverty, with both the material and non-material aspects being important. Key elements of poverty are given as the inability to satisfy basic needs, lack of control over resources, lack of education and skills, poor health, malnutrition, lack of shelter and access to water supply and sanitation, vulnerability to shocks, and a lack of political freedom and voice. The World Bank's approach since 2000 stresses the multi-dimensional character of poverty, with both the Organisation for Economic Cooperation and Development and Development Assistance Committee arguing that "poverty, gender and environment are mutually reinforcing, complementary and cross-cutting facets of sustainable development" (Poverty Guidelines 2001), so that

any poverty reduction strategy must focus on gender and environmental issues. Poverty itself is defined as being rooted in the lack of economic, human, political, socio-cultural and protective capabilities. In a joint contribution to the World Summit on Sustainable Development preparatory process the European Commission, the Department for International Development, UNDP and the World Bank also emphasize the material and non-material aspects of poverty including the lack of income and material means, poor access to services, poor physical security and the lack of empowerment to engage in political processes and decisions that affect one's life. They focus on livelihoods, health and vulnerability as three dimensions of poverty reduction.

Approaches to poverty are consequently important in both the centrality of concepts such as vulnerability and in the expectation that any approach to adaptation should demonstrate how it is able to target the needs and potentials of poor people as a first priority.

The new thinking on poverty reflected in the approach of these and many other international agencies and national governments has also placed poverty reduction at the top of the policy agenda. In almost all cases, actions (including those such as adaptation to climate change) are expected to show in direct and material ways how they contribute to poverty reduction. This is as it should be, for the poor are the hardest hit and the least able to cope with processes such as climate change and other forms of environmental jeopardy (just as they are most vulnerable to negative impacts from changing economic and political systems). For the purposes of this paper, these approaches to poverty are consequently important in both the centrality of concepts such as vulnerability and in the expectation that any approach to adaptation should demonstrate how it is able to target the needs and potentials of poor people as a first priority.

Indeed, in many ways this is what climate change impacts are all about: changes to resource flows critical for livelihood sustainability.

Livelihoods is an idea that has been gaining increasing currency in recent years and is now seen as fundamental to poverty reduction approaches around the world. The emergence of livelihoods approaches has led to new understandings on how poverty, and the ability to move out of poverty, reflects the (lack of) capabilities and assets available to the poor. This includes material assets such as access to land, other natural resources, financial capital and credit, tools and inputs into productive activities and others. It also reflects human capabilities (the knowledge and skills of the family), social and political factors such as contact networks and the openness of government institutions and, critically for our purposes, the capability to withstand the effects of shocks such as natural disasters. For most households, and especially for poor people, these assets are deployed in a series of livelihood activities: the means through which a household gains an income and meets its basic needs. This includes paid employment, but for poor people in particular it includes the ability to farm and to exploit common property resources for livestock, fishing, gathering fuelwood and many other things. Reliable and secure access to these resources, to land, water and biotic resources, is fundamental to the livelihoods of the poor. Climate-induced changes to resource flows (whether temporary, reflecting variability or structural, reflecting change) can fundamentally affect the viability of the livelihoods of the poor. Indeed, in many ways this is what climate change impacts are all about: changes to resource flows critical for livelihood sustainability.

All of these six concepts—adaptation, vulnerability, resilience, security, poverty and livelihoods—are open to many interpretations. It is hoped that the explanations given here will provide a basis for the identification of the most effective processes through which actions to assist the poor and vulnerable to adapt to climate change can be developed.

Mozambique floods (March 2001). Photo: Christopher Black/International Red Cross

III
The Current Regime

Check dam, Chincholi, India (February 1999). Photo courtesy of WOTR.

Under the UNFCCC, a new regime for the promotion of adaptation has slowly been emerging. It is important to situate the IUCN/IISD/SEI initiative in this context since its concerns are central to the issue of adaptation and development. Getting a clearer picture of these trends is a considerable task that will be undertaken in the future, and although the final form of this model is far from set, weaknesses exist.

This paper does not attempt a full analysis of the praxis of development, but focuses upon two major shortcomings. These are the wide gulf between high-level and top-down development work and needs and actions at the local and community level, and the lack of integration across socio-economic sectors, and especially the delay in addressing the ongoing activities in poverty and vulnerability reduction in the context of climate change.

The current wave of climate change adaptation activities started at the first meeting of the Conference of the Parties to the Framework Convention (COP-1, Berlin, 1995), where a decision was taken (Decision 11/CP.1) to approach adaptation in three stages. These stages were defined as follows:

Stage I – Planning, which includes studies of possible impacts of climate change, to identify particularly vulnerable countries or regions and policy options for adaptation and appropriate capacity building.

Stage II – Measures, including further capacity building, which may be taken to prepare for adaptation.

Stage III – Measures to facilitate adequate adaptation, including insurance and other adaptation measures.

Under these provisions, the Global Environment Facility (GEF), which is the financial mechanism for the Convention, has met the agreed full costs for the preparation of First National Communications under the Convention. In addition a number of impacts, vulnerability and adaptation studies have been carried out including studies supported by the World Bank in Bangladesh, the Caribbean and the Pacific Islands. Studies of impacts have also been carried out in many countries as part of the United Nations Environment Programme's country studies, and in the country study programs sponsored by the Netherlands and the United States. In addition, many independent research institutions and NGOs have begun their own programs on vulnerability and adaptation. Bilateral development assistance agencies are also becoming interested in adaptation.

Most of the early work has focused heavily on the potential impacts of future climates are described in climate scenarios derived from General Circulation models (GCMs). A new generation of research is now in the formative stage which provides for much greater attention to adaptation, and which addresses adaptation and vulnerability to current climate change and variability and extremes as well as longer-term climate change. The proposed new round of studies will also be focused on the role of adaptation in development. Although this change in perspective is now generally accepted as an appropriate step forward, the methods to be employed and the scope of the

Box 2

Community-based Rangeland Rehabilitation for Carbon Sequestration in Sudan

Beginning in 1992 and continuing through 2000, a group of 17 villages in the drought-prone Bara Province in Western Sudan took part in a project, funded by the UNDP Global Environmental Facility (GEF), to rehabilitate overexploited and highly-vulnerable rangelands through the use of community-based natural resource management (NRM) techniques. Cyclic droughts had severely degraded grazing areas, reducing their ability to regenerate and provide sufficient fodder for livestock, while cultivation under these arid conditions left the land bare and therefore exposed to wind erosion. The cumulative impacts of drought, grassland conversion to cropland and fuel wood gathering (deforestation), severely degraded the local resource base, undermined livelihoods and left communities more vulnerable to the adverse effects of future droughts.

The project had two overall objectives: 1) to create a locally-sustainable NRM system that would both prevent overexploitation of marginal lands and rehabilitate rangelands for the purpose of carbon sequestration, preservation of biodiversity and reduction of atmospheric dust; and 2) to reduce the risk of production failure by increasing the number of alternatives for sustainable production strategies, leading to greater stability for the local population.

Developed through the support of local NGOs and strong community buy-in, the project involved a package of mutually-supportive sustainable livelihood activities to be undertaken by participating villages. These included:

- Institution building: mobilizing community groups for planning and implementation of project activities.

(continued on page 11)

studies have not yet been established. The UNDP has developed an Adaptation Policy Framework, which is now being elaborated and tested in Central America, Mexico and Cuba. The Conference of the Parties has adopted guidelines for the conduct of National Adaptation Plans of Action (NAPAs) for the Least Developed Countries, and the World Bank has taken the initiative in establishing an inter-agency cooperation group know as the Vulnerability and Adaptation Resource Group. (VARG). The World Bank is also proposing to develop a methodology for rapid assessments, and to launch its own National Adaptation Strategy Studies (NASS).

All of these initiatives are attempting to define their own approaches and methodology. In developing these frameworks, there is a recognized danger that a classic top-down approach will emerge in which adaptation measures are equated with large-scale infrastructure-based interventions associated with physical protection. There will without doubt be many circumstances where large investments in infrastructure are an essential part of the adaptation process, but more focus is needed on non-structural alternatives. In particular, "bottom-up" approaches that are rooted in existing community-based patterns of resource management and that aim at sustaining and enhancing the livelihoods of vulnerable people have not been sufficiently recognized. We believe that these "grassroots" initiatives should be the point of departure for the identification and assessment of adaptation strategies, as they are cheaper, more sustainable and, in many cases, more effective in achieving the

Village watershed committee meeting, Darewadi, India (February 2003). Photo: Heike Junger for WOTR

core goal of assisting poor communities to adapt to the impacts of climate change. In addition to promoting "vertical" cooperation by linking these grassroots initiatives with national and regional activities, there is a need for "horizontal" integration, strengthening coordination across socio-economic sectors and mainstreaming adaptation needs into existing policies and practices.

These deficiencies have been identified many times, and attempts to resolve them are being advanced slowly. It is the mission of the program being launched by IUCN, IISD and SEI to accelerate progress by linking climate change adaptation to the closely-related issues of natural resource management, disaster prevention, and people's decisions and choices at the local level, especially those that affect the livelihoods of the poor and the most vulnerable. Specifically, we are seeking to promote an approach in which adaptation to climate change is rooted in ecosystem management and restoration activities that reduce risks and strengthen resilience of these vulnerable communities. It is recognized that adaptation alone is not sufficient and that ultimately, the stabilization of greenhouse gas concentrations is essential.

IUCN, IISD and SEI's mission is particularly relevant in light of recent funding opportunities. In response to the evolving nature of the climate issue and the way in which it is perceived, the Conference of the Parties has moved to establish two new funds that can provide support for adaptation. The first is the Special Climate Fund, a multi-purpose fund open for voluntary contributions from donors. This fund is not expected to have significant monies before 2005. Second is the Least Developed Countries Fund which is currently resourced by voluntary contributions and which is supporting the preparation of NAPAs as its first activity. A third fund is also in prospect, but this is a fund dependant upon the ratification of the Kyoto Protocol. It will be created under the Clean Development Mechanism (CDM) of the Protocol and involves a levy on activities undertaken under the CDM. The IUCN/IISD/SEI initiative can help in the development and formulation of activities under these three funds by testing out and demonstrating a new integrative approach.

Box 2 (continued)

- Training: in areas such as community development (e.g., soap production and handicrafts), natural resource management (e.g., range management and fodder production), credit systems, drought mitigation, etc.
- Rangeland Rehabilitation: through activities such as sand dune revegetation, windbreak installation, etc.
- Community Development: through small irrigated vegetable gardens, water well construction, etc.

Some project activities were not directly related to the purpose of carbon sequestration but instead focused on addressing socio-economic conditions. The long-term improvement in NRM and land rehabilitation could only be accomplished by meeting the near-term survival and production needs of villagers.

The results exceeded original expectations. For example, over 700 hectares of rangeland was improved and properly managed through the project, far exceeding the original goal of 100. Notably, the additional land area was improved on the basis of added community-buy-in and positive leakage, through which additional communities undertook project activities after witnessing the benefits. Community development activities diversified the local production system, thereby easing pressures on marginal lands. Community mobilization and training equipped local people with the capacity to cope with drought.

With improved land management and a more secure environmental and social asset base, communities were able to increase their resilience to climate-related shocks, such as drought. Such resilience-building activities should form the basis of climate change adaptation strategies, as these communities are responding to climate impacts similar to those expected from climate change.

Source: Dougherty, B., A. Abusuwar and K.A. Razik. 2001. Sudan: Community-based rangeland rehabilitation for carbon sequestration and biodiversity. Report of the Terminal Evaluation, SUD/93/G31. UNDP GEF.

Specifically, we are seeking to promote an approach in which adaptation to climate change is rooted in ecosystem management and restoration activities that reduce risks and strengthen resilience of these vulnerable communities.

IV
Vulnerability, Livelihoods and Climate

A stranded ship on the coast of Mauritania. Photo: Olivier Hamerlynck/IUCN – The World Conservation Union

The key goals of adaptation strategies are to reduce vulnerability to climate-induced change and to sustain and enhance the livelihoods of poor people. These strategies consequently need to be rooted in an understanding of how the poor and vulnerable sustain their livelihoods, the role of natural resources in livelihood activities and the scope for adaptation actions that reduce vulnerabilities and increase the resilience of poor people. This is not as straightforward as it sounds, for the effects of climate change are just one of the many factors that influence people's livelihoods. This section develops these ideas further, relating the dynamics of livelihoods to the vulnerabilities that climate change is likely to bring.

Livelihoods and Climate Change

What do we mean by livelihoods? This is an increasingly widely-used concept that, as with the concepts discussed in section 2, can be open to different interpretations. One of the most widely-accepted definitions of livelihoods is:

> *"A livelihood comprises the capabilities, assets (including both material and social resources) and activities required for a means of living. A livelihood is sustainable when it can cope with and recover from stresses and shocks and maintain or enhance its capabilities and assets both now and in the future, while not undermining the natural resource base" (Carney 1998, page 4).*

Central to both this definition and determining the resilience of households to vulnerabilities is the idea of livelihood assets. These are the means of production available to a given individual, household or group that can be used in their livelihood activities. These assets are the basis on which livelihoods are built and, in general, the greater and more varied the asset base the higher and more durable the level of sustainability and security of their livelihoods. There are generally five forms of livelihood assets identified in most approaches:

1. **Natural capital:** The natural resource stock from which resource flows useful to livelihoods are derived. The actual resources available to an individual household reflects the characteristics of the local resource base and the extent to which the household is able to gain access to these resources, which in turn reflects issues of ownership and entitlements as well as the availability of technologies that make it possible to use the resource potentials.
2. **Social-political capital:** The set of social relationships upon which people draw in pursuit of their livelihood. This includes the range of contact networks, membership of groups and organizations, relationships of trust and access to wider institutions of society that are important in the actual operation of livelihood activities and that can be determining in terms of access to markets, credit, government services and many other factors of production.
3. **Human capital:** The skills, knowledge, ability to labour and good health important to the ability to pursue livelihood activities. For individual households, this includes both the quantity (number of productive individuals) and the quality (what these individuals know and how hard they are able to work) of human resources. It includes knowledge and skills learned from formal education and through experience and non-formal learning.

4. **Physical capital:** The basic infrastructure for transport, buildings, water management, energy, and communications and productive capital (tools, machines, etc.) which enables people to pursue the livelihoods. It includes both those that people own and those that they have access to (roads, irrigation systems, telephone networks, etc.) whether provided by government or the private sector (and whether free or paid for).

5. **Financial capital:** The financial resources which are available to people (whether savings, supplies of credit, regular remittances and pensions, social security payments or insurance) and which provide them with different livelihood options. This includes finances (including credit) for investments in new productive assets, for inputs into production and (importantly for our purposes) for responding to the effects of different vulnerabilities, including recovering and reconstructing livelihoods after disasters.

Taken together, these livelihood assets determine much about how livelihoods work, and in particular are the basis for understanding how people will respond to climate-induced vulnerabilities. This in turn means they are (or at least should be) the basis for the development of adaptation strategies. All of these assets are important, but for the poorest and most vulnerable of the world (especially the rural poor), natural resources are of particular significance. This poverty-environment link has been recognized for some time: "predominantly the poor of the world depend directly on natural resources, through cultivation, herding, collecting or hunting for their livelihoods. Therefore, for the livelihoods to be sustainable, the natural resources must be sustained" (Rennie and Singh, 1996, page 16).

This recognition is now reflected in international processes such as the joint submission to the World Summit on Sustainable Development prepared by the World Bank, European Union, UNDP and DFID: "poor people tend to be most dependent upon the environment and the direct use of natural resources, and therefore most severely affected when the environment is degraded or their access to natural resources is otherwise limited or denied" (page 3). It is even reflected in a number of Poverty Reduction Strategy Papers (PRSPs):

> *The poor in Tanzania are heavily dependent on the environment (Tanzania PRSP).*
>
> *Climate conditions… degradation of soil and water resources are major constraints on economic growth and contribute massively to poverty and severe food insecurity (Burkina Faso PRSP).*
>
> *There is a strong correlation between sound natural resource management and poverty reduction (Cambodia PRSP).*
>
> *Environmental protection is of significant relevance to poverty reduction… the poor are disproportionately exposed to the impact of deteri-*

Box 3

Agroecological Roots of Resilience in Honduras, Nicaragua and Guatemala

The human and ecological devastation wrought by Hurricane Mitch in October 1998 served as a stark reminder of Central America's vulnerability to climate-related disasters. Bringing winds of over 180 km per hour and 127 cm of rain in only a week, the storm caused massive floods and landslides. Over 18,000 people were killed (taking into account the missing), and thousands of homes, bridges, roads, water systems, crops and animals were destroyed. Mitch impacted an estimated 6.4 million people in Central America, and while all sectors of the population were affected, the poorest groups suffered the greatest losses. Mitch brought worldwide attention to the disproportionate vulnerability of these groups, highlighting the complex forces that shape their exposure, sensitivity and capacity to cope with sudden shocks and trends. Among these groups, the most vulnerable were those living and farming on hillsides and near riverbanks, people whose livelihoods were based on the vital relationship between social and environmental sustainability.

Owing to unequal land tenure policies and skewed resource distribution, many of Central America's farmers own small plots of land on ecologically-fragile, disaster-prone lands. With little access to credit, land titles and technical assistance to diversify and enhance their livelihoods, these farmers have little incentive to invest in sustainable farming practices. Clear-cutting of forestlands for timber, ranching and farming, and widespread burning have led to massive losses of protective vegetative cover, leaving hillsides barren and unable to absorb or retain water. During Hurricane Mitch, heavy rainfall led to massive runoffs on these degraded hillsides, which carried away tons of topsoil, rocks and vegetation. Debris-choked rivers overflowed

(continued on page 14)

Livelihood assets are the means of production available to a given individual, household or group that can be used in their livelihood activities and, in general, the greater and more varied the asset base the higher and more durable the level of sustainability and security of their livelihoods.

Box 3 (continued)

their banks, causing extensive damage to human and natural systems that lie in their paths.

In the aftermath of Mitch, it seemed that farms using agroecological practices withstood the storm's impacts better than those using conventional farming methods. Using a participatory action research method, the international NGO World Neighbours sponsored a project to compare the impact of Mitch on these two types of farm plots. Based on data collected from Honduras, Nicaragua and Guatemala, they found that overall, farms using agroecological practices such as soil and water conservation, cover cropping, organic fertilizer use, integrated pest management and reduced or zero grazing, were more resilient to erosion and runoff, and retained more topsoil and moisture. The damage from gullies and landslides was equally severe on both types of plots, although many gullies and landslides originated uphill or upstream from the research sites on poorly managed, degraded or deforested slopes. This result reinforced the importance of conserving entire hillside and watershed ecosystems rather than individual plots of land—a holistic approach to resource management that is fundamental to agroecology.

Moreover, agroecology emphasizes the role of sustainable agricultural production in reducing poverty and enhancing livelihoods. Rather than focusing on marginal short-term economic gains from conventional farming methods, longer-term strategies are emphasized in order to maintain the natural resource base and ensure the economic viability of peoples' livelihoods. With a more sustainable and secure asset base, communities are better equipped to deal with sudden shocks and disruptive trends, including climate-related disasters like Hurricane Mitch. As the incidence and severity of these disasters increase as a result of climate change, resilience-building activities, such as those associated with agroecology, will become more important in helping vulnerable communities successfully adapt to their changing environments.

Source: World Neighbours, 2000. Reasons for Resiliency: Toward a Sustainable Recovery after Hurricane Mitch. Tegucigalpa, Honduras: World Neighbours.

> *orating environmental conditions (Armenia PRSP).*

These quotes reflect the situation today in many parts of the world, with 3/4 of the poor in developing countries living in rural areas and deriving much of their income from natural resources (Bojö and Reddy, 2002). With environmental resources playing such a crucial role for a large proportion of the world's population, threats to ecosystem functioning and integrity undermine livelihood security. All the evidence suggests that environmental vulnerabilities are going to significantly increase in the future, in part due to climate change but also because of other forms of resource and livelihoods pressures, unless effective and substantial measures are taken to ameliorate them through adaptation and other strategies.

Livelihoods and Climate Change

How do livelihoods relate to climate change-induced vulnerabilities? The range of vulnerabilities that poor people face in different parts of the world encompasses all aspects of life, with most not directly related to climate change (though many are affected in some way by it). There are many ways to approach the relationship between climate change and vulnerability, but the 2001 IPCC Working Group II report on Impacts, Adaptation and Vulnerability gives insights that are as good a starting point as any. Here we relate the likely changes to vulnerabilities identified in the report to the dynamics of the livelihoods of poor people in different major types of agroecological zones of the developing world. In doing so, we strongly agree with the Working Group II statement that:

> *Populations are highly variable in their endowments [of different capitals] and the developing countries, particularly the least developed countries… have lesser capacity to adapt and are more vulnerable to climate change damages, just as they are more vulnerable to other stresses. This condition is most extreme among the poorest people (IPCC 2001, page 8).*

Sea level rises will displace millions of the poor, with the areas least likely to be protected those where people are poorest. Small island states and low coastal areas and deltas such as southern Bangladesh are most at risk. In many cases, those displaced will have few opportunities to re-establish their lives except in urban areas, where livelihood opportunities are limited without the skills, capital and contacts needed to cope with urban life. Even where people are not physically displaced, rising seas will reduce the natural capital in ecosystems such as coastal fisheries, mangroves and wetlands that are essential to the current livelihood patterns of many poor communities, while the dangers of salination of water supplies will affect these and other coastal communities.

Changes to *temperature and rainfall patterns* (both to averages and to the variability of rainfall) are widely predicted, with many semi-arid parts of the developing world likely becoming even hotter and dryer with even less predictable rainfall. These changes will both directly affect crop yields and will produce changes to ecosystem distributions and species ranges. This will dramatically affect the livelihoods of many poor people, particularly through declining food security and problems with the viability of many livelihood activities, including

livestock raising, fishing and the use of forest products as well as agricultural production. Secondary impacts will likely include increases in urban food prices and greater problems with services such as water supply and sanitation (exacerbating pressures that rapid urbanization will bring) that affect the urban poor.

The changing climate patterns, and especially the increased frequency and/or severity of *extreme events,* will increase vulnerability to natural disasters, both slower-onset ones such as droughts and rapid-onset disasters such as floods and cyclones. These will affect many areas, but semi-arid areas (droughts) and coastal and deltaic regions (floods and storms) are particularly vulnerable. Dangers of erosion, landslides and flash floods will also increase, particularly in many hilly and mountainous areas.

Changing climate patterns and more extreme events will have impacts on new livelihood activities such as from tourism, that will limit diversification of opportunities which, combined with damage to infrastructure and other types of physical capital, will affect the wider range of vulnerabilities (such as limited access to markets) the poor face. The poor social and political capital, along with extremely limited access to financial capital, mean that these communities are least likely to be protected by investments in infrastructure or disaster mitigation and relief systems.

Predicted adverse *health risks* will affect the poor in particular throughout the developing world. These risks are in particular those associated with water-borne (such as dysentery or cholera) vector-borne (such as malaria) diseases as well as heat stress morbidity and mortality. These health impacts pose a double jeopardy for poor people's livelihoods: the contribution of key productive members of the household is lost and the cost of health care is expensive and time consuming. Such risks will be widespread, but the dearth of medical care systems in many more remote, poorer areas of Africa and Asia in particular mean that the poor in these areas are the most vulnerable to these risks. The deterioration of the availability or quality of water supplies in many areas (again due to wider resource stresses that climate change will exacerbate) will significantly increase many of these health risks, while poorer nutritional states caused by declining food security will make many poor people more vulnerable to the effects of diseases when they do strike.

The increased danger of damage to crops, livestock and gathered plants and animals from *pests* will be similar in distribution and impact to those of increased health risks, but will be exacerbated by the risks of physical damage caused by floods, droughts and storms. Although the development of more pest-resistant or drought-tolerant crop strains may limit these risks, many poor rural communities are far less able to gain access to such new varieties (which in any case make them more dependent upon external inputs that can be unreliable in their availability), placing them at an even greater disadvantage in agricultural markets.

Finally, the IPCC report stresses the likely impact of climate change on *financial and insurance systems*. These will indeed be dramatic on a global scale, but very few poor people are able to gain access to these systems so that the direct effects upon them may be limited. This does not mean that they will be unaffected, however, as the strains these systems will experience, along with the declining value of many of their assets, mean that poor people are even less likely to be able to gain access to the capital and credit systems that they so vitally need. Innovative financial solutions are essential in any program to assist the world's poor to adapt to the impacts of climate change.

Health impacts pose a double jeopardy for poor people's livelihoods: the contribution of key productive members of the household is lost and the cost of health care is expensive and time consuming.

Top: China Floods (August 1999). Photo: Jane Martin/ International Red Cross

Bottom: Cows grazing in the floodplain of the Inner Delta of the Niger in Mali. Photo: Ger Bergkamp/IUCN – The World Conservation Union

V
Adaptation as a Process: Issues and Challenges

Vietnam Mekong Delta floods (November 2000). Photo: Viet Tanh/International Red Cross

The discussion so far has shown that peoples' livelihoods are dynamic, complex and variable in character, with the poor in particular responding with the means they have available to the vulnerabilities they face. The development of adaptation strategies to reduce the impacts of climate change on these people should reflect these dynamics of peoples' livelihoods, working in particular to reduce the vulnerabilities they face and to strengthen their resilience. This can only be achieved where adaptation is seen as a process that is itself adaptive and flexible to address the locally-specific and changing circumstances that are the reality of the lives of the poor.

What does this mean? The first point is that adaptation is not something that is "done" to or for people; it is something that they do for themselves and that may (or may not) be supported by external agencies. This is the heart of the logic presented here. Whether or not this is "autonomous" or "planned" adaptation is hard to say, as it is not centrally orchestrated, but individuals and communities often take very conscious and planned steps to adapt the patterns of their lives and livelihoods to reflect immediate or anticipated changes to climate conditions (including increases to variability and extreme events that can add significantly to vulnerability).

The extent and significance of this varies according to how vulnerable people are and how significant climate, and natural resources affected by climate, is to their livelihoods. As such, while the IPCC (2001) statement that "those with the least resources have the least capacity to adapt and are the most vulnerable" (page 8) may be true, it should also be recognized that those with the least are the most likely and the most motivated to take conscious adaptation actions precisely because they are the most vulnerable. Moreover, the actions that they take will be constrained by their limited assets and capabilities, but they will also be the most appropriate given the specific local manifestations of climate change impacts and potentials to respond to them. The point of departure for any adaptation process must consequently be what is already happening (or is likely to happen) among the people who are the target of the process: the poor and the vulnerable.

Their actions can and should be supported by external agencies, aiming to either increase their resilience or reduce the vulnerabilities that they face. This may include major projects, like large-scale infrastructure such as dams or coastal defenses, which are largely financed by others and in which poor people are among many stakeholders. It may also include changes to the framework of laws and policies that govern different aspects of natural resource management, investment incentives, access to technologies, services or markets, disaster management and relief and many (perhaps all) spheres of government. It may include changes to institutions and to governance conditions that affect the lives of the poor and dictate the channels through which they interact with external agencies. It almost certainly will include actions to build up the asset base of the poor, to sustain existing—and open up new—livelihood opportunities and to help forge stronger and more cohesive community-level institutions that are the basis for future adaptation measures.

Adaptation should also not be seen in isolation. One of the keys to catalyzing adaptation will be to mainstream it into wider development and other

processes, rather than separating it into special measures funded separately and executed by separate agencies. The key to adaptation is to ask what is being adapted (and why, of course), then to see how much and in what direction changes to existing development trajectories need to move. This needs a careful analysis of patterns of development and natural resource management, with particular focus on how sensitive these are to existing and potential future changes to the climate. For larger countries in particular, this needs to be spatially disaggregated so that it can be linked effectively to ecological variety. It also needs to be targeted for equity: that is, linked to the distinctive needs and potentials of poor communities. Understanding what these are should reflect the livelihoods approach set out above, with in particular a focus on sustaining and improving the asset base of poor people and strengthening their resilience to external vulnerabilities.

In developing this approach to adaptation, particular attention needs to be paid to the disconnections: the gaps between local and national processes, between formal and informal patterns of economic activity and management of resources. These gaps are characteristic of much of life in many parts of the world, and are found particularly in many poor communities where wider institutional weaknesses are found. It necessitates a strong focus on institutional capacity development in adaptation process with, in particular, activities to ensure the effective participation and empowerment of poor communities in key decisions in

Box 4

Watershed Restoration and Development in Maharashtra State, India

In the semi-arid region of Maharashtra State, India, the Watershed Organization Trust (WOTR) is assisting poor, rural communities to increase their livelihood security by supporting watershed restoration projects. With rain-dependent livelihood systems, these communities survive on limited water supplies to feed their crop and livestock production and cottage industries. The combination of recurring droughts and human pressures on the surrounding land has degraded watersheds. Barren and eroded lands are unable to absorb and retain water, thereby accelerating surface runoff and soil erosion and inhibiting ground water recharge. The resulting decrease in soil fertility and water availability has created extremely water-stressed communities vulnerable to the impacts of climate change. WOTR's work seeks to assist these communities alleviate their poverty and regenerate the watershed environments upon which they depend.

Conducted on a micro-catchment basis, WOTR's work is community-driven and characterized by participatory planning, implementation, and management and a self-assessment process for monitoring and evaluation. Upon approaching WOTR with a proposal for action, communities agree to undertake a series of rigorous watershed restoration measures designed to regenerate and conserve micro-catchments. These include:

1. Soil, land and water management, e.g., trench building to control erosion, improve soil fertility and enhance groundwater recharge;
2. Crop management;
3. Afforestation; rural energy management, e.g., ban on tree-felling; planting shrubs and grasses to meet household fuel needs; and

(continued on page 18)

Continuous contour trenches, Chincholi, India (December 1998). Photo courtesy of WOTR

Box 4 (continued)

4. Livestock management; pasture/fodder development, e.g., grazing restrictions leading to the natural regeneration of grasses and shrubs.

To simultaneously lessen human pressures on the micro-catchment, a set of community development measures are undertaken to enhance, diversify and secure livelihoods. Such measures include:

5. Community organization through the formation of "Village Self-Help Groups," which work with WOTR to build "social capital" and guide the restoration process;
6. Micro-lending, supporting cottage industries for supplemental income; and
7. Human resource development, e.g., training on project management, new fruit crop or animal husbandry techniques.

These measures represent a blending of "new" or "external" techniques with traditional knowledge in order to ensure both effective and local ownership.

The results of this approach have been laudable. Reduced barren soil cover, improved soil moisture regimes, increased well water levels, biomass regeneration, and dramatic increases in fodder availability, milk production, and vegetable farming are some of the results reported by participating villages. Coupled with micro-enterprise development and an increase in savings groups, these results have translated into more secure livelihoods, diversified asset bases and reduced exposure to climate-related shocks. In short, drought-prone communities have been able to make themselves less vulnerable to drought. In the face of projected increases in extreme events, this reduced vulnerability will improve their capacity to adapt to climate change.

Source: http://www.wotr.org

these processes. Three particular challenges exist in developing institutions to support adaptation processes:

1. Changes to laws and policies must enable place-specific actions, something that their generic character makes particularly challenging. These changes must both direct the actions of government institutions and create packages of incentives and regulations that catalyze actions within society as a whole.
2. How can successful local-level actions, often developed under controlled conditions and with intensive external inputs, be scaled up to a level where they can make an impact at national and global levels?
3. How can we ensure that they are effectively targeted at the needs and interests of the poor, and in particular that the emerging institutions represent marginalized peoples and enhance equity in the development of adaptation processes? The history of the impact of many major infrastructure projects on the poor gives salutary lessons here.

This institutional focus should not be at the expense of effective action where needed, however. There is always a fear that nebulous and long-term processes such as "institutional development" can delay action or be an excuse for inaction. This must not be the case, so the approach to adaptation advocated here is based on the idea of looking for "win-win" solutions: actions that serve immediate needs and bring immediate benefits and that also contribute to the longer-term process of capacity-building and structural change. This may sound optimistic, even unrealistic, but if adaptation processes are rooted in the reduction of existing vulnerabilities and increasing the resilience of poor people to these vulnerabilities, then this will bring immediate rewards and will also strengthen their capability to deal with future, even greater threats from climate change.

There are many such win-win approaches, with different ones appropriate for different places. The conservation of mangrove belts, coral reefs, wetlands and forests through community-based sustainable management are examples of where immediate benefits and long-term capacity development go hand in hand, as are sustainable improvements to water management and availability, improvements to infrastructure such as roads, and even improvements to environmental health conditions that will mitigate potential climate change impacts. There is a need to document models of good practice of such approaches, including barriers to action and conditions for their success, and the processes through which these lessons can be disseminated on a scale sufficiently large to make an impact. Doing so is one of the objectives of the IUCN/IISD/SEI project, and it is hoped that the approach set out here will catalyze wider thinking on this relationship between contemporary development, based on sustaining and enhancing the livelihoods of the poor, and the process of adaptation to climate change.

VI
A Strategic Framework for Adaptation

The approach set out here is that adaptation should be rooted in addressing the climate-induced vulnerabilities that poor people face. This can be achieved by a combination of structural and non-structural measures that reduce vulnerabilities and/or increase the resilience of poor people. A key is that action is needed now. The poor of the world are already vulnerable. We cannot afford to wait.

But at the same time, we recognize the problems associated with the precautionary principle, where future threats are mitigated by present investments, but at a price that is the opportunity cost of these investments. For poor people and poor countries, there are many urgent needs, many immediate problems that demand attention and investment. Adaptation approaches should consequently seek out win-win options whereby actions today will meet immediate needs and will also create the basis for reducing future vulnerabilities and the capacity for more effective adaptation as the impacts of climate change bite. For IUCN, IISD and SEI, these actions should include local-level ecosystem management and restoration activities that promote sustainable livelihoods in poor communities.

How can these measures be identified? What is the process through which the world's poor can be assisted to adapt to the threats of climate change? A three-stage process, each with several steps, can form the basis for developing adaptation strategies:

1. Understanding Vulnerability-Livelihood Interactions

- Identify the main climate-induced vulnerabilities that affect poor communities in different places and relate these to the wider vulnerabilities they face and to the dynamics of their livelihoods and their assets base, with particular attention paid to environmental resources.
- Assess the adaptation measures that poor people already take and relate this to their resilience to withstand climate-induced vulnerabilities.

Gully plugs, Nagzari, India (October 1999). Photo courtesy of WOTR

- Identify prevailing forces and conditions that serve as barriers to action or enabling factors in the implementation of new policy measures.
- Determine, through participatory processes, the needs, priorities and capabilities of different stakeholder groups in relation to adaptation to climate-induced vulnerabilities.

2. Establishing the Legal, Policy and Institutional Framework

- Diagnose existing laws, policies and regulatory systems in relation to their effects on climate-induced vulnerabilities, including agriculture, forestry, disaster management, water and all other relevant sectors.
- Define the institutional processes through which adaptation measures are implemented, including where decision-making authority lies at national, local and intermediary levels and the links between these levels.

Nala Bund, Chincholi village, India (October 1997). Photo courtesy of WOTR

3. Develop a Climate Change Adaptation Strategy

- Identify potential reform measures and investment options to enhance the resilience and reduce the vulnerability of poor people to climate variability and change and enhance their access to ecosystem services. This should include both structural and non-structural measures, and the financial means and the institutional changes necessary to implement successful adaptation processes.
- Based on participatory processes, prioritize the potential reforms and investments taking into account the financial, knowledge, institutional and other resources available to implement them.

VII
Seizing the Opportunity

We have argued the case that there is a new window of opportunity to utilize the concept of adaptation as a means to bring together, harmonize and reinvigorate the experts, the programs and the stakeholders in the diverse fields of disaster management, climate and climate change, environment and natural resources management, and poverty reduction. If a strong convergence of these interests can be brought together and marshaled into a new initiative, there is a prospect of significant payoff, and an important contribution to the intractable problems of sustainable development.

This paper has tried to succinctly elaborate upon some of the main concepts and processes involved, and provide a conceptual basis for action. Specifically, we have tried to present a rationale for adopting an adaptation approach that reduces climate-related vulnerability through ecosystem management and restoration activities that sustain and diversify local livelihoods. This calls for a greater emphasis on micro-level approaches to vulnerability reduction and a closer collaboration between disciplines, agencies and sectors to scale up these activities and integrate them into emerging policy frameworks. It is argued here that further discussion of this type of approach is essential among all stakeholders involved in the adaptation debate. It reflects our conviction that adaptation can make a vital contribution to poverty reduction now—indeed, that real, substantial adaptation efforts will only happen when they can and do make such a contribution, as without this priorities will (should?) always lie elsewhere. This is why it is essential to bring together people and organizations connected with the four areas of climate, disasters, resource management and poverty reduction, for all have a vital role to play and their collaboration needs to start with better mutual understanding. Of course, there is plenty of scope for posturing and token gestures (some of which may even be quite substantial—the gestures that is, not the posturing).

But if we are really to see adaptation on the scale needed and effectively targeted to the specific needs and capabilities of poor people, then this link is essential and the time to act is now.

Vietnam Mekong Delta floods (November 2000). Photo: Viet Tanh/ International Red Cross

VIII
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Appendix

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Livelihoods and Climate Change

24

From the Preface:

"While government representatives negotiate international policy frameworks to limit greenhouse gas emissions, and researchers continue to debate the science and impacts of climate change, climate-induced changes to physical and biological systems are already being detected. Retreating glaciers, longer growing seasons, shifting eco-zones and thawing permafrost have all been observed in different regions around the world. Compounded by human pressures and modifications to the environment, these changes threaten to further entrench global inequities, as those with the least stand to suffer the most. There is a pressing need to develop response measures that will address current development disparities and protect vulnerable communities from the longer-term impacts of climate change."

Climate Change, Vulnerable Communities and Adaptation

IUCN The World Conservation Union

SEI Stockholm Environment Institute Boston Centre

iisd International Institute for Sustainable Development / Institut international du développement durable

inter cooperation
Natural Resource Management
Rural Economy
Local Governance and Civil Society