

Sustainable Livelihoods & Climate Change Adaptation

**A Review of Phase One Activities for the Project on,
“Climate Change, Vulnerable Communities
and Adaptation”**

February, 2004

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Acronyms and Abbreviations

APF	Adaptation Policy Framework
COP	Conference of the Parties
EM&R	Ecosystem management and restoration
GCM	Global Circulation Model
GDP	Gross Domestic Product
GEF	Global Environmental Facility
Intercooperation	Swiss Organisation for Development and Cooperation
IPCC	Intergovernmental Panel on Climate Change
IISD	International Institute for Sustainable Development
IUCN	The World Conservation Union
LDC	Least Developed Country
NAPA	National Adaptation Programme of Action
NGO	Non Governmental Organization
NRM	Natural Resource Management
SDC	Swiss Agency for Development and Cooperation
SEI-B	Stockholm Environment Institute – Boston Center
SL	Sustainable Livelihoods
TAR	Third Assessment Report of the IPCC
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change

Executive Summary

The rising toll of today's climate-related disasters foreshadows the likely adverse future impacts of climate change and signals an urgent need to minimize current vulnerabilities. For poor communities living on fragile and degraded lands, actions must address the deteriorating environmental conditions that undermine their livelihoods and capacity to cope with disasters. Protecting and enhancing the natural services that buffer communities from climate impacts and provide them with a range of assets for coping with shocks will not only address immediate development priorities, but improve local capacities to adapt to climate change.

Recognizing this link between climate-related vulnerability and natural resource / ecosystem management, IUCN, IISD, SEI-B and Intercooperation have been working together on an integrated approach to climate change adaptation that draws from four communities that have long been tackling the issue of vulnerability reduction: disaster risk reduction, climate and climate change, environmental management and poverty reduction. These communities have been brought together through the establishment of a Task Force on Climate Change, Vulnerable Communities and Adaptation, which has been guiding project developments for the last 2 years. Working together with the Task Force, the partners developed a project structure and work program to inform and influence how the international community invests in adaptation.

In order to meet its stated goal and objectives, the project was divided into two main phases of activity. Phase One (December 2001 – December 2003) focused on researching and communicating the Task Force's approach to adaptation, forming the basis of Phase Two (January 2004 – December 2005), which would focus on operationalizing adaptation. This report is a summary of the activities conducted in Phase One, highlighting the lessons-learned and the basis for launching Phase Two in early 2004.

Phase One sought to develop and promote the Task Force's approach to adaptation by meeting three main objectives: (1) Establishing the rationale for the project's approach to adaptation, (2) Collecting supporting evidence for this approach, and (3) Communicating the value of this approach to broader decision-making audiences and policy-processes. This was achieved through a work programme that included a conceptual framework paper, Task Force consultations, in-depth case studies, desk-based assessments, the production of Information Papers and participation in a range of meetings and events.

While the Task Force meetings and conceptual framework paper were used to establish and articulate the project's particular approach to climate change adaptation at the outset, as this approach was further developed it eventually changed to one which emphasized sustainable livelihoods (SL), rather than simply natural resource or ecosystem management. While the importance of NRM and EM&R continued to be stressed in project activities, it was done so in recognition of the full range of mutually-reinforcing activities (i.e. economic and community development, capacity building, education, etc.) that help the poorest and most vulnerable adapt to climate change.

Collecting information on how SL activities – and in particular EM&R components of SL activities – reduce community vulnerability to climate hazards was done through

2 complimentary processes: (a) in-depth case studies that involved empirical research and field visits, and (b) desk-based assessments of ongoing or completed SL/EM&R interventions that successfully reduced community vulnerability to climate impacts. The in-depth case studies confirmed that communities were better able to cope with climate-related hazards as a result of a SL/EM&R intervention, while the desk-based assessments demonstrated that climate change adaptation is already taking place around the world and can be better supported by heeding lessons-learned from projects past.

The outreach and communications strategy for the project focused on participating in international meetings to promote the Task Force's approach to adaptation, as well as developing a number of 'information papers' that demonstrated the successes and lessons-learned from community-based vulnerability reducing projects around the world.

After two years of project activities, the results of Phase One could be broadly summarized as:

- a) The establishment of an institutional platform for bringing together the fields of disaster risk reduction, NRM, climate change action and poverty reduction;
- b) The development of a theoretical basis for promoting EM&R / SL activities as climate change adaptation measures;
- c) A growing portfolio of SL / EM&R projects that reducing community vulnerability to climate hazards;
- d) Lessons-learned on how to support the implementation of vulnerability-reducing projects in different communities; and
- e) A network of institutions interested and/or involved in SL / EM&R approaches to climate change adaptation.

These activities from Phase One also yielded a range of lessons-learned for adaptation interests at different levels: (a) the field project level; (b) the national policy level; and (c) the 'adaptation community' level.

Building upon the results and lessons from Phase One, IUCN, IISD, SEI-B and Intercooperation are looking forward to operationalizing adaptation in their next phase of project activity. Phase Two will include activities for developing decision-making toolkits on adaptation, implementing these toolkits in different contexts, and continuing their outreach and communications strategy. Combined, these activities will seek to expand constituencies and operational capacities for adopting an integrated approach to climate change adaptation based on the livelihoods of the poorest and most vulnerable communities around the world.

1. Introduction

Climate variability and extreme events have devastating impacts on communities, causing loss of life, human suffering, and the destruction of the infrastructure and natural resource base upon which many livelihoods depend. Economic losses from 'weather-related' disasters have skyrocketed, with an estimated US\$ 432.2 billion loss reported for the 1990s, up from US\$ 128.4 in the 1980s.¹ The same goes for costs associated with humanitarian relief. For developing countries, the impacts of these events place tremendous pressure on their economies, creating a spiral of debt and setting development efforts back, sometimes by decades.

Forebodingly, the rising toll of today's climate-related disasters foreshadows the likely adverse future impacts of climate change. For those who are already vulnerable to climate impacts, this condition will only be exacerbated, as more frequent and intense extremes threaten to inflict even greater harm. Responding to climate change must therefore include measures that minimize current vulnerabilities and increase resilience to anticipated changes. For the poorest and most vulnerable communities living on fragile and degraded lands, such as steep hillsides, drylands and low-lying coastal areas, these response measures must address the deteriorating environmental conditions that undermine their livelihoods and capacity to cope with disasters. Diminished ecosystem buffering capacities and dwindling natural resource bases can translate into greater exposure to climate-related hazards and fewer resources from which to draw upon during times of scarcity and crisis.

Recognizing this intimate link between disaster vulnerability natural resource management, IUCN, IISD, SEI-B and Intercooperation are working together to strengthen the role of ecosystem management and restoration activities in reducing the vulnerability of poor communities to climate-related disasters and climate change. Protecting and enhancing natural services through activities such as watershed restoration, mangrove reforestation and rangeland rehabilitation can help these communities secure their livelihoods and improve their capacity for adapting to the impacts of climate change.

2. Background & Rationale

2.1 Climate change impacts and vulnerability

In its Third Assessment Report (TAR), the Intergovernmental Panel on Climate Change (IPCC) concluded that the globally averaged surface temperature increased $0.6 \pm 0.2^{\circ}\text{C}$ in the 20th century. This warming trend is expected to persist with a 1.4 to 5.8°C increase predicted for the current century. Warming will vary by region and be accompanied by significant changes in precipitation, sea level rise and changes in the frequency and intensity of some extreme events. These changes will impact natural and human systems directly or in synergy with other determinants to alter the productivity, diversity and functions of many ecosystems and livelihoods around the world. Yet these impacts will not be distributed or felt uniformly, as certain ecosystems and populations exhibit higher degrees of vulnerability.

The poor are already vulnerable to climate risks. Settlement on marginal or unstable lands, such as steep slopes or floodplains, heightens their exposure to the impacts of

¹ Economic loss figures from the Geo Risks Research Department at Much Re, January 30 2003.

climate hazards. Heavy dependence on ecosystem services can place their welfare and survival at the mercy of environmental conditions. As the availability and quality of natural resources decline due to natural and human-induced pressures, so does the viability and security of their livelihoods. Limited capacities and resources for responding to stresses such as droughts and floods, constrain their ability to meet basic needs and move out of poverty.

Climate change therefore threatens to exacerbate existing vulnerabilities and create new ones for the poor. These new vulnerabilities may include loss of livelihoods through increased extreme events, displacement by sea-level rise and coastal inundation, food insecurity due to changes in temperature and rainfall patterns and falling crop yields, increasing morbidity and mortality associated with a rise in water- and vector-borne diseases, and a deepening poverty cycle associated with diversion of livelihood assets towards recovery and coping, to name a few. The impacts of climate change may further entrench development disparities, as those with the least stand to suffer the most.

2.2 Responding to climate change: The case for community-based adaptation

Studies have confirmed that climate change is happening, and societies must take the necessary steps to prepare for and adjust to the impacts. From the beginning of climate negotiations, it has been accepted that adaptation has some role to play in countries' responses to climate change. While it has been difficult to define precisely what role adaptation should play, it has become increasingly apparent that all countries will need to develop thorough and sustainable adaptation strategies if the impacts of climate change are to be effectively addressed.

Much of the early work on adaptation focused on identifying potential impacts of future climate change using General Circulation Models (GCMs). But the models proved to be extremely limited in telling us about regional impacts of climate change and therefore did not really provide a basis for catalyzing immediate and practical action on local level adaptation. Moreover, the prevailing emphasis in adaptation assessment and planning was, and to a certain degree continues to be, on large-scale, centralized, technical measures. While these will undoubtedly figure prominently in many national adaptation strategies, they are often removed from local realities and therefore may not be able to yield the sort of vulnerability reduction that is most needed by marginalized, high risk groups – i.e. the poor.

A new generation of research is looking at vulnerability and adaptation within **current climate contexts**, since communities who are vulnerable to today's climate stresses will only become more vulnerable as global temperatures rise. But understanding current climate-related vulnerability also involves looking at **existing coping and adaptive strategies** for responding to climatic impacts. Just as climate variability and extremes are nothing new, humans have long been coping with these and other environmental stresses. When droughts strike or floodwaters rise, individuals, households and communities *cope*, using creative responses to deliver them through the incident with minimal loss and suffering, ideally returning to a pre-impact state. Since climate change threatens to introduce climatic conditions that fall outside the range of current coping experience, adaptation is needed. Quite naturally, many initial forms of adaptation will be modified versions of measures that are used to cope with current climate variability and extremes.

It follows then that adaptation must start with actions that target current vulnerabilities and build upon community-based experiences in coping with these vulnerabilities.

2.3 Reducing vulnerability through sustainable livelihoods

If reducing current vulnerabilities is the starting point of adaptation, then poverty reduction is essential to the process, since poverty is both a condition and determinant of vulnerability. Yet poverty reduction requires an understanding of how local livelihoods are conducted and sustained, as the assets and capabilities that comprise peoples' livelihoods often shape poverty and the ability to reduce it. By understanding the dynamics of poor people's livelihoods, we can begin to understand how they will be affected by climate change impacts, how they might respond with the resources they have, and how these conditions can be reflected and built upon for successful adaptation strategies.

Given the reliance of the poor on environmental services for their livelihoods, a central element of this adaptation approach should be ecosystem management and restoration activities such as watershed rehabilitation, agroecology, and forest landscape restoration. By protecting and enhancing the natural services that support livelihoods, vulnerable communities can maintain local safety nets and expand the range of options for coping with disruptive shocks and trends. This combination of a secured natural resource base, reduced exposure to natural hazards and diversified livelihood activities can increase community resilience to future threats, including climate change. In fact, this approach to adaptation has the advantage of meeting immediate development needs while contributing to longer-term capacity development that will create a basis for reducing future vulnerabilities.

3. The IUCN, IISD, SEI-B and Intercooperation Project on Climate Change, Vulnerable Communities and Adaptation

Recognizing an urgent need to develop adaptation strategies based on current vulnerabilities and peoples' livelihoods, IUCN, IISD, SEI-B and Intercooperation have been working together on an international research and policy initiative on Climate Change, Vulnerable Communities and Adaptation.

3.1 Project Origins

The project was originally conceived as a non governmental response to the emergence of adaptation as the leading issue in the global climate change debate. The aim was to inform and influence how the international community invests in adaptation by promoting an integrated approach that draws from four communities that have long been tackling the issue of vulnerability reduction: disaster risk reduction, climate and climate change, environmental management, and poverty reduction. Bringing these communities together to share their experiences and forge a common approach to vulnerability reduction in the face of climate change represented a unique opportunity for institutional and trans-disciplinary collaboration.

The institutional collaboration consists of organizations that bring their own set of technical, scientific, research and policy strengths: **IUCN** with their expertise in

biodiversity conservation and linking field level actions with global policy processes; **IISD** with their experience in sustainable development research and policy analysis; **SEI-B** with their extensive knowledge in environmental management and economics; and **Intercooperation**, with their operational expertise in natural resource management and rural development in tropical countries and countries in economic transition.

The trans-disciplinary approach of the project was formalized through the establishment of a **Task Force on Climate Change, Vulnerable Communities and Adaptation** (Annex 1). Comprised of 15 experts from the fields of disaster risk reduction, climate change action, biodiversity conservation and poverty alleviation, the Task Force was formed to guide the initiative and identify entry-points into emerging policy processes. It met for the first time in November 2001 and set in motion an initial work program that would clarify the conceptual foundations of the project and communicate them to broader constituencies. With this endorsement, project partners developed a research, advocacy and policy-relevant work program that included case studies, project assessments, information papers, and participation in international meetings.

3.2 Project Goal and Objectives

The overall goal of the partnership project was:

To strengthen the use of ecosystem management and restoration (EM&R) activities in reducing the vulnerability of communities to climate-related hazards and climate change.

Partners hoped to achieve this goal by meeting the following specific objectives:

1. Identify successful ecosystem management and restoration actions that reduce the vulnerability of communities to climate-related disasters and climate change;
2. Enhance the role of these activities by identifying barriers to action, conditions for success and policy options;
3. Mobilize and expand constituencies and operational capacities for adopting and implementing this approach; and
4. Promote the integration of this approach into emerging policy frameworks and strategies on disaster reduction, climate change action, biodiversity conservation and poverty alleviation.

In order to meet the above goal and objectives in a thorough yet efficient manner, the project has been divided into two main phases of activity:

1. Phase One (December 2001 – December 2003): has focused its activities on the first two objectives by researching and communicating the Task Force's approach to climate change adaptation. This has been achieved through case studies and assessments of resilience-building projects from

around the world, as well as a targeted communications and outreach strategy.

2. **Phase Two (January 2004 – December 2005):** will build upon the achievements of Phase One and focus on the last two project objectives by operationalizing the Task Force's approach to climate change adaptation. This will be achieved through efforts to design and implement projects in communities vulnerable to climate risk as well as actions to assist local policymakers in supporting and integrating these projects into national adaptation strategies and other emerging policy frameworks.

The remaining sections in this report offer a summary of the activities conducted in Phase One, highlighting the lessons-learned and the basis for launching Phase Two activities.

4. Phase One

With a broad endorsement and project structure from the Task Force, as well as funding from the Swiss Agency for Development and Cooperation (SDC), the project partners set out to research and advocate a climate change adaptation approach based on poor people's livelihoods, which would include a strong emphasis on natural resource and ecosystem management activities. An initial project work program was developed to lay the foundations for operationalizing the Task Force's approach to climate change adaptation.

4.1 Purpose of Phase One

The purpose of Phase One was to establish the intellectual foundations of the project, identifying its institutional niche within broader climate change adaptation debates and creating footholds in relevant policy processes. In other words, given the growing interest in climate change adaptation and the range of methodologies being promoted by different agencies, IUCN, IISD, SEI and Intercooperation sought to develop and promote an adaptation approach that drew from their respective institutional strengths.

This translated into a work program with 3 main objectives:

- a) **Establishing the project's unique approach to climate change adaptation:** clarifying and developing the rationale for promoting ecosystem management and restoration activities to reduce vulnerability to climate hazards;
- b) **Collecting supporting evidence for this approach :** making the case for the project's approach to climate change adaptation by gathering information on how ecosystem management and restoration activities can reduce community vulnerability to climate hazards and climate change; and
- c) **Communicating the value of this approach:** building awareness and support for the project's approach to climate change adaptation by conveying the merits of ecosystem management and restoration activities in facilitating adaptation to broader decision-making audiences and policy processes.

4.2 Activities for Phase One

The project activities undertaken in Phase One (and their supporting on-line documents or coverage) are summarized in the table below:

Phase One objective	Corresponding Phase One Activity
Establish the project's unique approach to climate change adaptation	<ul style="list-style-type: none"> - Background paper http://www.iisd.org/pdf/2002/envsec_cc_bkgd_paper.pdf - Task Force meetings #1: http://www.iisd.org/pdf/2002/envsec_tf_mtg_report.pdf #2: http://www.iisd.org/pdf/2003/envsec_mtg2_report.pdf - Conceptual Framework paper http://www.iisd.org/publications/publication.asp?pno=529
Collect supporting evidence for this approach	<ul style="list-style-type: none"> - In-depth case studies - Desk-based assessments - Ongoing research into partner project portfolios
Communicate the value of this approach to broader constituencies	<ul style="list-style-type: none"> - Project brochure http://www.iisd.org/publications/publication.asp?pno=462 - Project website www.iisd.org/natres/security/ccvca.asp - Participation in international meetings (10 meetings) http://www.iisd.ca/climate/sb16/enbots/jun11.html http://www.iisd.ca/linkages/climate/cop8/enbots/28oct.html - Information Papers #1: http://www.iisd.org/publications/publication.asp?pno=593 #2: http://www.iisd.org/publications/publication.asp?pno=594 #3: http://www.iisd.org/publications/publication.asp?pno=595 - CoP 9 Synthesis Report

4.2.1. Establishing the project's approach to adaptation

Establishing the project's particular approach to climate change adaptation was achieved primarily through consultations with the Task Force, which was convened twice over the course of Phase One. In the first meeting, the Task Force helped to clarify the scope, methodological framework and initial work program for the project, while the second meeting focused on identifying the information needed to support the project's message, as well as the target audience and communications strategy.

In order to define, articulate and promote the project's approach to adaptation, a conceptual framework paper was developed by several Task Force members. This document described a common platform for bringing together the different

communities represented on the Task Force to develop an alternative approach to climate change adaptation – i.e. a framework for vulnerability reduction based on the livelihoods of the poor and most vulnerable people, highlighting the importance of ecosystem management and restoration activities. In so doing, the paper also situated the project within ongoing adaptation activities and processes, identifying the niche it hoped to fill.

At the very core of the Project's approach was the belief that protecting and enhancing the natural environment – through natural resource management (NRM), and/or ecosystem management and restoration (EM&R) activities – was an important, and oftentimes undervalued, aspect of reducing community vulnerability to climate variability. Vulnerability reduction was achieved not only through preserving or enhancing the buffering capacity of natural systems, thereby reducing community exposure to certain hazards (i.e. mangrove forests protecting against storm surges, steep slope forests against landslides, etc.), but also by contributing to the productivity and security of local livelihoods. The more productive and secure a livelihood, the better it can withstand and recover from climate-related shocks and eventually adapt to climate change.

Over time, project activities began stressing the latter livelihood component of vulnerability reduction, which led to a gradual shift in focus within the project. Emphasis was no longer limited to NRM or even the broader approach of EM&R, but was expanded to include a broad range of activities that reduce vulnerability – i.e. sustainable livelihoods (SL) activities. The SL approach sees poverty as vulnerability to shocks, and seeks to reduce vulnerability by building on the livelihood assets of households, increasing their access to a blend of assets and gradually building household resilience. While NRM and EM&R activities are an important part of the SL approach, they are buttressed by a number of other separate but related activities that address financial, economic and community development needs.

This change in focus does not signal a change in project goal and objectives, however. Project partners are still committed to strengthening the role of NRM / EM&R activities in reducing vulnerability to climate-related disasters and climate change. Instead this commitment will be carried out in recognition of the full range of mutually-reinforcing activities that help the poorest and most vulnerable adapt to climate change. What's more, the SL approach also captures some of the other aspects of adaptation that the partners seek to promote – that is the bottom-up, people-centered approach that builds upon existing strengths and experiences. The NRM/EM&R component of SL activities will therefore continue to be emphasized and communicated through project activities.

4.2.2. Collecting supporting evidence of the project's approach to adaptation

Collecting information on how SL/EM&R interventions reduce community vulnerability to climate hazards was done through 2 processes: (a) in-depth case studies and (b) desk-based assessments. The former involved empirical research and field visits, where researchers employed a multi-stakeholder participatory methodology to measure community vulnerability/resilience to climate-related impacts with and without a particular intervention. In short, the case studies confirmed that communities were better able to cope with climate-related hazards as a result of a SL/EM&R intervention. Apart from restoring the physical environment and increasing its capacity to buffer the impacts of droughts and floods, production systems were

diversified and local capacity was built, thereby reducing pressure on natural resources and security livelihoods. The case studies are summarized in Annex 2.

The second information-gathering process, which sought to compliment the in-depth case studies, was the use of short desk-based assessments to glean lessons-learned from ongoing or completed SL/EM&R interventions that successfully reduced community vulnerability to climate impacts. By highlighting more experiences in vulnerability reduction and resilience-building, these assessments also emphasized that climate change adaptation is already taking place around the world and should therefore be supported and expanded by governments and institutions. Summaries of some of the assessments are presented in Annex 3.

Implicit in the desk-based assessments was the message that climate change adaptation does not necessarily require large investments in new development interventions, as there are already a wide range of activities that have been tried and found effective in lowering vulnerability to current climate stress. If the most urgent goal of adaptation is to create resilience among the most vulnerable people, one of the most effective means of achieving this – and a means that deserves greater attention and support within the adaptation process – is through ecosystem management and restoration, as demonstrated in the examples above.

4.2.3. Communicating the project's approach to broader audiences

The project partners developed an outreach and communications strategy to raise awareness and try to inform policy processes. In addition to launching a project website and producing a project brochure, various members of the Task Force and Project Team participated in a wide range of international meetings. These meetings ranged in disciplinary focus and level of participation – from organizing a session in disaster risk reduction, to presenting on a panel related to global water issues, to hosting side events at the UNFCCC meetings – in order to reach a broad range of constituents.

Moreover, partners developed a series of 'information papers' as their primary communications tool. Drawing from Phase One activities, these papers offered summaries of specific examples of projects from around the world where sustainable livelihoods measures reduced the vulnerability of poor communities to climate stresses. Papers were organized thematically according to different types of vulnerable communities

4.3 Results

Phase One of the IUCN, IISD, SEI-B and Intercooperation project was successful in meeting its objectives. After two years of project activities, the overall results from Phase One can be summarized as follows:

a) The establishment of an institutional platform for bringing together the fields of disaster risk reduction, NRM, climate change action and poverty reduction

The creation of the Task Force on Climate Change, Vulnerable Communities and Adaptation has provided a basis for promotion trans-disciplinary and institutional collaboration. The Task Force has been useful in identifying potential case study/assessment projects and policy openings. Because members come from

varying fields of expertise and are engaged in different policy processes, they have also played an important communications role for project by representing the Task Force in different forums.

b) The development of a theoretical basis for promoting EM&R / SL activities as climate change adaptation measures

Drawing from the experiences of the Task Force members and project institutions, partners were able to develop a framework for climate change adaptation based on the livelihoods of poor and vulnerable communities, which necessarily involves ecosystem management and restoration measures. While initial emphasis was on the relationship between climate-related vulnerability and ecosystem management and restoration activities, partners gradually expanded their scope to consider the more comprehensive approach of 'sustainable livelihoods' in reducing vulnerability to climate hazards.

Understanding that adaptation should be driven by bottom-up approaches and mainstreamed into wider development processes, the Task Force recommended 3 general steps for identifying 'win-win' options that address current realities and assist with long-term capacity-building: (1) understanding the 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, contingency planning and investment options.

c) Growing portfolio of EM&R / SL projects that reduce community vulnerability to climate hazards

Through its in-depth studies and desk-based assessments, project partners were able to better understand how different natural resource / ecosystem management and restoration activities increase community resilience to climate hazards. This understanding provided partners with a basis from which to identify proposed and ongoing vulnerability reducing activities externally and within their own project portfolios. Projects that might have been previously overlooked are now recognized in terms of their climate change adaptation potential. With this expanding knowledge and portfolio of adaptation projects, partners can now help other institutions to identify and maximize the adaptation potential of their activities.

d) Lessons-learned on how to support the implementation of vulnerability-reducing projects in different communities

In addition to providing a basis for identifying the adaptation potential of different projects, Phase One activities also yielded a range of lessons-learned on why certain ecosystem management and restoration activities are successful in building community resilience to climate hazards. The in-depth case studies and desk-based assessments demonstrated the importance of certain enabling measures and conditions that lead to successful resilience-building projects. These are summarized in Section 5.

Using these lessons-learned, project partners can now help governments, institutions and local communities to develop and implement adaptation projects

e) A network of institutions interested and/or involved in EM&R / SL approaches to climate change adaptation.

As a result of the project's outreach and communications strategy, and the networking role played by Task Force members, Phase One activities were able to uncover a network of academic, research, policy and field-based organizations involved in resilience-building activities and climate change adaptation.

5. Lessons learned for Climate Change Adaptation

Phase One activities succeeded in yielding a range of observations and lessons-learned on 4 different, but closely intertwined, levels: the field project level, the policy level and 'adaptation community' level.

5.1 Lessons for adaptation from vulnerability-reducing field projects

Both the in-depth case studies and the desk-based assessments reinforced many of the hard-won lessons that researchers and practitioners have been deriving from environment and development projects for decades. Understanding the challenges and enabling conditions that characterize local action can provide a basis for developing climate change adaptation measures that are based on local livelihoods and environmental conditions. The research conducted during Phase One emphasized the following elements for enabling local-level vulnerability reducing projects:

- A thorough understanding of local livelihoods and vulnerabilities: knowing the assets that comprise peoples' livelihoods and the factors (including climate-related risks) that shape vulnerability to ensure the design of appropriate and locally-relevant project activities that address immediate and long term priorities.
- A strong understanding of the main climate risks in the region and how they impact livelihoods: related to the point above, but worth emphasizing on its own, is the need for information on climate conditions, climate-related hazards, observed changes and their impacts on local livelihoods.
- Community-driven implementation: emphasizing the active participation of community members in the initiation, design, implementation and monitoring of project activities to secure community support and promote a strong sense of ownership.
- Community organization: establishing or building upon social institutions—e.g. Village Self-Help Groups, women's groups and village water sub-committees—to carry out activities in a structured, participatory and efficient manner.
- Strong participation of women: recognizing their role as household and community resource managers, promoting their active involvement in project activities to ensure the success and sustainability of achievements.

- Local training and capacity building: enhancing the local human resource base and the effectiveness of project activities by teaching community members a range of technical, financial and managerial skills.
- Blending of traditional and modern approaches: using traditional knowledge and local perceptions to develop appropriate project activities.
- Reconciling short-term needs with long-term goals: investing in the long-term success of the project with activities that meet the immediate development needs of the community and build local capacity to sustain the resilience-building effort.
- Supportive policy environment: working within broader policy frameworks that support de-centralized natural resource management and community development processes.

Again, most of this list is neither new to decision-makers nor exclusive to climate change adaptation. While these lessons may be well known to environment and development practitioners, thereby highlighting the close relationship between climate change adaptation and development priorities, it is not enough to simply tell decision-makers to ‘do development better’ in order to increase adaptive capacity. Reducing vulnerability at the local will continue to be challenged by a shifting environmental and socio-economic context, to which climate change will be a contributor. This changing context will call for innovative and/or adaptable interventions that go beyond the existing praxis of sustainable development. New or modified vulnerability reducing measures will undoubtedly be served by the lessons of projects and programs passed, but they will also require a thorough understanding of what is to come. Understanding the nature of social and environmental change and their impacts on poor livelihoods will be an ongoing, resource-intensive process requiring, among other things, continued scientific research, improved access to information, as well as capacity-building and training.

Nonetheless, the factors described above speak to the kind of knowledge, incentives and priorities that promote local-level action and sustain success. Understanding these within a context of climate-induced changes to resource flows and vulnerabilities will provide a starting point for developing and implementing locally-relevant adaptation strategies.

5.2 Lessons for climate change adaptation at the policy level²

Having identified and confirmed the effectiveness of some sustainable livelihoods interventions in reducing community vulnerability to climate impacts, one of the next steps will be integrating these micro-scale adaptation activities into existing and emerging policy processes. These processes can range from existing national policies on development and poverty alleviation, disaster risk reduction and natural resource management, to those specific to climate change such as the National Adaptation Programme of Action (NAPA), and Stage II adaptation assessment and Second National Communications processes.

5.2.1 National policies

² Based on excerpts of a draft working paper entitled, “Pro-Poor Climate Change Adaptation: A Strategic Framework for Scaling Up Local Action” by Erika Spanger-Siegfried and Anne Hammill (2003).

Coping and adaptation to climate impacts through government policy has a lengthy background. Throughout history, governments have met climate extremes and slow-onset changes with a range of responses, which today include engineered flood control measures, emergency grain storage, drought early warning systems and sea wall construction. Beyond these, a range of government action and action plans on sustainable development concerns has tremendous potential for reducing climate vulnerability and forming the basis for emerging national adaptation strategies. Though climate change adaptation may be less of a pressing national priority than other concerns such as poverty, debt, civil war, food shortage and AIDS, reducing vulnerability to climate-related impacts does figure prominently in national priorities, albeit in a fragmented form across sectors and agreements. The challenge for adaptation is, on the one hand, to identify the intersection of current national policies and adaptation needs, and on the other, to catalyze *action* where presently only plans and commitments to action exist.

Developing an adaptation strategy that incorporates sustainable livelihood activities may support and advance efforts in other priority areas, such as poverty alleviation, biodiversity conservation, water management and disaster mitigation. These synergies between adaptation and national development goals must therefore be identified and built upon.

Apart from mobilizing the necessary political will to operationalize vulnerability reduction measures, other conditions for **policy integration** include:

- Involving the most influential and important ministries (e.g. Ministry of Economic Development) for national strategy development and implementation;
- Within influential ministries, soliciting the participation of representatives who have participated in relevant pro-poor processes such as Poverty Reduction Strategy Paper (PRSP) development or National Biodiversity Strategy and Action Plan development. Apart from ensuring that these high-level representatives are adequately sensitized to the needs of pro-poor adaptation and CBRB activities, their participation may promote mainstreaming of adaptation with key MEAs and other existing policies;
- Raising awareness among bilateral and multilateral agencies on the high-impact adaptation value of CBRB activities, as donor support will increase the likelihood of their integration into national strategies;
- Involving the full range of relevant government ministries and agencies in developing and implementing strategies, as those sectors within a particular country that are highly vulnerable to climate change may not correspond precisely to the most influential sectoral ministries.

In addition to following these general suggestions for integrating micro-scale sustainable livelihoods activities into existing policy priorities, governments must also include these activities in processes that are specifically designed to assist countries in developing policies that address climate change adaptation. The United Nations Framework Convention on Climate Change (UNFCCC) has established a number of such processes, including NAPAs, Second National Communications and Stage II adaptation assessments.

Parties to the UNFCCC are required to prepare National Communications, which are essentially reports to the Conference of the Parties on their work in implementing the Convention. For non-Annex I (developing) countries, the preparation of National Communication is subject to the receipt of funding from the Global Environmental Facility (GEF). Once funding has been secured, these countries have three years to prepare their First National Communications, and no deadline has been set for the Second National Communications. To date, over one hundred non-Annex I countries have submitted their initial National Communications, and the number continues to rise. For Least Developed Countries, National Communications may be prepared at their own discretion. While the reporting requirements for Non-Annex I countries are less detailed than those of Annex I parties, they are still relatively time-consuming and resource-intensive.

Understanding the Least Developed Countries (LDCs) to be in immediate and urgent need of support to begin adapting to current and projected climate impacts, as well as their limited capacities for reporting these needs through a full national communication, the Marrakesh Accords to the UNFCCC established a separate work program for LDCs centered on the preparation of **NAPAs**. NAPAs serve as a simplified communications channel to help LDCs inform donors of their urgent and immediate adaptation needs, identifying priorities and options for moving forward. They are intended to be easily understood, action-oriented, country-driven and prepared using a set of guiding principles that emphasize, among other things: participatory stakeholder processes, multidisciplinary approaches, complementarity with existing plans and programs, the country's sustainable development goals, gender equality, sound environmental management and cost-effectiveness.

Box 1: NAPAs and micro-scale vulnerability reduction

Many of the vulnerability reducing projects identified in Phase One encompass all of these principles. For example, the watershed restoration project in India involves community-driven efforts supported by local NGOs, regional and national decision-makers and bilateral agencies. Activities are a combination of technical interventions in watershed management, along with measures for economic growth and community development. Apart from building resilience to climate change impacts, the project also succeeds in addressing biodiversity and desertification issues as well as national sustainable development priorities by restoring and enhancing ecosystems, reversing soil degradation, and protecting rainfall dependent agricultural production. The active participation of women is central to the watershed effort, while the costs of implementing and sustaining the project will presumably be offset by the costs that would have otherwise been borne in continued emergency water supply schemes, drought relief, and resettlement.

Recognizing this, LDCs may wish to ensure that successful micro-scale vulnerability reducing measures are included in NAPAs. This can be done by identifying entry points into the major steps of the NAPA process. Below are a few examples:

- Steps 1 & 2: In establishing the NAPA Team and the multidisciplinary assessment team, there should be a concerted effort to include representatives with that specialize in community-based, vulnerability reducing projects that have employed ecosystem management and

restoration practices;

- Steps 3 & 4: Synthesizing available vulnerability assessments and conducting a rapid participatory assessment to identify urgent adaptation options should involve focusing on particularly vulnerable settings and communities, as well as soliciting input from micro-scale experiences and key actors at the local level;
- Step 5: In identifying adaptation needs and potential activities, focus should be placed on synergies between adaptation and other MEA/development activities at *all* scales, building upon those vulnerability-reducing activities that have already been undertaken or are currently underway;
- Step 6: Because these activities respond to most of the criteria for prioritizing adaptation options and generate benefits across a range of different sectors, they should definitely be considered in the adaptation planning process;
- Steps 7 & 8: Following this, in developing priority adaptation proposals and reviewing the draft NAPA, efforts will have to be made to ensure that stakeholder consultations are genuinely participatory, rather than dominated by certain interest groups.

Just as the NAPA process reveals a number of entry points for the integration of community level sustainable livelihood activities, so does the **Stage II adaptation assessment process**, in particular the Second National Communications Process . The former refers to a decision that was taken at the First Conference of the Parties to the UNFCCC (COP-1, Berlin, 1995, Decision 11/CP.1), where the adaptation to climate change was to be approached 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 as envisaged in Article 4.1(e).
- Stage III: Measures to facilitate adequate adaptation, including insurance, and other adaptation measures as envisaged by Article 4.1(b) and 4.4.

Most countries have conducted studies under Stage I Adaptation, the results of which were included in initial National Communications. Many developing countries are now looking to prepare their Second National Communications and incorporate Stage II adaptation activities into their reports, building upon the scoping studies on climate change impacts and vulnerability to identify priority sectors and prepare for adaptation. To facilitate this process, tools such as the **Adaptation Policy Framework (APF)** have been developed, and can be used to identify and explore the adaptation potential of micro-scale sustainable livelihood interventions, such as those examined in Phase One.

Launched in late 2003, by the UNDP-GEF, the APF is a structured approach for developing adaptation strategies, policies and measures that support sustainable human development in the face of climate change. As a flexible and iterative process, the APF produces a variety of outputs, which depend on the identified needs of the users. These outputs include: (a) specific policy options for reducing the

negative impacts of climate change, (b) integrated assessments to identify how adaptation measures in one sector will affect other sectors, and (c) the formulation of small- and large-scale adaptation projects. Using vulnerability to current climate conditions as the starting point, the APF is based on a process of synthesizing existing information on a developing country's vulnerable systems, exploiting synergies and building upon what is already known. Within an individual country, the APF encourages the integration of adaptation into existing MEA commitments, national and sectoral policies, as well as the integration of adaptation action across relevant institutions.

Guidance on the APF is organized into five discrete steps: (1) Project scope and design, (2) Assessing current vulnerability, (3) Characterizing future climate risks, (4) Developing an adaptation strategy, and (5) Continuing the adaptation process. These steps are informed by two ongoing processes, namely stakeholder engagement and measuring and enhancing adaptive capacity.

Entry points for community-based vulnerability reducing activities, such as mangrove reforestation or rangeland rehabilitation, exist at each step. The single most critical opportunity to ensure their inclusion, however, may be at Step One, during the project scoping and design process. Following the recommendations given in establishing NAPA teams, APF project teams should also have representatives with experience in community-based vulnerability reduction. This will help to ensure that micro-level SL activities and the needs of the most vulnerable communities are considered in identifying adaptation priorities, devising project objectives and implementing the research and synthesis work plan.

Combined, the above discussion on NAPAs and Stage II adaptation are intended to put forth some initial recommendations for how these existing processes can be modestly expanded or reoriented to transmit critical information from the local level to the national process, and to enable replication and scaling up. As these processes undergo more application and specific examples are generated, these recommendations will be further developed.

5.3 Lessons for adaptation for the 'adaptation community'

Over the course of Phase One, project partners were engaged in a wide range of meetings, events, projects and other processes that related to climate change adaptation. In dealing both directly and indirectly with the growing 'adaptation community', a number of general lessons were drawn to inform future activities in this area:

- Target governments and bilateral agencies: While interest in climate change adaptation has grown dramatically in the past few years, both inside and outside of the climate negotiations, governments and bilateral agencies are not necessarily: (a) adequately informed about the issues or (b) fully convinced/supportive of efforts to promote and operationalize adaptation. There is still a great deal of work that needs to be done in raising awareness and getting governments and bilaterals on board, indicating a continued need for targeted lobbying and communications.
- Reach out: The growing interest in climate change adaptation does not necessarily mean a growing list of constituencies involved in the effort. There

is a need to not only target climate change teams, but reach out to the so called 'non-converted' in different disciplines, sectors and different scales of decision making.

- Strategize, communicate and compliment: Because of the growing currency of climate change adaptation, a growing list of actors, interests and institutions are becoming involved in efforts to push the adaptation agenda. As with any growing field of interest, the challenge will be in staying informed about ongoing activities, coordinating activities so that the end result is complementarity rather than duplication. Central to this will be looking at and building upon what's already been done in the areas of environment and development, as many adaptation initiatives have arrived at the same conclusion: adaptation is inextricably linked with sustainable development and poverty reduction.
- Start implementing adaptation projects now: While developing guidance is crucial for successful adaptation, there is also a need for immediate action, as vulnerabilities continue to increase in communities around the world. Examples of local level resilience-building activities abound, and they represent a viable, 'no-regrets' starting point for adaptation.

6. The Way Forward: Areas of Focus for Phase Two

The activities Phase One examined and emphasized the effectiveness of certain ecosystem management and restoration activities in meeting the needs of communities who are vulnerable to climate hazards and climate change. Recognizing that climate change adaptation must be informed by successful ground-level experiences in vulnerability reduction, project partners felt that these activities should serve as a starting point for adaptation strategies. With thousands of community-level efforts to cope with climate variability and extremes currently taking place around the world, why ignore them? Embedded in these experiences are valuable lessons for a range of potential users. Tapping hard-won lessons and existing coping mechanisms and adaptive strategies can propel the adaptation process toward an impact on the most vulnerable groups. As such, further understanding the contribution of certain projects to community resilience-building became a focus for Phase One, in order to establish a basis for operationalizing the Task Force's approach to adaptation in future phases of work.

The first step in operationalizing this adaptation approach would be to scan proposed and ongoing projects in the fields of natural resource management, disaster risk reduction, and poverty reduction to identify those with adaptation potential. Such a process would enable decision-makers to prioritize high-impact (i.e. multiple benefits) projects in building adaptive capacity of vulnerable communities. This step would undoubtedly require a set of decision-making tools (criteria, guidelines, indicators, etc.) to help international donors, country adaptation teams and project managers to identify, develop and implement adaptation projects.

Upon identifying adaptation projects based on environmental management activities, steps should be taken to build upon their strengths, ensure their sustainability, and monitor their impacts on adaptive capacity. Building upon projects to include climate change adaptation concerns will require a careful examination of current and anticipated climate-livelihoods interactions in the area. Trying to ensure the success of identified adaptation projects will mean incorporating the lessons learned from the

Phase One studies on community resilience building activities, where applying them where they are relevant. Monitoring and evaluating the impact of an intervention will call for a set of criteria and indicators that demonstrate changes in community resilience to climate risk.

Parallel to the identification and implementation of adaptation projects should be the development of a supportive policy framework that will enable successful project to be scaled-up and linked to broader sustainable development priorities. Central to this will be integrating ecosystem management and restoration into existing adaptation processes such as the UNFCCC National Adaptation Programmes of Action (NAPAs) 2nd National Communications, the UNDP Adaptation Policy Framework, and other national adaptation strategies.

Following the achievements of Phase One, IUCN, IISD, SEI-B and Intercooperation look forward to expanding constituencies and operational capacities for adopting an integrated approach to climate change adaptation based on the livelihoods of the poorest and most vulnerable communities around the world.

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Annex 2: Summary of in-depth case studies

Project: Community-based rangeland rehabilitation in Sudan
Study done by: Stockholm Environment Institute – Boston Center

Working in partnership with the Sudan Higher Council for Environment and Natural Resources (HCENR), SEI-B conducted an in-depth case study in the drought-prone Gireigikh rural council of Bara Province, western Sudan. Researchers spent six months identifying, collecting and validating field information to measure community resilience before and after the implementation of a pilot project entitled, “Community-Based Rangeland Rehabilitation for Carbon Sequestration”, which was implemented from 1992 to 2000.

Funded by the UNDP’s Global Environment Facility (GEF), the pilot project involved 17 villages using a simple model of community-based natural resource management to rehabilitate overexploited and highly-vulnerable rangelands. Participating communities implemented a package of mutually-supportive sustainable livelihoods activities that fell under four broad categories: (a) awareness and institution building, (b) training, (c) rangeland rehabilitation and improvement, and (d) community development activities. Preliminary results exceeded original expectations, as over 700 ha of rangeland was improved and properly managed – far exceeding the 100 ha goal. Moreover, community training and development activities diversified local production systems so that pressure on marginal lands was reduced, thereby ensuring sustained success of project activities. Local livelihoods had been enhanced and communities were better equipped to cope with a range of stresses, including drought.

Recognizing the relevance of the pilot project’s success to climate change adaptation, SEI-B and HCENR researchers returned to some of the original project communities to further understand the nature and enabling factors behind this success. Community resilience was measured using locally-derived resilience indicators, which were based on critical livelihood assets – i.e. natural, physical, financial, human and social capital. Using these indicators, researchers were able to compare pre-project circumstances within the communities with post-project circumstances. Results uncovered a distinct pattern of increased resilience among community members to the impacts of drought. Improvements to all categories of livelihood assets were reported, suggesting that community members were better prepared to withstand future drought, and better prepared to cope with potential climate change conditions. Moreover, the drivers for this success were identified at the community, institutional and policy levels, which could inform adaptation processes.

Project: Community-based forest landscape restoration in Bolivia
Study done by: Intercooperation

Similarly, in October 2003, project team members from Intercooperation conducted an in-depth study of the resilience-building impacts of the afforestation project PROFOR (*Programma de Repoblamiento Forestal*) in the department of Cochabamba, Bolivia. Established in 1984 through a bilateral agreement between Bolivia and Switzerland, PROFOR was designed to build upon the Development Corporation of Cochabamba’s (CORDECO) tree plantation program, which had been operational since 1976. PROFOR extended CORDECO’s program, but did so using a community

forestry approach where the principal goal was to generate income and work in rural areas, as well as stabilize steep hillsides prone to landslides. Tree plantations were established as a result of a mix of activities including community consultation and organization, local training, technical assistance, and provision of inputs such as seedlings and tools. After 14 years of forestry intervention in the department of Cochabamba, PROFOR established more than 7,000 ha of tree plantations.

Amongst the communities that participated in PROFOR activities was Khuluyo, a village of 500 people located in the sub-Andean valley region of Bolivia. Faced with a dwindling natural resource base and the threat of landslides from overgrazed hillsides above them, community members undertook a suite of forestry-related activities to establish tree plantations, stabilize and regenerate soils, and secure local livelihoods. A total of 80 ha of forest plantations were established, which minimized the risk of landslides and increased the productive base of agricultural lands. Given the observed changes in rainfall patterns – i.e. a decrease in total precipitation levels but more frequent storms – project results suggested an enhanced capacity for dealing with climate stresses.

Recognizing these program results as a basis for developing local climate change adaptation strategies, researchers from Intercooperation and PROFOR returned to Khuluyo to examine the impacts of program activities on community resilience. The researchers employed community consultations and social mapping to determine how livelihood assets changed as a result of community forestry activities. Results indicated that PROFOR activities were instrumental in promoting community organization, reducing dependency on agricultural production by diversifying livelihoods with timber and non-timber products, decreasing pressure on the natural resource base, and improving watersheds. Community resilience to extended dry periods and heavy rainfall events (i.e. landslides) was increased, providing a basis for local adaptation to climate change impacts.

Annex 3: Summary of Desk-Based Assessments

Project: Mangrove Reforestation in Vietnam
Implemented by: Vietnam Red Cross, with Danish Red Cross and Japanese Red Cross

Since 1994, the Vietnam Red Cross has worked with local communities to plant and protect mangrove forests in northern Vietnam. Because mangrove ecosystems provide enhanced physical protection against storm surges and a base for local livelihood activities, they are crucial to the resilience of coastal communities. To date, nearly 12,000 ha of mangroves have been planted with remarkable results. Savings in seadyke maintenance were estimated at US\$ 7.3 million per year, project areas remained unharmed during storms, while local livelihoods were diversified and improved. The enhanced coastal environment enabled communities to improve local fisheries, which offered economic and nutritional benefits to members.

Project: Community watershed restoration in India
Implemented by: The Watershed Organisation Trust (WOTR)

In the semi-arid region of Maharashtra state, the Watershed Organisation Trust (WOTR) has been assisting poor rural communities to increase their livelihood security by supporting watershed restoration projects. The cumulative impact of recurring droughts and human pressures on the surrounding land has degraded watersheds, leaving rain-dependent communities to subsist in highly water-stressed circumstances. WOTR assists these communities in developing, implementing and monitoring a range of watershed restoration/development measures. To date, WOTR's activities have been conducted in over 150 watersheds, covering about 160,000 hectares and benefiting over 230,000 people. In all project areas, the local environment has started to recover and stabilize. Rehabilitated watershed ecosystems have boosted and diversified agricultural production, thereby securing food supplies and livelihoods. Dry climate conditions no longer signify hunger and migration, as communities have an increased resilience to drought.

Project: Forest landscape restoration in Central America
Implemented by : Programa para la Agricultura Sostenible en las Laderas de *América Central* (PASOLAC)

Since 1992, PASOLAC has been helping local communities in Nicaragua, Honduras and El Salvador to increase the agricultural productivity of their hillsides through improved soil and water management. While hillsides represent the economic base for the majority of rural population in Central America, they are also characterized by severe soil and landscape degradation, leading to more frequent water shortages during dry seasons and floods during extreme rainfall events. Using a participatory, demand-driven approach in implementing its activities, PASOLAC has encouraged the long-term adoption of sustainable soil and water management techniques in local communities. These have resulted in reduced water shortages, restored water supplies, increased drought resistance and increased resilience to heavy rainfall.

Project: Aquifer management in Iran
Implemented by: Ministry of Agriculture, Islamic Republic of Iran

In the Gareh Bygon Plain (GBP) of Fars province in southern Iran, the Government of Iran has been using aquifer management, or 'Abkhandary' to control floodwaters while augmenting local water supplies. The expansion of agricultural lands had resulted in the loss of rangeland vegetation and the recession of water tables, which in turn led to livelihood insecurity and decreased protection against desert encroachment and destructive floods. Building upon ancient techniques used to collect, store and distribute water, 'Abkhandary' was instituted to restore the GBP environment. The results have been laudable: increased number of irrigation wells, greater vegetative growth and cover, reappearance of wildlife, improved soil stability, the return of people to abandoned villages and reduced losses to floods. Previously fragile and barren lands were transformed into productive lands supporting growing communities and diversified livelihoods, as vulnerability to floods and drought were reduced.

Project: Woodlands restoration in Kenya
Implemented by: Turkana Pastoralists

Following a drought-induced famine in the early 1960s, the Turkana pastoralists in northern Kenya worked to restore the *Acacia tortilla* woodland ecosystem, which provided them with vital livelihood goods and services. Woodlands had been degraded and cleared as a result of agricultural expansion, efforts to eradicate the tsetse fly, the establishment of famine relief camps, and the implementation of policies that undermined local resource management strategies. Using traditional institutions and management systems, such as Ngitili, or enclosure, the Turkana were able to restore approximately 30,000 ha of Acacia woodland. Over 250,000 ha were restored over the course of 15 years, providing a range of tree-based goods for people and livestock. The result was increased capacity to cope with dry seasons and droughts, and opportunities to secure and enhance livelihoods.