

F O R E S T L A N D S C A P E R E S T O R A T I O N

Forest Landscape Restoration is a process that aims to regain ecological integrity and enhance human well-being in deforested or degraded forest landscapes.

The need to restore lost and degraded forests is not just an African issue, but East Africa is leading the way in rebuilding forest assets for people and nature. The case studies reported here illustrate that cost-effective restoration of forest goods and services can be made a reality at a landscape level, for example:

- ⊗ From 1,000 to 250,000 hectares of *'ngitili'* woodland in the Shinyanga region of Tanzania over the space of only 15 years.
- ⊗ The restoration of 30,000 hectares of acacia woodland by Turkana pastoralists in northern Kenya.
- ⊗ The broadening of the objectives of a carbon sequestration project in Uganda to deliver 8,500 hectares of forest benefits to 12 communities.

Success in all three examples was not built on the desire to restore ecosystems *per se* but rather the need of local people to have functioning forest ecosystems as a livelihood resource.

People and ecosystem-centred restoration were recommended in Agenda 21 ten years ago at the Rio Earth Summit as a means of building assets for people and nature. Research and field experience have moved ahead. Now, with the resurgence of political interest in restoration, it is time to put the international agreements into action, by:

Implementing and supporting the key elements of Forest Landscape Restoration through local, national, regional and multilateral action.

More specifically, Governments can undertake a range of activities, including to:

- ⊗ Endorse and promote forest restoration in key sustainable development policy fora.
- ⊗ Undertake to reform and redirect environmentally harmful and market distorting plantation and agricultural subsidies to environmentally and socially responsible restoration.
- ⊗ Promote the Forest Landscape Restoration approach within the provisions of the Kyoto Protocol's Clean Development Mechanism, as a means of delivering more secure carbon storage by addressing social and environmental issues.
- ⊗ Develop schemes to fairly reward the rural poor for their stewardship over forest functions.
- ⊗ Encourage the Global Environment Facility to designate land degradation, primarily desertification and deforestation, as a GEF focal area, and allocate of resources to addressing these problems through the restoration of forest goods and services.
- ⊗ Develop and announce specific domestic and regional initiatives to implement restoration that enhances ecological integrity and human well-being.



B u i l d i n g A s s e t s f o r P e o p l e a n d N a t u r e
E x p e r i e n c e f r o m E a s t A f r i c a

S U M M A R Y F O R D E C I S I O N M A K E R S
a c a l l f o r a c t i o n

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IUCN
The World Conservation Union



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Farmer demonstrates the importance of tree products from his Ngitili in Shinyanga, Tanzania.

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IUCN *The World Conservation Union - founded in 1948, brings together States, government agencies and a diverse range of non-governmental organizations in a unique world partnership: nearly 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.*

IUCN's Forest Conservation Programme has a proven track record with a wide range of forest conservation and sustainable management issues - from conserving pristine ecosystems for present and future generations to restoring forest landscapes that have been degraded or destroyed; from developing new policy to working "on the ground." The Forest Conservation Programme supports field projects around the world, each focusing on finding practical ways of improving forest conservation and management and using lessons learnt from experience to influence policy at the national, regional and global level.

Tree-dominated landscapes play an important role in the provision of goods and services to local resource users, communities and countries in Eastern Africa. Consequently, IUCN's Regional Office for Eastern Africa (IUCN EARO) started working more closely with the global forest programme in 1993, to assist the conservation and forest authorities in the region, as well as to focus on practical methods for conserving and managing forests.

IUCN EARO works with its members and partners to develop the knowledge base about these ecosystems, as well as their importance for biodiversity conservation and to the livelihoods of rural people. Even within conservation areas, sustainable use of trees is being explored through collaborative management agreements. Lessons about balancing sustainable use with biodiversity conservation are being used to inform and influence regional policy processes.

IUCN champions action that tackles the problems at their roots, through addressing the underlying causes of forest loss and degradation. Its work benefits from its powerful coalition of members (almost 1,000 non-governmental organizations and governments), expert volunteer Commissions, and staff around the world.



Countries where IUCN works in Eastern and Southern Africa.



*Tanzanian farmers and extension staff discuss the management of their restored Ngitili in the Shinyanga Region. **Obadia Mugassa***

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Other resources:

CD-Rom with the summary report, abstracts, papers and powerpoint presentations for the International Expert Meeting on Forest Landscape Restoration (Costa Rica, March 2002). These are currently available online from <http://www.iucn.org/themes/fcp> <<http://www.iucn.org/themes/fcp>>.

CD-Rom with the Regional Workshop Synthesis Report, National FLR reports and the Regional FLR overview, together with the powerpoint presentations for the Eastern African Regional Forest Landscape Restoration Workshop (Mombassa, November 2001).

WWF's Forests for Life website at <http://www.panda.org/forests4life/>

IUCN/WWF's Arborvitae forest newsletter is online at <http://www.iucn.org/themes/fcp/activities/publications/arborvitae.html> or can be ordered through forests@iucn.org.

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Restored Ng'itili woodland in Shinyanga, Tanzania. **Obadia Mugassa**

Forest loss and degradation carry a heavy human and environmental cost throughout tropical, temperate and boreal regions. In response, IUCN The World Conservation Union, the World Wide Fund for Nature (WWF- International) and various government and non-government partners have developed an approach called Forest Landscape Restoration (FLR). **FLR focuses on restoring the goods, services and ecological processes that forests can provide at the broader landscape level.** It differs from more conventional approaches to afforestation and reforestation which tend to be limited to increasing tree cover, usually for a very narrow range of goods and services.

FLR is not a new idea. The approach builds on a number of existing rural development, conservation and natural resource management principles and approaches, bringing them together to restore multiple functions to degraded or deforested landscapes. It emphasizes the importance of both the quality and the quantity of tree cover and requires that ecological integrity is enhanced at the same time as tangible benefits accrue to local people. Although FLR seeks to build on the past, it does not aim to return forest landscapes to their original pristine forest state. Rather it is a forward-looking approach that puts in place forest-based assets that are good for both people and biodiversity.

Since Forest Landscape Restoration is concerned with the supply of forest goods and services at a landscape level it is not limited to - nor does it exclude - particular technical interventions. Any individual FLR approach will be a flexible package of site-based techniques - from pure ecological restoration through to planted, on-farm trees whose combined contribution will deliver significant landscape level impacts.

While FLR is globally relevant, some captivating and interesting examples have come from East Africa. This publication highlights three examples of restoration efforts from this region.

Globally, 80% of original forest cover has been cleared, fragmented or degraded.

BIBLIOGRAPHY AND CASE STUDY MATERIALS

An FLR Timeline

1996 WWF and IUCN launch the **Forests for Life** strategy, with a specific objective on restoring forests.

1998 IUCN initiates a review of forest restoration activities in Vietnam, Lao PDR, Cambodia and Thailand. The subsequent dialogue with these four governments helps broaden thinking and ideas concerning the rationale for, and scope of, restoration activities.

1999 WWF and IUCN establish the **Forests Reborn** project.

2000, Segovia, Spain A scoping workshop on forest restoration is attended by a range of IUCN/WWF partners including representatives from: the Canadian International Development Agency (CIDA), the UK Department for International Development (DFID), the European Union (EU), the US Agency for International Development (USAID), The World Bank, the World Conservation Monitoring Centre (WCMC) and the University of Queensland. The participants work on a framework and process, taking into account regional variations and priorities, for exploring and promoting innovative approaches to socially and ecologically appropriate forest restoration. The workshop produced the following definition:

2001, Mombasa, Kenya An African regional workshop organized by IUCN/WWF brings together participants from Kenya, Uganda, Ethiopia, Tanzania, Madagascar and Cote d'Ivoire. The workshop reviews the principles of FLR in light of experience gained in Tanzania, Uganda, Ethiopia and Kenya. Political decision-makers join the workshop on the last day to develop ideas and recommendations for action at the national level.

2002, Costa Rica Over 70 experts from government, academia, and international and non-governmental organizations attend the International Expert Meeting on Forest Landscape Restoration. The meeting covers: the definition of FLR; stakeholder engagement at the landscape level; biophysical challenges; an enabling environment; and a framework for implementation. The meeting is hosted by the Government of Costa Rica and the Government of the United Kingdom, in collaboration with IUCN, WWF, the International Tropical Timber Organization (ITTO), the Canadian International Development Agency (CIDA), the Centre for International Forestry Research (CIFOR), and the Northeast Asian Forest Forum (NEAFF). Participants request the documentation of more detailed FLR case studies, providing the basis for this publication.



Kenya workshop participants learning about restoration efforts in Bamburi. Edmund Barrow.

Forest Landscape Restoration is a process that aims to regain ecological integrity and enhance human well-being in deforested or degraded forest landscapes.



The International Expert Meeting on Forest Landscape Restoration in Costa Rica was attended by participants representing governments, international and non-governmental organizations, research institutions and universities, more than 60% from developing countries. IUCN/Edmund Barrow.

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C O N C L U S I O N RESTORATION FROM A VILLAGE PERSPECTIVE



The following is an account of a forest restoration initiative undertaken in Bermi Village, Babati District, Tanzania, as explained by one-time Bermi Village Chairman Gervase Halahalay to Dr Gill Shepherd of the Overseas Development Institute in 1994 and 2001.

"My name is Gervase Halahalay, and I live in Bermi village at the foot of the Rift Valley escarpment in Babati district, Tanzania.

"The area was originally very thinly inhabited but during the 1970s, the Tanzanian government initiated compulsory 'villagization.' As new people moved into the area, they cleared fields and built houses, and the trees on the Rift Valley escarpment began to disappear.

"By the 1990s, we were faced with a series of major problems. In the dry season, streams no longer ran for the whole year and there were fewer springs. During the rainy season, the water was far more damaging than it used to be, pouring down the mountain-side and through household compounds. There were more landslides than before and the footpaths which ran up the escarpment were deeply gullied and dangerous.

"By 1994, the Village Committee, decided to close our lands on the escarpment to grazing animals and fuelwood collection for a temporary period so that natural regeneration could take place. Over the next year or two, the trees began to regenerate so rapidly that it was obvious to everyone. Neighbouring villages on either side of Bermi began to follow our example and to close their land on the escarpment as well. By 2001, everyone was noticing that streams now flow all round the year again, and that landslides had become fewer. We also noticed an increase in wild animals on the escarpment.

"I suppose my main point is that villagers are far better at this kind of planning and decision-making at local level than anyone else. Nobody but we could ever understand the full picture, and I do not think that villagers would have co-operated as well with outsiders as they do among themselves. We saw first, co-operation within one village, then several villages working together, and now plans to deal with the next set of management problems which have come into focus. We have done a lot in eight years."

Source: Interview, recorded in Shepherd, Gill (1995, 2001).

F O R E S T L A N D S C A P E R E S T O R A T I O N

There are over 850 million hectares of degraded primary forest, regenerating secondary forest and degraded forest land in the tropics and a further 400 million hectares of agricultural land that carries a significant tree component. In addition, CGIAR (Consultative Group on International Agricultural Research) estimates that 630 million people live on marginal land (double the population inhabiting favorable land), a significant proportion of which qualifies as degraded forest landscapes. In the humid tropics alone, up to 300 million people depend to some degree on degraded primary and secondary forest and degraded forest land. Degraded landscapes are not only important from a social and economic perspective, many are still key repositories for biological diversity.

Forest Landscape Restoration shifts the emphasis from simply re-establishing tree cover on a particular site, to ensuring that forest landscapes have the necessary mix of forest goods and services to meet both social and environmental needs. The potential applications of FLR include: promoting sustainable livelihoods; improving the supply of key ecosystem services; increasing the resilience of vulnerable areas to the impacts of climate change and other natural disasters; and extending biodiversity conservation beyond protected areas.

"Good forest restoration will be characterised by an increase in ecological integrity and human wellbeing."

Forests for Life: Reaffirming the Vision. A Call for Action from WWF and IUCN, 2001



Restoration work in the Honduras. CIDA-ACDI/ Patricio Baeza.

Forest Landscape A landscape that is, or once was, dominated by forests and woodlands and although now modified or degraded continues to yield forest-related goods and services.	
Forest Lands	Agricultural Lands
Protected primary forest Managed (natural) forest Regenerating or managed secondary forest Degraded forest lands (wastelands) Industrial plantation	Agro-forestry (including farm fallows) Permanent cropping Silvi-pastoralism Intensive grass-based livestock production

IUCN Working to put FLR into Practice



IUCN developing forest management plans with the local community in Lao PDR. IUCN Lao Office.

Over the past year, IUCN's Forest Conservation Programme moved from scoping studies in Asia and Eastern Africa, to concrete planning for achieving restoration on the ground. IUCN's regional office in Asia completed a major study and workshop on forest restoration for Vietnam, Lao PDR, Thailand and Cambodia in the lower Mekong River basin. In Eastern Africa, IUCN initiated a similar process with government departments and civil society groups from Kenya, Uganda, Tanzania and Ethiopia, with an explicit focus on poverty reduction.

Fitting the goals to the landscape

One of the key challenges of FLR is to identify what type and level of restoration will be compatible with the social and physical realities on the ground. Thus, it is important to be clear on both the long-term and immediate objectives of restoration when identifying the potential suite of technical approaches and policy interventions. The objectives must be based on the interests of key stakeholders, the physical landscape and the resources available. It will also depend on factors like existing institutional and land tenure arrangements, the prevailing land-use policy framework, and biotic factors such as residual soil fertility and remnant species diversity, abundance and distribution.

Objectives may also shift over time. While long-term aims may be to increase the resilience, diversity and productivity of land-use practices and improve biodiversity, realities on the ground may require short-term interventions that yield immediate benefits. For example, a heavily degraded and economically impoverished landscape will dictate that immediate efforts focus on recovering primary processes and direct financial benefit to local communities. These activities will bring the landscape to a starting point for further restoration.

"While healthy ecosystems have built-in repair mechanisms, damage often exceeds their capacity for self-repair. An initial restoration focus on the recovery and maintenance of primary processes, rather than on replacing structure and "near natural" species mix, can initiate self-sustaining forest restoration. This doesn't imply we repair function and accept any structural development. It is simply a priority-setting philosophy that recognizes that achievable restoration options become more diverse once primary processes (hydrology, nutrient cycling, and energy flows) are recovering." (Steven G. Whisenant - Department of Rangeland Ecology & Management, Texas A&M University)

What makes FLR work?

While there are many site-specific technical issues that arise in the case studies, most of the common challenges are more social and political in nature. It is clear from the experience gathered here that community support is a key element in the success of any forest landscape restoration activity. Stakeholders need to feel empowered to act and be sure that what they put in place will not be taken away from them. This means being prepared to address perennial land-use governance issues such as decentralized decision-making and the transfer of access and use-rights. Traditional practices and institutions also play a significant role while the importance of long-term government commitment cannot be discounted. Finally, there is no one blueprint for FLR. Success is inevitably built on adaptive management and driven by people who are willing to learn.

TAKING ACTION

ITTO Guidelines for the restoration, management and rehabilitation of degraded and secondary tropical forests



Although prepared for the humid tropics, the International Tropical Timber Organisation's (ITTO) guidelines on restoration provide a particularly useful starting point for any policy maker or practitioner interested in Forest Landscape Restoration. ITTO's guidelines for the restoration of degraded primary forest, the management of secondary forests and the rehabilitation of degraded forest lands in the tropical regions outline the social, environmental and technical criteria that should be taken into account when designing a restoration programme. They also reflect on the importance of a landscape level perspective when considering the restoration and rehabilitation of forest lands. ITTO has developed a portfolio of 400 field projects, including 150 currently in operation, to test their policies in the field and promote best practice. In West and Central Africa, ITTO is funding six restoration projects. For example, the December Women's Movement and indigenous communities in Ghana's Worobong South are implementing an ITTO project to restore the integrity of a degraded forest reserve and to generate income that will raise the living standards of rural women in the project area. Another project in Togo is assisting several communities to generate income from an old, neglected teak plantation and restore remnant natural forests. ITTO works on policy and practice in its 56 member nations and the European Community, which represent 90% of the world's tropical timber trade and 77% of the world's tropical forests. The ITTO Guidelines will be available in English, French and Spanish from <http://www.itto.or.jp>.



This Waisomo villager owns and manages a small pine plantation behind his village in Fiji. WWF-Canon/ Catherine HOLLOWAY

Perverse Incentives - Dealing with the Economics of Restoration

There are various countries already providing incentives for natural or man-made induced forest restoration, particularly concerning reforestation schemes, protection of natural forests in critical watersheds and related initiatives. Interestingly, disincentives may have an even larger impact particularly in promoting natural forest regeneration of degraded landscapes. A case in point is the suppression of economic incentives to promote animal husbandry in the Nicoya Peninsula of Costa Rica. Now, about 40 per cent of the area has come back in secondary forests, including the return of wild animals, whereas 20 years ago, the area was almost totally deforested. A classic "perverse incentive" is the age-old legal way of claiming property, requiring an "improvement" ("mejoría"), consisting of clearing a piece of forest to show intent to "use the land." Cleared forest lands traditionally also command a higher selling price than forested areas. (Gerardo Budowski - Senior Professor, Department of Natural Resources and Peace, University of Peace, Costa Rica)

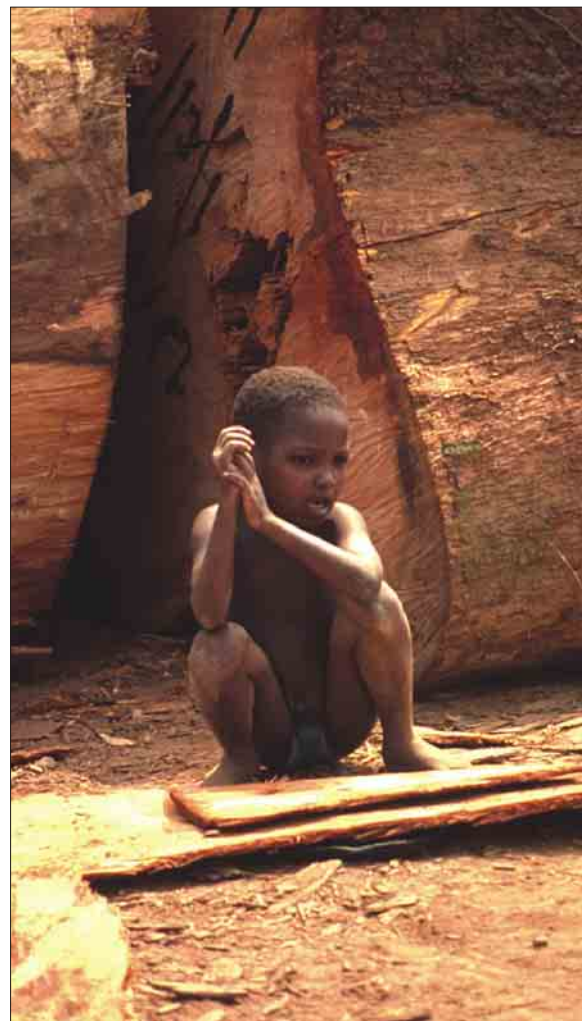
MOVING FORWARD - RESEARCH ISSUES FOR FLR

While it is encouraging that a number of the technical challenges are already well understood and tools to facilitate stakeholder land-use negotiations have been developed and tested, much work still remains to be done in order to refine and strengthen approaches to FLR. An experts meeting in Costa Rica during February 2002 identified some of the most pressing technical, ecological and social science research needs as:

- ⊗ A greater array of **case study material** of both success and failure. As adaptive management is central to FLR, it is important to document the lessons that local people, foresters and politicians have learned and how they have responded.
- ⊗ Tools and approaches for helping stakeholder groups identify and negotiate **land-use trade-offs at a landscape level**. Balances will inevitably have to be struck between human livelihood needs and the desire to enhance ecological integrity. Participatory approaches are well developed at the local level, but how can they be scaled up to address landscape level issues?
- ⊗ Collection and analysis of **baseline data** needed to target restoration activities including identification of criteria and indicators for landscape level monitoring and evaluation.
- ⊗ Better understanding of how poor people integrate forest goods and services into their **livelihood strategies** and/or what factors prevent forest resources from being better deployed in rural poverty alleviation.
- ⊗ Identification of multiple function **management options** in degraded forests, new plantations and community-managed forest lands.
- ⊗ Better understanding of how different **restoration technical packages** that yield site-level increases in diversity (alpha diversity) can be used to increase landscape level (or gamma) diversity.
- ⊗ Basic research into the **impacts of climate change** on modified or degraded forest landscapes.
- ⊗ Analysis of **environmental services** and how they can be affected by restoration, including the functional consequences of different sorts of diversity. The challenge remains how to get the desired landscape level outcomes (e.g. species conservation, watershed protection) from many small site-level decisions.
- ⊗ Basic research into various aspects of the **economics of restoration**, including analysis of innovative funding options for FLR and mechanisms for valuing forest goods and services in FLR. This also requires an assessment of the **perverse incentives** that currently encourage bad forest management.



Bringing research and field work together, Masters student Ignatius Achoka in discussion with a park guard in Bwindi Impenetrable Forest National Park in Uganda. WWF- Canon/ Frederick J. Weyerhauser.



WWF-Canon/ Sandra MBANEFO OBIAGO.



Wholesale clearance of forest Near Xapuri Acre, Brazil. WWF-Canon/ Edward PARKER.

Reaching Beyond Local Level Stakeholders

"Stakeholders at the local level are very often the easiest to find and work with. Those who rely on and live near forests have strong reasons to protect and enhance it provided they have the right to do so, or can be helped to acquire such rights. The logic of a connected forest landscape is much easier to understand at this scale, and it is at this level that the mosaic of diverse use, value and ownership can most easily be understood. However, this level needs to be balanced by national level institutions and processes which can take some of the bigger decisions about the future of the nation's forests in the context of conservation, development and sustainable use." (Gill Shepherd - Forest Policy and Environment Programme, Overseas Development Institute)

"Forest restoration activities undertaken at the site level often fail to take into account the needs of other interest groups (for example, downstream water users) because inadequate attention is paid to the trade-offs of forest goods and services that happen at the landscape-level. Institutional mandates seldom coincide with 'landscapes' suitable for forest landscape restoration. This makes bringing the right people around the table a challenge, but one we have to take up for a successful outcome." (William J. Jackson - Director, Global Programme, IUCN)

"Landscape restoration requires the active involvement of local people. People will be motivated to get involved if they are inspired. The local 'march against burning' in El Salvador was a huge success, because it provided local government officials, religious leaders, teachers and students with a fun way to get involved. Movements are often more successful than projects and give meaning to people's lives." (David Kaimowitz - Director, Centre for International Forestry Research)

Forest resources directly contribute to the livelihood of 90 per cent of the 1.2 billion people living in extreme poverty and indirectly support the natural environment that nourishes agriculture and the food supplies of nearly half the population of the developing world." (The World Bank)



A guide pointing out the medicinal herb *Lavageria macrocarpa* used for fevers and malaria in Cameroon. WWF-Canon/ Edward PARKER.

Forests and their Services are Valuable

The estimated commercial value of products derived from or dependent on natural vegetation is US \$ 500 800 billion per year, including pharmaceuticals, botanical medicines, agricultural seeds, cosmetics and ornamental plants. This photo shows a guide pointing out the medicinal herb *Lavageria macrocarpa* used for fevers and malaria in Cameroon. The estimated value of ecosystem services worldwide is US \$33,000 billion dollars a year!

Some Key Terms

Forest Landscape Restoration (FLR) - A process that aims to regain ecological integrity and enhance human well-being in deforested or degraded forest landscapes

Ecological Integrity - Maintaining the diversity and quality of ecosystems, and enhancing their capacity to adapt to change and provide for the needs of future generations. Forest loss and fragmentation is a major factor in biodiversity loss and species extinction.

Human Well-being - Ensuring that all people have a role in shaping decisions that affect their ability to meet their needs, safeguard their livelihoods and realize their full potential.



Restoration has eased the burden on woman to collect fuel wood. Obadia Mugassa.

EAST AFRICA LEADING THE WAY ON RESTORATION

Aside from sequestration, FLR also offers major opportunities to address the issue of adaptation to climate change. Since FLR seeks to optimise future options, as well as deliver immediate benefits, it can easily be employed to help increase the resilience and the resistance of current farming systems, especially in regions such as East Africa, to the adverse effects of climate change.

The Convention to Combat Desertification (UNCCD, 1994) focuses on the rehabilitation of land, and the conservation and sustainable management of land and water resources. In the context of the implementation of this Convention, a number of countries have initiated afforestation and reforestation programmes and adopted policies related to forests. The use of greenbelts is often proposed as a landscape level response to halt the encroachment of the desert into urban centres and agricultural zones. However, major challenges lie ahead in establishing a clearer connection between these techniques and the alleviation of the high levels of poverty endemic in dryland areas.

A committee has been established to develop concrete recommendations on further steps in the implementation of this Convention. Forest Landscape Restoration, with its focus on meeting local needs and building on existing knowledge as illustrated in the Tanzanian and Kenyan case studies offers the potential for a broader, more comprehensive means of combating desertification at the landscape level, and thereby contributing to the successful implementation of this Convention.

The **tripartite liaison arrangement** between the CBD, UNFCCC and UNCCD is initiating a process to begin "identifying and promoting synergies through forests and forest ecosystems."

In addition to these Conventions, the **UN Forum on Forests** (UNFF) has been charged by the UN Economic and Social Council (ECOSOC) with reviewing progress in the implementation of the proposals for action of the Intergovernmental Panel on Forests (IPF). Those bodies adopted a suite of proposals for action relevant to Forest Landscape Restoration. The IPF in particular outlined an approach that is consistent with FLR. One of the agreed elements of the UNFF's work is the "Rehabilitation and Restoration of Degraded Lands, and the Promotion of Natural and Planted Forests." FLR could also contribute to the UNFF's deliberations on the economic, social and cultural aspects of forests.

Regional Policy Processes Given that neighbouring countries tend to share similar legal and institutional frameworks, regional forest processes can be a useful place to share experiences and develop common approaches to Forest Landscape Restoration. Such opportunities have already been taken by the Central America Forest Strategy process, which has already developed and adopted regional guidelines for forest restoration. Forest Landscape Restoration also has major potential to contribute to the objectives of the Tehran Process on Low Forest Cover Countries (LFCCs).



Deforestation for construction, fuelwood and agriculture in Madagascar. WWF-Canon/ John E. NEWBY, and discussing the restoration and management of woodlands in Shinyanga, Tanzania. Obadia Mugassa.

In East Africa, restoration is being used as a tool to promote both livelihood security and forest conservation. The following three examples of projects from the region make it clear that the lessons from East Africa are pertinent to the rest of the world.

- ⊗ **Tanzania:** Local communities have improved their livelihoods by working in partnership with the Government to revitalize a traditional practice of natural resource management.
- ⊗ **Kenya:** Following a severe drought, communities have re-established an extensive area of tree cover that provides food security for humans and livestock.
- ⊗ **Uganda:** A Dutch-funded tree planting project to compensate for emissions from European power stations has broadened its initial narrow carbon sequestration objective to include a range of social and environmental benefits for the local community.

Between 1980 and 1990, Africa lost an estimated 9 million hectares of forest per year. Current African reforestation efforts have offset only 10% of this loss. Reforestation programmes planting mostly exotic species to meet fuelwood and industrial roundwood needs have tended to underestimate the importance of products from indigenous forests to the livelihood security of rural people. For example, 70% of Kenyans and Tanzanians rely on naturally occurring medicinal plants to remedy all but the most serious ailments, while 35% of rural Zimbabwean income is derived from the use and sale of forest products.

The following case studies document some of the innovative ways in which forest restoration has been implemented in the region. They also demonstrate the importance of actively involving those stakeholders most dependent on forests in decision-making. These stakeholders need to be given secure use rights and responsibilities and benefits need to be shared equitably.

Perhaps the most emphatic lesson from East Africa is that one does not have to wait for more research, analysis or the allocation of more resources from central government. Communities and executive agencies can take action now, and build Forest Landscape Restoration from the ground up to restore forest goods and services, making an important and vital contribution to securing livelihoods and reducing poverty.

RESTORATION AS A FOCUS FOR THE IMPLEMENTATION OF INTERNATIONAL COMMITMENTS

The Need for FLR in East Africa

East Africa's population and land pressures are increasing. In the past, forest resources were often seen as separate from local livelihood security by donor projects and government departments. This ignored the vital roles that forests and their products play in rural people's lives both in terms of goods and culture. This separation has had two major consequences. Firstly, forest degradation has been rapid, as land is converted to agriculture; and secondly, forest conservation, with the exception of its role as an energy source, is not seen as an important tool in poverty reduction and livelihood security. This is demonstrated by the relatively low importance given to forest conservation and forestry in national poverty reduction strategies.

The three case studies that follow demonstrate the opposite. Trees, woodlands and forests provide critical components of rural livelihood security the main reason why the Sukuma people in Tanzania have restored more than 250,000 ha. Rural people need forest goods and services to secure their livelihoods - providing diversity in their diet and much-needed medicines - and to act as a vital safety net in time of need. There is a clear message here for the next revision of the Poverty Reduction Strategy Papers (PRSPs) in these three East African countries the goods and services provided by forests and trees need to be addressed in the PRSPs in a way that reflects their importance to rural people.



Before and After - The Bamburi cement works in Kenya open mined the coral rock, but they did not dig through to the water table - as they would normally have done - in order to create a better environment for restoration. The top soil and vegetation was removed prior to the rock mining. Fifteen to twenty years after the area was first planted and landscaped, the vegetation has been restored. Pioneer tree species are gradually being replaced by more climax tree types, grass and freshwater. Soil has returned and so have the birds. IUCN EARO/ Edmund Barrow.



Young Masai woman carrying firewood- Tanzania. WWF-Canon/ John E. Newby.

Although the exact terminology is not set in stone, the elements of Forest Landscape Restoration identified in these case studies appear to be broadly in line with many of the key issues in the policy debate. International policy discussions now regularly encourage Governments and civil society to work beyond the site level, and aim for multiple benefits in forest rehabilitation and restoration schemes. There has also been wide recognition of the need to deal with broader aspects of forest ecosystem management, including social and economic issues. Furthermore, there is increasing emphasis on the need to recognize and expand the contribution of forests to sustainable livelihoods, poverty eradication and human development.

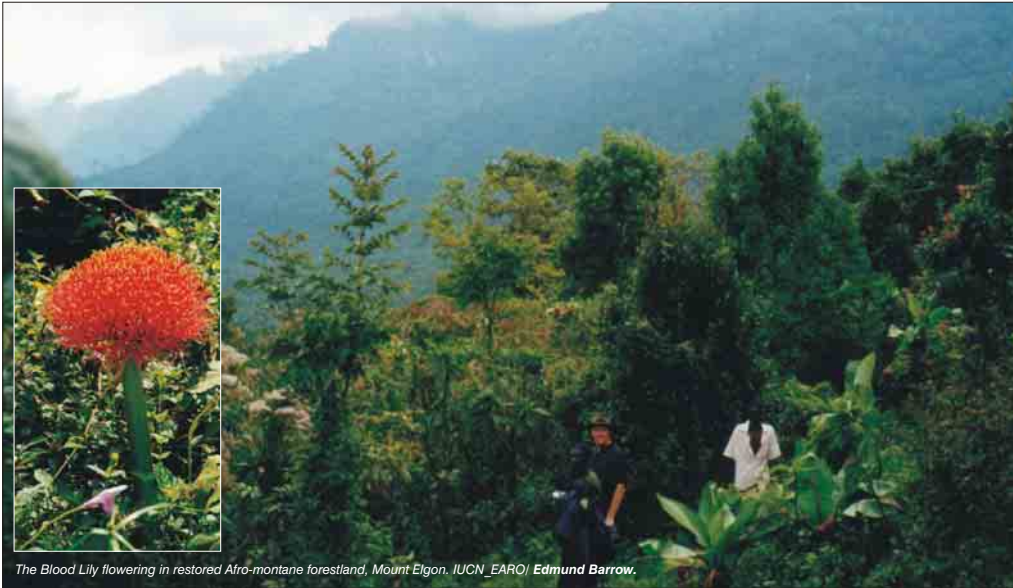
The Convention on Biological Diversity (CBD, 1992) contains a commitment by State Parties to rehabilitate and restore degraded ecosystems. The ecosystem approach is central to the work programme on forest biodiversity, reflecting a growing realisation that land-use has both on-site and off-site impacts that affect ecosystems and people, and that land-use management decisions must consider the wider function of the ecosystem. In practice this means that more innovative ways are needed to take decisions across whole landscapes. This will necessitate the meaningful involvement of multiple interest groups while guaranteeing the rights of those who traditionally exercise stewardship over the forest resource. The revised work programme on forest biodiversity, adopted in April 2002, includes a strong emphasis on restoration. It calls for the restoration of forest biodiversity in secondary forests and in forests established on former forestlands and other landscapes, including in plantations. Recommended activities include promoting practices for restoration in accordance with the ecosystem approach, and restoring forest biodiversity with the aim to restore ecosystem services. The CBD also places great emphasis both on the role of traditional knowledge in implementing effective biodiversity conservation and on the importance of equitable access rights and benefit sharing. The Turkana and Shinyanga case studies in particular illustrate that effective implementation of many of the Convention's seemingly complex provisions is possible and that this can be achieved in a cost effective manner.

The Kyoto Protocol of the Framework Convention on Climate Change (UNFCCC, 1992) offers industrialized country Parties implementing their commitment to reduce carbon emissions, the opportunity to partly offset a portion of this reduction through afforestation and reforestation projects in developing countries. There is a high degree of concern that many of these projects will have negative social and environmental consequences. Some early experience with sequestration projects in East Africa has resulted in farmers who do not possess formal land tenure being expelled from their land and their farm fallow systems being replaced with exotic monocultures of fast growing trees. This raises major questions as to whether such schemes are permanently sequestering "additional" carbon or simply displacing land-use change, and therefore releasing more carbon into the atmosphere, elsewhere.

Forest Landscape Restoration offers opportunities to support biodiversity conservation and sustainable livelihoods under the Clean Development Mechanism (CDM), and set a high standard for investors and governments to develop projects with social and environmental co-benefits. This would encourage more carbon sequestration initiatives like UWA/FACE that use native species to restore natural forest while providing tangible economic benefits to local people.

T A N Z A N I A

Reviving Traditional Resource Management Systems to Meet Contemporary Livelihood Needs



The Blood Lily flowering in restored Afro-montane forestland, Mount Elgon. IUCN_EARO/ Edmund Barrow.

A study on carbon accumulation undertaken in Mt. Elgon in 1998 indicated that the mature forest (at 50 years old) is estimated to have a potential biomass of 430 tonnes per ha including root biomass, which is equivalent to 176 tons of carbon. The project plans to plant 25,000 ha. Assuming that 25,000 ha is reforested and that all of the existing degraded forest outside of the reforestation area reaches a biomass of 430 tonnes per ha, the total carbon accumulation due to the project is estimated at 4.6 million tonnes which is equivalent to about 17million tonnes of carbon dioxide. (Source: Begumana J., 1998.)

Mount Elgon is a solitary extinct volcano with one of the largest craters in the world, spanning 8 km across. The mountain descends to the plain in a series of precipitous 'shelves' and is dissected by numerous streams cascading over the cliffs in spectacular waterfalls. It lies just north of the equator, about 100 km from Lake Victoria.

The semi-arid Shinyanga landscape in Tanzania is changing due to the efforts of the Sukuma people. Naturally regenerating indigenous trees are being left, allowed to grow back and managed on farm and grazing land together with associated vegetation, especially grass. "Ngitili" (or enclosure) is the name of the indigenous natural resource management system that HASHI - *Hifadhi Ardhi Shinyanga* (the Shinyanga Soil Conservation Programme) is using to restore the forest and woodland ecosystems after years of overgrazing and deforestation. The programme has been so successful that in a mere 15 years the area of *ngitili* has risen from about 1,000 hectares to over 250,000 hectares. The project has been selected as one of twenty five initiatives for the final round of the prestigious Equator Initiative.



Map of the Shinyanga region (Tanzania).



Degraded land, devoid of trees in Shinyanga (1992). IUCN EARO/ Edmund Barrow.



The Sukuma people of Tanzania are agropastoralists relying on livestock and crops for their livelihoods. Obadia Mugassa.



Restored trees on farmland. Obadia Mugassa.

Over 80% of the population own livestock to meet household needs and provide income. In 1998, Shinyanga region, covering less than six per cent of Tanzania, had an estimated 2.25 million cattle, or more than 20% of the national herd. This concentration of livestock has resulted in overgrazing and degradation far beyond the natural regenerative capacity of the land. Conversion of land to cash crops (cotton and rice) as well as deforestation for tsetse fly eradication has further exacerbated the problem. Over the past 60 years, state initiatives to reduce land degradation in the region, such as compulsory destocking and tree planting, have had little success. The survival rate of planted trees in communal woodlots, for example, was below 20%. Even with awareness raising initiatives, acute forest degradation continued in the region.

With the 1975 *Villagization Act*, farmers were relocated from their traditional homesteads to newly created settlements to facilitate the provision of social services. Leaving their villages also meant leaving behind their houses, farms and *Ngitilis*. The large villages, although an advantage for administrative purposes, were often poorly situated and made the practice of traditional adaptations to local ecological conditions more difficult. Traditional soil conservation practises were used less and less, and by 1985 only about 1,000 ha of *Ngitili* remained.

A strong memory of both individual and communal "*Ngitili*" provided the best entry point for forest restoration efforts. In fact, the Sukuma people had already suggested that restoring *Ngitili* might be an easier and better option than planting mostly exotic trees. This locally driven need for restoration, combined with an increasingly liberalized economy, and the initiation of the HASHI project, provided the right incentives for local ownership of efforts to revitalise the indigenous *Ngitili* system.

HASHI started field operations in 1986 as a Government soil conservation project. Indigenous knowledge and natural resource management systems were adopted as the basis for restoration. The traditional function of *Ngitili* to provide fodder for the dry season was expanded to cover other products and services required by rural people to meet their livelihood needs.

The project raised awareness of the importance of restoring natural resources through various media including video, theatre, newsletters and demonstrations. Participatory Rural Appraisal tools were used at the village level to identify important natural resource problems, and how they could be solved. This process identified the need for training so that villages and farmers could manage for 'improved' **Ngitili**. The project continues to provide advice on **Ngitili** management, for example which natural species should be selected for, which species are best used for enrichment or boundary planting, and which tree species and soil conservation methods are best used in any given area.

In order to effectively manage the **Ngitili**, HASHI worked to build the capacity of both official government institutions - such as village government and environmental committees - and traditional institutions - such as the **dagashida**, a community assembly which formulates customary law and punishes those that break it. Building on, rather than replacing, such local institutions fosters local ownership and responsibility. Rules agreed with local communities were monitored by the traditional village guards, or **Sungusungu**.

The adoption of a revitalized system of **Ngitilis** by communities and individuals is contributing to improved livelihood security and helping to restore a wider range of woodland goods - such as fodder, fruits, fuel, poles and medicines - and services, such as improved water availability and shade. The creation of local ownership at the village or individual level has been critical to the success and spread of **Ngitili** restoration not just in Shinyanga, but also to neighbouring regions. Trees are being planted around homesteads, schools and villages, and on farm land and along farm borders. Naturally regenerating indigenous trees are being left and managed on farm and grazing land. While biodiversity was not a major objective of **Ngitili** restoration, the variety of indigenous trees and associated vegetation being restored has led to an increase of species diversity in the region. For example on Mt. Matias' farm in Sungumile village 26 tree species were found, 16 of which are indigenous.

Understanding existing land use and natural resource management systems has been key to the success in Shinyanga, in contrast to the externally driven, and often imposed, tree planting interventions before 1985. HASHI used this indigenous knowledge as the basis for restoration, while encouraging village governments to establish by-laws to protect their **Ngitili**. The main advantage of using traditional rules is that they are well understood, they are strictly adhered to by the majority of people, and they complement village by-laws.

The fact that the Tanzanian Government has made devolution, decentralization and empowerment a practical reality greatly helped the project. In Tanzania the village is now the lowest accountable body and can pass by-laws as long as they do not conflict with higher statutes. The National land tenure and forestry policies and statutes support this devolved governance. The benefits of such devolution are increasingly clear in Shinyanga, as the **Ngitili** example demonstrates. The right conditions of decentralization, increased tenure security and the empowering approaches of HASHI combined with a solid traditional knowledge base contributed to the success of restoration in the region.

The success of Shinyanga has prompted a shift of focus within the forestry sector in Tanzania, from externally planned and promoted schemes of tree planting based on exotic species, to one of restoration of, in the case of Shinyanga, indigenous Miombo and acacia woodlands.

Tanzania has about 33.5 million hectares of forests and woodlands. Almost two-thirds of this consists of woodlands on unreserved land. Forest resources on unreserved lands are under enormous pressure. Shinyanga region, south of Lake Victoria in north-west Tanzania, suffered from serious forest and woodland degradation due to over-grazing, uncontrolled bush fires, unsustainable wood demand (in particular for fuel), and the clearing of forest land for agriculture and tsetse fly eradication (1940-1965). WWF- Canon/ John E. NEWBY.



Children display Tamarind seeds, harvested from the restored woodland at their school. **Obadia Mugassa.**

Due to local efforts, there are now over 15,000 individual Ngitili covering approximately 25,000 ha, and 284 communal Ngitilis covering about 46,000 Ha. This represents a total of more than 70,000 ha of important woodland restored in 172 villages surveyed, out of the total of 833 villages in the region. Based on these figures, it is estimated that over 250,000 ha have been restored across the whole region.

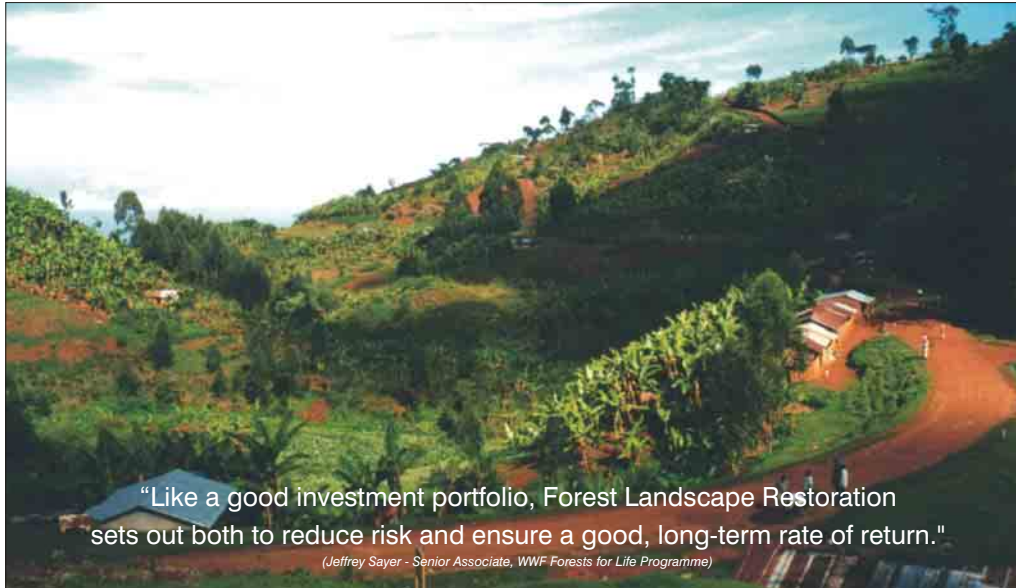


Rich agricultural lands as a result of the climate mitigation efforts of Mount Elgon. IUCN-EARO/ **Edmund Barrow.**

What is the FACE Foundation? The FACE Foundation (Forests Absorbing Carbon Dioxide Emissions) was originally set up by the Dutch Electricity Generating Board, with the objective of establishing forests as carbon sinks to offset emissions of greenhouse gasses from power stations in the Netherlands. It has since evolved into an independent organization with a range of industrial and business clients. The foundation has funded carbon sequestration projects in the Netherlands, the Czech Republic, Ecuador, Malaysia and Uganda. Joining forces with the Uganda Wildlife Authority (UWA), FACE plans to establish a total of 35,000 ha of forest in Uganda - 25,000 ha in Mount Elgon National Park and 10,000 ha in Kibaale National Park at an annual planting rate of 1,500 ha.



How will the tree plantings be maintained in the long term, especially after the FACE project ends? The agreement between UWA and FACE provides for FACE funding during the establishment phase. Subsequent management and protection of the forest will be the responsibility of UWA. As the trees grow, CO₂ is absorbed and stored in the biomass of the trees and other vegetation above and below ground. Total biomass increases until the forest is mature, after which it increases at a minimal rate. To qualify for carbon credits, the forest must be permanent. Under the contract arrangements between the two partners, logging or clear felling is not allowed for at least 99 years. Forest management for that period will consist of protection and periodic measurements of carbon or biomass accumulation.



“Like a good investment portfolio, Forest Landscape Restoration sets out both to reduce risk and ensure a good, long-term rate of return.”

(Jeffrey Sayer - Senior Associate, WWF Forests for Life Programme)

One of the villages which border Mount Elgon National Park, and who have a collaborative agreement for accessing certain resources in the park. IUCN-EARO/ Edmund Barrow.

include power generating companies and other industrial and business clients in Europe. The credits will assist those companies which comply with emissions reduction targets set by the Kyoto Protocol of the UN Framework Convention on Climate Change.

Initiated in 1994, the project has reforested 8,500 ha of Mt. Elgon to date. Additional areas have regenerated naturally through protection provided by the project. Areas that were once degraded forest or cultivated plots are now covered in dense regenerating forest.

Expanding the availability of goods and services supplied by planted forests

The early phases of the project focused exclusively on the goals of the two partners, namely, carbon sequestration achieved by maximizing biomass production on the site and biodiversity conservation achieved by restoring the forest in the National Park. Other benefits that forest restoration might bring were not considered relevant. When community needs for subsistence forest resources conflicted with the project goals, carbon sequestration and biodiversity conservation took precedence. People were banned from harvesting firewood, thatching grass and other subsistence resources on the grounds that this would reduce the total carbon accumulation on the site.

This approach brought the authorities into conflict with local people, and tree seedlings were destroyed in a number of cases. Concerns over the long-term security of the reforested areas led the authorities to review their policy of excluding local people. At the same time, Uganda Wildlife Authority was experimenting with new community based approaches to protected area management. With the assistance of IUCN, UWA pilot tested collaborative management approaches with local communities on Mt. Elgon which involved providing access to resources in exchange for self-regulation and resource protection by the community.

The approach was successful and has been expanded to areas reforested under the UWA/FACE project. People are now able to enter into formal written agreements with the authorities to harvest a wide variety of resources such as firewood, wild fruit and vegetables, thatching grass, vines, wild honey and bamboo. The agreements are designed to permit sustainable levels of harvest and to empower the communities to regulate their use of the forest. The communities have agreed to monitor forest use and protect the forest from destruction or unsustainable use. It is expected that this will ultimately lead to less need for protection by the Authority and better security for the forest.

The change in policy has reduced conflict between the Authority and the local people and has improved local attitudes to conservation. Since 2000, 12 agreements have been signed between the parishes and the National Park for commercial and non-commercial harvesting of wild resources. In addition to the benefits of resource harvesting, some local people are also employed by the project. Improvement in the water catchment value of the area as a result of forest restoration is an added benefit that accrues to the wider community downstream.

“HASHI demonstrates that rural people and communities can revitalize local institutional mechanisms to restore forests and woodlands, and see the importance of natural trees and vegetation to help secure and improve their livelihoods.” (Edmund Barrow - Coordinator, Forest Conservation & Social Policy, IUCN Regional Office for Eastern Africa)

When the former chairman of Isagala village was asked why it had been possible to turn a large stretch of land into a communal Ngitili, he said "it was because the village made the decision themselves. It was not imposed on them."

“It makes good sense to consciously look for any institutional arrangements which are in place for managing natural resources, and to then build on them for restoration activities. This sounds eminently sensible, but in fact is rarely done. Quite frequently it is assumed that no institutional arrangements exist. It is perceived that there is a need to create and impose a new institutional structure on local communities. This normally destroys the pre-existing arrangements, and may not provide a sustainable alternative. It is always much better to build on what is already there.” (David Lamb, Don Gilmour, 2002 in press)



Two children collect water from an almost dry river bed
WWF-Canon/ Sandra MBANEFO OBIAGO

Bringing Water to Wigelekeko Village

Wigelekeko village suffered from a shortage of wood products, fodder and water during the dry season, until HASHI extension workers helped turn things around. In 1986, the village set aside an area of 160 ha of degraded land as Ngitili for the production of fodder, firewood, grass for thatching, medicine, poles and soil conservation. After five years, the area was covered with dense vegetation. Controlled collection of firewood and other goods was allowed. In 1992, a well situated in the Ngitili, which used to have water only during the wet season, now had water all year round.

The villagers attributed the increased water supply to the conservation of their Ngitili which provided them with a strong incentive to intensify conservation efforts. In 1997, they added another 20 ha to the Ngitili for water catchment purposes. Each household in the village contributed about US\$4 for the construction of a water dam that was completed in 1998. By the end of 1999, the dam's reservoir held water throughout the year and in 2000, fishing began. The value of the water the dam provides for domestic use was estimated to be US\$26,000 per year. A special watering point was constructed for livestock, and the reservoir provides water for about 1,900 cattle. The value of the water for livestock is estimated to be US\$92,000 per annum.

Now, Wigelekeko village has established a water-users group to manage the dam. The users group, with the approval of the village assembly, is selling water to outsiders to fund village community development programmes, including the conservation of the village Ngitili.

The villagers realize the importance of natural resource conservation, and they are actively participating in conserving their Ngitili. As a result they are also able to increase the water available to them, a crucial asset during the dry season, as well as derive income from the sale of surplus water. This contributes to livelihood security as well as to conservation.

U G A N D A
Adding Social and Environmental Benefits to a Carbon Project



Ngitili on restored hillsides. **Obadia Mugassa.**

"Ngitili" is an indigenous natural resource management system involving the conservation of fallow and range lands by encouraging the active management and regeneration of vegetation, in particular for browse and fodder in the dry season. There are two types of Ngitili reserves, namely family or individual reserves and communal reserves. Private Ngitili can actually increase a farmer's land value. Communal Ngitili have helped people restore degraded hill and river-edge areas.



Reviewing the encroachment and degradation of the Mount Elgon forest, Uganda. IUCN-EARO/ **Edmund Barrow.**



IUCN-EARO/ **Edmund Barrow.**

What began as a carbon sequestration initiative, with the narrow objective of maximizing biomass accumulation, evolved into a model for Forest Landscape Restoration when the project's scope was broadened to include delivery of a range of forest goods and services to local, national and international beneficiaries. In addition to the carbon benefits originally envisaged, the reforested areas are providing subsistence resources from indigenous species to local communities and have enhanced the biodiversity and water catchment value of the forest.

Mount Elgon is a very large volcanic mountain on the border of Kenya and Uganda. Its base covers an area of about 4,000 km² and its slopes are densely populated by subsistence farmers who cultivate its rich volcanic soils. Its upper slopes, in both Kenya and Uganda, are conserved as National Parks and Forest Reserves for their valuable forests, biodiversity and water catchment value. The National Park on the Ugandan side amounts to about 100,000 ha but its forests were largely destroyed and encroached for agriculture during the civil wars of the 1970s and 80s. Since the late 1980s the government has been rehabilitating the protected area with the assistance of donors and conservation organizations. One initiative which has been particularly successful in restoring large areas of degraded forest in Mt. Elgon is the UWA/FACE carbon sequestration project.

Financed by the Netherlands' **FACE Foundation** and implemented by the Uganda Wildlife Authority, the Project aims to re-establish the original forest on 25,000 ha of encroached land in the National Park by enrichment planting with indigenous species. The Foundation will claim carbon credits equivalent to the amount of carbon sequestered in the reforestation area. Those credits will then be offset against CO₂ emissions by the Foundation's clients, which

Equator Initiative Honours the Rebirth of the Ngitili Tradition

The Equator Initiative chose this case as one of twenty-five outstanding projects to be put forward at the World Summit on Sustainable Development. The Equator Initiative was set up by the UNDP, working with a range of groups including IUCN, to highlight successful initiatives undertaken by communities in the Equatorial belt, which promote poverty alleviation through the conservation and sustainable use of biodiversity. For more information: <http://www.equatorinitiative.org>.

K E N Y A T r e e s

The Safety Net and Risk Management Strategy for Pastoralists in Drylands



The removal of trees and woodland has a disproportionately negative impact on women who have to spend more and more time collecting fuelwood as much as 100 days a year in some parts of Turkana. IUCN-EARO/ Edmund Barrow

The Many Benefits of Conserving *Acacia tortilis* Trees in Lorugum

Fodder - The conservation of *Acacia tortilis* trees is a major strategy for the livelihood security of the Turkana, as during dry times the leaves and pods provide much needed fodder for livestock.

Food Security - The flour, or 'apinet,' which is made from grinding the pods (not the seeds) is an important component of Turkana dry and drought time diet. It is nutritious and can be stored for long periods. It is used to make porridge either on its own, or mixed with maize meal. Alternatively it can be mixed with milk or blood and made into pancakes which can be sun-dried and stored.

Fuelwood - Firewood is the only source of domestic energy used by the people of the area.

Building Material - Being able to collect enough branches, and poles for making houses and livestock enclosures was becoming an increasing problem, with people having to go further and further away to collect these resources. The restored *Acacia tortilis* now provides many of these needs.

Pasture - Trees and bushes act as windbreaks providing a micro-climate for the growth of grasses and other vegetation. With the removal of the woody vegetation ground vegetation is reduced in amount and quality, even after rains.

Shade The shade of trees is very important for the health of Turkana's livestock. Shade is important for lactating cows, sheep, camels and the donkeys helping them to produce enough milk for their young and human consumption.

Medicinal - The roots and pods of *Acacia tortilis* are used in medicine. The small roots are burned and the smoke inhaled to clear pulmonary disorders. The fresh pods are boiled in water, and the decoction used as a general preventive medicine.



Roots are collected for food in drought stricken countries. WWF-Canon/ John E. NEWBY

The forests and woodlands of Turkana suffered during the drought years of the early 1960s. People and livestock were dying, and famine relief camps were established. Larger areas of woodland were severely degraded to meet the construction and fuel needs of the relief camps. As the effects of the famine receded, the Turkana pastoralists moved out of the camps into a landscape that had suffered significant environmental damage. This case study tells the story of how more than 30,000 ha of *Acacia tortilis*-dominated woodland was restored by the Turkana people from the Lorugum area of Turkana District, North West Kenya through their traditional institutions. The woodland provides vital goods and services they require to secure their livelihoods in this drought-prone region.



Restored Acacia trees in the Turkana drylands. Pauline Akaran.



Acacia trees are an important source of fodder for camels. IUCN-EARO/ Edmund Barrow.

Trees are vital to the Turkana way of life. They provide a continuous flow of products throughout the year, and are therefore an important aspect of risk management, especially in the arid and semi-arid lands. Dry timber is used for fuel. Building material is selectively cut from different trees. Small branches are cut during the long dry season to feed livestock, and pods and fruits are also a source of fodder for livestock and food for people. During times of drought, trees provide emergency food and fodder and firewood can be sold. In effect, trees are like a savings bank acting as an emergency store for hard times while the interest can be used to supplement livelihoods when resources are more plentiful.

The Turkana have developed an intricate management system that includes wet and dry season grazing combined with communal reserved grazing areas (**Epaka or Amaire**) and dry season individually-owned fodder reserves (**Ekwar**).

The **Ekwar** system for trees is especially important in the drier parts and along rivers where the riparian vegetation also helps to conserve scarce waters resources. In these areas, ownership of the trees and associated produce is divided into **Ekwar** (lit. "trees beside the river"). During the dry season in particular, pods and leaves from the **Ekwar** provide the family with valuable fodder. Produce from the **Ekwar** belongs to the owner, and no one else can use it unless by prior arrangement and agreement. The Turkana understand and respect this system. This social organization has important ecological implications, as it enables people to regulate the exploitation of their natural resources. In a drought-prone environment such as in Turkana the maintenance of natural resources is crucial for survival.



Riverine forest of the Turkwell River, Turkana, Kenya. IUCN-EARO/ Edmund Barrow.



Acacia pods, a vital resource for Turkana livestock in the dry season. IUCN-EARO/ Edmund Barrow.

The two institutions of **Amaire** and **Ekwar** formed the basis for the restoration of the **Acacia tortilis** woodland in the Lorugum area of Turkana District. As the famine of the 1960's receded, the relief-camp was closed and the Turkana pastoralists returned to the pastoral economy. The number of people depending on the natural resources of the area returned to pre-famine levels. Paradoxically, the accumulation of livestock, goats in particular, in camp provided an ideal starting point for restoration.

A key component of goats' diet are the pods of **Acacia tortilis**. While the pod material provides a nutritious food, the seeds are not digestible and are excreted in goat droppings. As the goats around the camp were enclosed during the night, most of the seeds were excreted in a concentrated area. When the rains returned, the **Acacia tortilis** seeds germinated forming the basis for the regeneration of the **Acacia tortilis** woodland. Without protection, the seedlings would not have survived as most would have been quickly browsed by livestock. This is where the Turkana reserved grazing area systems and institutions came into play, providing the basis to conserve the area and allow the young seedlings to establish.

In 1974 Chief Musa Ngitiangi became the administrator of the area. Ngitiangi was keen to restore the lands to their former state and persuaded local people to protect the **Acacia** seedlings. The people of the area agreed that it was important to conserve their natural resources, as they had all seen what had happened after the drought, and clearly understood the benefits of conserving their **Acacia tortilis** trees. While **Acacia tortilis** has been the main focus for the restoration, other important tree species such as **Cordia sinensis**, **Dobera glabra**, **Salvadora persica** and woodland plants also grew back. As a result a wider array of biodiversity was restored as a "by-product."

The success of these restoration efforts was phenomenal, with vibrant re-growth across 30,000 hectares changing the landscape. Moi University Lecturer, Dr. D. Ogweno explained, "The once windy place is now no longer so. Before the start of Ngitiangi's initiative, one could clearly see Lorugum shops from Lorugum Primary School, some 3 kilometers away. Currently, one cannot see beyond the school's football pitch in the direction of the shopping centre. The once bare ground is now valued so much that there is no empty place for a person to build a house. There is so much change in this place."

How did it come about? Firstly, as in so many such cases, there was a visionary and strong personality who could catalyse the process from within. In this case that person was Chief Musa Ngitiangi who believed that the restoration process would work, and had the perseverance and strength of character to make it work despite much early criticism.

Secondly, the people of the area understood the importance of **Acacia tortilis** to their livelihood security it is, simply, the most important tree for them during the dry season and in times of drought. This is why the Turkana have developed ownership rights over individual **Acacia** trees. While the importance of the trees was well understood, the people were far more skeptical about being able to restore the forest. As a result Chief Musa met with a lot of opposition.

Thirdly, the Turkana have a range of institutions which could be used to assist with the restoration process. Declaring the area a traditional grazing reserve (**Epaka** or **Amaire**) meant that the principle was understood by everyone. In addition the systems of rules and regulations together with the sanction methods were internal, and part of Turkana natural resource management. The traditional rules and regulation were given added legal support through the Chiefs Act. The project was also actively supported by the Forestry Department during the 1980s.



IUCN-EARO/ Edmund Barrow

Turkana is an arid district on the western shores of Lake Turkana in north-western Kenya. The area is dominated by hills which enclose the very dry central plains through which the Turkwell River flows. The river is fed by a network of seasonal streams whose banks are lined with trees. This riverine vegetation plays a vital role for the Turkana providing vital food supplies during times of drought. Use of the trees is strictly regulated under a traditional management system.



Acacia trees with a carpet of pods. IUCN-EARO/ Edmund Barrow

The Cultural Value of Trees for the Turkana Trees play a central role in Turkana culture. People are named after trees, shady trees act as meeting places, and trees provide traditional medicine. Trees play an integral role in rituals and ceremonies, such as marriage and are used for various feasts. Such trees have important cultural significance and cannot be cut down without serious consequences.



Pauline Ekanan

External Threats to Sound Management Systems - The people of Turkana have evolved sound ecological strategies which enable them to utilise vegetation on a sustainable basis through exploiting different ecological niches

(grazers, including cattle, sheep and donkeys, and browsers including camels and goats), as well as diversified food procurement strategies. The Turkana silvopastoral system makes best use of the vegetation both in time and space through a transhumant system of wet and dry season grazing

combined with the setting aside of specific dry season grazing reserves (Epaka or Amaire), combined with actual ownership of critical resources such as trees (Ekwar). Such complex silvopastoral systems have worked in the past, yet are now under threat from, primarily, externally driven interventions (e.g. settlements, irrigation schemes, health and education facilities). With 'modern' development, the importance of customary systems and institutions is often ridiculed and down-played as being 'backward', and for not being in keeping with current aspirations. As a result, unless actively used as a basis for development, such customary systems weaken and ultimately die out. The Turkana example demonstrates what can happen when such existing institutions are used as building blocks!