



# Improving ecosystem functionality and livelihood

Experiences in forest landscape restoration and management



LIVELIHOODS AND LANDSCAPES STRATEGY – Working Paper n°2



Ministry of Foreign Affairs of the  
Netherlands

The designation of geographical entities in this book, and the presentation of the material, do not imply the expression of any opinion whatsoever on the part of IUCN or the Ministry of Foreign Affairs of the Netherlands concerning the legal status of any country, territory, or area, or of its authorities, or concerning the delimitation of its frontiers or boundaries.

The views expressed in this publication do not necessarily reflect those of IUCN or the the Ministry of Foreign Affairs of the Netherlands.

This publication has been made possible by funding from the Ministry of Foreign Affairs of the Netherlands.

Published by: IUCN, Gland, Switzerland

Copyright: © 2012 International Union for Conservation of Nature and Natural Resources

Reproduction of this publication for educational or other non-commercial purposes is authorized without prior written permission from the copyright holder provided the source is fully acknowledged.

Reproduction of this publication for resale or other commercial purposes is prohibited without prior written permission of the copyright holder.

Citation: Edmund Barrow, Robert Fisher & James Gordon (2012). *Improving ecosystem functionality and livelihoods: Experiences in forest landscape restoration and management*. Gland, Switzerland: IUCN.

Cover photo: Mozambique © IUCN/Daniel Shaw

ISBN: 978-2-8317-1496-7

Available from: IUCN (International Union for Conservation of Nature)  
Publications Services  
Rue Mauverney 28  
1196 Gland  
Switzerland  
Tel +41 22 999 0000  
Fax +41 22 999 0020  
books@iucn.org  
www.iucn.org/publications

A catalogue of IUCN publications is also available.

# Contents

<b>Executive summary</b> .....	<b>iv</b>
<b>About LLS</b> .....	<b>v</b>
<b>Introduction</b> .....	<b>1</b>
<b>Case studies</b> .....	<b>3</b>
Doi Mae Salong (Thailand) .....	3
Developing inter-communal forest management in the Sablogo Forest, Burkina Faso .....	4
Renewal of inter-village management of the Kelka forest of Mali .....	6
“Rights, resources and rewards”, Mount Elgon, Uganda .....	7
Tacaná, Guatemala – native tree planting for watershed restoration .....	9
Improved biodiverse forest management optimizes benefit flows in Miyun, China.....	10
Lao PDR.....	12
Lachuá, Guatemala – increasing connectivity of a protected area through landscape restoration.....	14
<b>Conclusions</b> .....	<b>16</b>
<b>References</b> .....	<b>18</b>

# Executive summary

This paper examines how interventions intended to improve functionality and productivity of forested landscapes to improve livelihoods of the poorest populations, might actually yield co-benefits in terms of biodiversity conservation. It argues in favour of a 'landscape' approach to achieve these co-benefits.

Using case study examples from eight landscapes involved in LLS – Doe Mae Salong, Thailand; Sablogo forest, Burkina Faso; Kelka forest, Mali; Mount Elgon, Uganda; Tacaná, Guatemala; Mayun, China; Lao PDR; and Lachua, Guatemala – it presents evidence for the benefits of landscape approaches to forest restoration.

Among the key findings flowing from the case studies include the finding that for landscape interventions to lead to improved livelihoods and enhanced biodiversity requires taking a holistic approach in which the different land uses of the forested landscape along with the types of trees and their products and services are taken into account. Reconciling both will of necessity require trade-offs. Balancing these trade-offs requires stakeholder engagement, careful negotiation, and participatory planning and goal-setting.

Similarly, all the case studies also reveal that to yield co-benefits in terms of improved livelihoods and biodiversity conservation and enhancement, interventions implemented as part of the LLS approach may require change. This could be in the form of behavioural changes, changes in the traditional or accepted way of doing things, e.g. farming techniques, animal grazing patterns, or institutional changes including changes in the ways in which decisions are made, and in land policies, e.g. land tenure rights. Such changes provide resource-dependent communities with security and incentives for engaging in sustainable management practices.

Finally, various forms of active management, either on their own, or in partnership, or as part of collaborative management agreements, result in improved biodiversity conservation as the conditions and institutional arrangements have been put in place for enhanced biodiversity conservation, sustainable benefit flows, and local community ownership. These biodiversity benefits may be seen as a by-product, as the biodiversity is being managed for livelihood benefits. Though this is not always the case.

# About LLS

The Livelihoods and Landscapes Strategy (LLS) is a global project of IUCN's Forest Conservation Programme funded by the Directorate General for International Cooperation (DGIS) of the Netherlands Ministry of Foreign Affairs. Its first phase ran from 2007-2011. Its overall goal has been *"the effective implementation of national and local policies and programmes that leverage real and meaningful change in the lives of rural poor, enhance long-term and equitable conservation of biodiversity and ensure the sustainable supply of forest-related goods and services in line with nationally-defined priorities"*.

LLS was designed as a direct response to achieving two of the major challenges facing sustainable development at the time of its design in 2006:

- How to find practical ways to support governments and donors in ensuring that the benefits of national poverty reduction strategies reach the rural poor, and in particular those who are highly dependent on natural resources including forests and trees.
- How to reverse the current lack of momentum in implementing international commitments on sustainable forest use and conservation and therefore address the slippage of forest-related issues within international development.

The strategy is predicated on the belief that although these two challenges are inextricably linked, natural resource management and conservation organizations have yet to make a convincing case, on a large enough geographic or institutional scale, as to how improved resource use and conservation can make a difference to the livelihood security of the rural poor. It is hardly surprising therefore that ministries of finance and economic planning have tended to be unaware of the fact that forest goods and services remain as important as ever for many poor people and could be better harnessed to contribute to rural poverty reduction, as well as the national economy.

LLS has contributed to shaping a bold new vision of forests as multifunctional assets that can make a real difference to rural poverty, economic growth, environmental quality, human well-being as well as biodiversity conservation. It has promoted this vision among both the forest sector and decision makers in other sectors whose own goals and targets impact, or are impacted by, the state and integrity of forest resources. The strategy has four key thematic components, each addressed in a mutually integrated manner:

- i) forests and poverty reduction,
- ii) markets and incentives,
- iii) governance, and
- iv) transforming landscapes

Targeted geographic interventions in nearly 30 landscapes across 23 countries in Africa, Asia and Latin America looked at the linkages between the four themes and avoiding their treatment as stand-alone issues.

This paper is one of a series of thematic working papers exploring the cross-cutting operational components, and which draw on various aspects of landscape experiences to test some of the assumptions behind LLS, bringing together a host of its lessons and insights. The papers draw on data and information generated over the last 5 years and in most cases, at the time of publication, successes on the ground have continued into 2012, when the first phase of the project officially closes.

With sustainability integral to the LLS project design, the work of LLS will in effect live on in each landscape and often much more widely than that, influencing local, regional and international practice and policy in the manner already detailed and reported in the LLS Landscape Papers, Thematic Papers, Thematic Briefs and Research Papers

## What is a landscape?

A landscape is a mosaic of different types of land use such as agriculture, forests, pasture and conservation areas. Managed as a whole, a landscape serves a variety of needs for various stakeholders.

The LLS vision of a landscape is of multiple and complementary land uses based on negotiation rather than centralized planning. Landscapes do not exist in a vacuum, but are influenced by a wide range of external factors including policies and economic conditions generated far outside it, land use in adjacent landscapes and perhaps remote physical features such as dams.

Addressing landscape management issues always requires interventions outside as well as inside the landscape.



# Introduction

Hundreds of millions of people depend directly on natural ecosystems and their constituent plants and animals for subsistence and income (Fisher *et al.*, 2008). Some of the world's most diverse ecosystems are a resource base for some of the world's poorest people (Fisher and Christopher, 2007), and this is particularly true of forested ecosystems (Sunderlin *et al.*, 2008). Ecosystem services, such as the provision of water and soil fertility, are important components of livelihoods, while forested landscapes can also have important sacred and cultural values. The amount or extent of diversity within landscapes can itself be an asset for those dependent on that functionality (e.g. Barrance *et al.*, 2003; Méndez, 2008) since it provides a variety of resources and livelihood options at different spatial and temporal scales. However, the true importance of biodiversity is not always fully appreciated as the value of resources derived from forests may only be apparent during seasonal shortages, periodic crises or may accrue mainly to marginalized, less visible sections of a community. In short, this value is hidden and rarely acknowledged by planners and national economists.

While maintaining or increasing biodiversity in forested landscapes may be important components in restoring the functionality of a landscape, it does not follow that improving the productivity or functionality of a landscape in ways that contribute to livelihoods, especially those of the poorest, will *necessarily* lead to improved biodiversity conservation. The Livelihoods and Landscapes Strategy (LLS) was an ambitious attempt to explore how livelihoods can be improved through restoring the functionality of forest landscapes, where the maintenance of biodiversity is also considered important.

The notion of the term 'landscape' in LLS draws upon the idea that forested landscapes consist of areas with a variety of different types of land use that are, in some ways, complementary to each other and which share "a specific set of ecological, cultural and socio-economic characteristics distinct from its neighbours" (Maginnis *et al.*, 2004). An important aspect of the landscape concept is that it assumes that multiple objectives (biodiversity conservation, livelihood improvements) cannot always be achieved in small isolated sites, but can often be achieved through negotiations at the wider landscape level (Fisher *et al.*, 2008).



Mangrove restoration site, Cambodia © Gordon

For this paper, we clarify what we mean by a forested landscape. While a forested landscape might evoke images of continuous verdant forest cover, today's reality is that most forest is found in mixed landscapes where many other human-dominated land uses exist, and the forest that remains is altered, to varying degrees, by fragmentation and various forms of formal or informal management. A forested landscape in this context is a mixed landscape that needs to continue to provide a number of goods and services to support the livelihoods of those dependent on it. Maginnis and Jackson (undated) define a forested landscape as one that "is, or once was, dominated by forests and woodlands and which continues to yield forest-related goods and services".

The trees in landscapes are at least as important for the role they play in the provision of goods and maintenance of services as they are in conserving biodiversity. Thus a landscape approach to managing forest resources recognizes that multiple goods and services have to continue to flow from a landscape. Inevitably there will be trade-offs between those goods and services, and therefore planning landscape management is a process of on-going negotiation between different stakeholders.

Forest Landscape Restoration (FLR) is one approach to restore the goods and services of a forest or landscape. FLR is “a process that aims to regain ecological integrity and enhance human well-being in deforested or degraded forest landscapes” (Maginnis and Jackson, 2007). Maginnis *et al.* (2007) stress that FLR “**does not necessarily aim to return forest landscapes to their original state**, but rather is a forward-looking approach to strengthen the resilience of forested landscapes and keep future options open for optimizing the delivery of forest-related goods and services at the landscape level” (emphasis in original).

This paper is based on work carried out in, and experience from landscapes involved in LLS. It covers a number of these landscapes but does not attempt to discuss all of them; rather the paper focuses on landscapes that provide clear lessons. In presenting evidence for the benefits of landscape approaches, the paper stresses the importance of restoring ecosystem functionality, the goods and services, and not just types of trees and biodiversity. It stresses the benefits of different types of landscapes.

This represents an opportunity to ask whether biodiversity can at least be maintained, if not enhanced in forested landscapes where improving the livelihoods of the rural poor is a principal goal. Certainly, there is ample evidence from elsewhere to suggest that managed forests and trees in areas where significant biodiversity exists can contribute to the maintenance of biodiversity in the landscape. These forests and trees may be naturally regenerating (Boshier *et al.*, 2004; Finegan and Delgado, 2000; Gordon *et al.*, 2004; Harvey and Haber, 1999; Ghazi *et al.*, 2005) or planted (Rodrigues *et al.*, 2009; Bremer and Farley, 2010; Keenan *et al.*, 1997). Biodiversity, for this paper also includes ecosystems (Shepherd, 2008) and their services, though the CBD has a more restricted definition: “*The variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems*” (CBD, 1992, Article 2). The ecosystem approach stands at the meeting point between sustainable ecosystem management and enhanced livelihood security. It encompasses both conservation and development concerns, and has the potential to shape these two ways of seeing the world in a more complementary relationship (Shepherd, 2008). The ecosystem approach, as presented by the CBD, has 12 guiding principles (Shepherd, 2008), some of which will be highlighted in this paper.

It is important to emphasize that landscape interventions in LLS were not planned with the overriding goal of improving biodiversity and ecosystem conservation. Instead there was an emphasis on participatory goal-setting and planning towards improving a variety of ecosystem services. Thus biodiversity conservation benefits might arise directly through better management of elements of biodiversity that have direct uses, or as co-benefits from, for example, improved soil and water conservation. One of the key themes of this paper is a consideration of biodiversity benefits that may have arisen in these landscapes.

A challenge in demonstrating the biodiversity impacts of Forest Landscape Restoration (FLR) and managed landscapes in the context of LLS arises from the timeframe of implementation, which is too short to show clear biodiversity impacts. LLS was effectively initiated in March 2007, and many landscapes did not commence active field operations until early 2008, or even later. Further, given the LLS approach and its emphasis on participatory planning as a necessary step in FLR and landscape management, physical activities involving FLR took time to develop. Time-series data based on intensive biodiversity sampling is not available to show changes in amounts and types of biodiversity in given landscapes, though for some landscapes this could be done and become part of long-term monitoring. We propose that the types of landscape changes described here indicate improved conditions for the maintenance or increase of biodiversity. Such changes can include: increases in native species forest cover; the greater use of natural regeneration for forest restoration; the improvement of rational use of threatened species; increases in connectivity between areas of natural forest (Bennett, 1999; Tischendorf and Fahrig, 2000); and reduction of human pressure on protected areas (PA).



# Case studies

## Doi Mae Salong (Thailand)<sup>1</sup>

The Doi Mae Salong landscape is located in a mountainous part of northern Thailand in the headwater of one of the tributaries of the Mekong River. Within this the LLS landscape has an area of 90 km<sup>2</sup> with a human population of about 15,000 consisting of members of a number of hill tribes, remnants and descendants of Chinese Kuomintang soldiers who left China after the Revolution and refugees from Myanmar. Doi Mae Salong is a military reserved forest under the control of the Royal Thai Armed Forces (RTAF); the landscape is at the core of this reserve.

The area has been heavily degraded for over five decades by agriculture, especially shifting cultivation. Large areas have been cleared for tea and cash crops. One of the impacts of this degradation has been felt on water quality downstream which has been affected by erosion to the detriment of downstream farmers.

The core feature of the interventions carried out in the landscape was the development of participatory land-use planning through a multi-stakeholder process. The management process focused heavily on negotiations between stakeholders about competing land uses. In particular, farmers of upland agricultural plots were allocated alternative plots in areas not prone to erosion. The original upland plots were then used for various forms of restoration.

Activities in Doi Mae Salong included the expansion of paddy rice production and various types of soil conservation. Restoration included forest landscape restoration using natural forest species, and reintroducing medicinal plants to the area which, though originally present, had largely disappeared. Work on restoration with natural forest species was carried out with FORRU (the Forest Restoration Research Unit at Chiang Mai University), and based on forest restoration using 'framework species' (Forest Restoration Research Unit, 2008).

A major innovation in restoration was the use of agroforestry as a form of landscape restoration. These activities were supported by the Royal Project (a project which works under the auspices of His Majesty the King of Thailand). The innovation lies in the fact that significant areas of agroforestry plantations have been established on areas sensitive to soil erosion such as ridges and slopes. Plantations include mixed areas of coffee and macadamia, and the planting of coffee under the shade of a mixed forest of indigenous species.



Photo 1: FORRU Framework species demonstration plot before planting



Photo 2: Close up of plot, one-and-a-half years after planting

---

<sup>1</sup> This draws heavily on Honadia, C., Sawadogo, S., Wandja, C, and G. Shepherd (2010): Sablogo Landscape, Burkina Faso. IUCN, 26pp.

The total area of degraded forest restored (up to about June 2010) was 640 ha. Significantly, there is great enthusiasm for this approach and training in seedling production means that a supply of seedlings will be available independent of external support.

The extent of landscape restoration in this managed landscape is relatively small in comparison to the size of the total landscape, but it is clear that the processes of decision making and planning are in place and the potential for income, when agroforestry crops such as coffee mature, provides a strong incentive for continued restoration activities. The shift to more participatory planning and management was a significant change in approach for RTAF from the more traditional military type top-down approaches which did not work. RTAF embraced these more participatory approaches, as they also contributed to their security-related outcomes.

Although these agroforestry plots do not restore the original biodiversity, they act as excellent protection against soil erosion and will provide significant income when mature. It can be argued that the biodiversity lost from the landscape is now being replaced by new forms of biodiversity, or agrobiodiversity, with the expectation that increased agroforestry will increase connectivity between remaining natural forest fragments.

It is clear that the elements necessary for continued restoration are in place, including a capacity for participatory management and planning and an interest in restoration resulting from the apparent financial benefits. There is a clear trend towards further improvement. It is likely that the interest in landscape restoration is related to the foreseen economic benefits, not necessarily to an abstract commitment to 'diversity'. The point is that the economic benefits of a managed landscape contribute to improved landscape function and biodiversity.

## Developing inter-communal forest management in the Sablogo Forest, Burkina Faso<sup>2</sup>

The Sablogo landscape (34,000 ha) is a Sahelian parkland woodland where tenure is based on customary authority. The people practise agriculture and keep livestock. Non-timber forest products (NTFP) such as fruits, honey, fodder, medicinal plants and wood for fuel and crafts represent important uses of biodiversity and demonstrate the dependency of communities on a diverse array of forest products that are available at different seasons and in different conditions. Women in particular depend on NTFPs and partly as a consequence of this, women are the most important users of the forest, and sell the products at market. The forest is also sacred and an important place for ancestral worship.

The immediate causes of degradation of the Sablogo forest include over-exploitation and land conversion. People exploited the forest to meet their livelihood needs for fuelwood, grazing and NTFPs. But there was little active management, and access was neither equitable nor controlled. In addition, this forest was also an important source of fuelwood for more distant towns. As a result, bush fires were common to both clear land for grazing and for farming, and the forest became severely degraded. The forest has also attracted migrants, who cleared areas for farmland or for dry season grazing for livestock. While authorization for forest exploitation is the responsibility of the Forest Service, this institution has not been able to prevent over-

---

<sup>2</sup> This draws heavily on Honadia, C., Sawadogo, S., Wandja, C, and G. Shepherd (2010): Sablogo Landscape, Burkina Faso. IUCN, 26pp. All of the landscape case studies referred to in this paper have been documented in more detail in a series of published landscape papers. The case studies draw to a varying extent on information provided in the landscape papers supplemented by the personal knowledge of the authors of this paper and by other sources as acknowledged. As LLS activities formally ceased in 2011, the information presented in the case studies applies to late 2010 or early 2011, unless otherwise indicated. See [www.iucn.org/forest/lls](http://www.iucn.org/forest/lls).

exploitation. The result is that the Sablogo landscape has become severely degraded over time. As the State Governor put it, “if nothing is done, the forest will soon become a desert”.

The initiative to conserve the Sablogo forest came from the government. It was perceived as an effective pilot project for Burkina Faso’s policy on decentralization of natural resource management. IUCN proposed the LLS approach, and a process driven by the communities in the three municipalities of Tenkodogo, Bissiga and Lalgaya of the Centre East State of Burkina Faso. The 20 communities who lived close to the forest were the main stakeholders of this *forêt inter-communitaire* (or inter-community forest). These communities began to plan, in a participatory manner, for landscape management and restoration approaches to ensure the sustainable use of natural resources. This meant restoring (forest restoration) and conserving (a core conservation area) the forest in a manner that enables it to continue to provide important goods and services. It also meant that rural people and municipalities would have important roles in management, so that customary tenure regimes are better and more formally recognized; the management work supported, and was in turn supported by, Burkina Faso’s decentralization policy and law.

A 10,000 ha conservation area within the forest was agreed following negotiation among the five villages and various government departments, and notably the Forest Service; it was secured by a perimeter track 5 m wide and 51 km long. This formed the core of the management plan based on local rules and in which pastoralists’ transhumant uses were respected and integrated. The people’s rationale for the conservation area was that if it is protected and excluded from use for a few years, there would be a lot of natural restoration, which could then be the basis for sustainable and agreed use. In addition, the villagers wanted to see the return of the forest animals, especially antelopes, which had disappeared.

Twenty communities (about 200 households) from three districts agreed the joint forest management plan and regulations to manage the core area of the forest – now referred to as an ‘inter-community forest’, a new concept for Burkina Faso. The management plan, which was a key outcome of the negotiations, allowed for equitable access to important natural resources from the area by the 20 communities. These resources include Shea butter (*Vitellaria paradoxa*), Balanites (*Balanites aegyptiaca*), Tamarind (*Tamarindus indica*) fruit, and the African locust bean (*Parkia biglobosa*).



Market in Sablogo forest © Intu

As well as protecting the 10,000 ha core of natural forest area from unsustainable use, some of the degraded areas in the remaining 24,000 ha were restored, with more than 80,000 indigenous trees planted (approximately 140 ha) by 2010. In addition, the use of indigenous trees is promoted as part of improved agroforestry on-farm.

Sablogo, the first inter-community forest in Burkina Faso, was created and managed by the communities and municipalities. The government closely followed this pilot as a potential model for other natural forests and woodlands in Burkina Faso, particularly in the context of the policy of decentralized natural resource management to local village authorities.

Restoring this landscape’s forest resources has increased and improved income-generating options for communities, but because of an emphasis on indigenous species and the declaration of the 10,000 ha core area, it is also expected to contribute to greater biodiversity conservation in the region, as evidenced by the variety of NTFPs harvested.

Restoration, agreement on the management plan, improved land use, and the sustainable harvesting of important natural resources are all important elements for enhancing biodiversity conservation and sustainable ecosystem management. The State Governor would, based on success so far, like to see the promotion of small private forests (approximately 0.5 to 2 ha) on-farm, in support of agro-silvo-pastoral activities around the forest, which would constitute a buffer zone for the forest and reduce dependence on it for some products.

## Renewal of inter-village management of the Kelka forest of Mali<sup>3</sup>

The Kelka forest in the Mopti region of Mali covers about 158,430 ha, and has an annual rainfall of 350-400 mm. There are 15 villages (approximately 60,000 people) bordering the forest made up of four main ethnic groups, Bambara, Dogon, Fulani and Marka. Rainfed and flood recession agriculture is practised (sorghums, millets and beans), though the main livelihood strategy is transhumant pastoralism.

The baseline assessment for the Kelka landscape showed eight types of vegetation, with four accounting for 90% of the landscape. These four main vegetation types are Gallery Forest (17%), Savannah Woodland (33%), Savannah shrub (18%), and Steppe Shrub (22%). Trees were dominant in the savannah shrub and gallery forest, where natural regeneration is most prevalent. A wide variety of wildlife is found including, for example, crocodiles (which are sacred and conserved by the people), gazelles and baboons. Most animal species live on the cliff slopes close to the water points in the Kelka forest. This natural forest is part of the migration route of the northern-most wild population of elephants in Africa. This combination of a large area of forest being managed by 15 villages, and its importance as an ecosystem for biodiversity (both resident and migratory), make it an important area to focus on in terms of both livelihoods and conservation.

The people are vulnerable to food insecurity because of the fragility of the land, pressures on the land and the impacts of an unpredictable climate. Local people move with their livestock in search of grazing in the Niger Delta between January and May. The carrying capacity of the Kelka area is estimated at about 95,000 cattle which is too high, as the forest is an important dry season grazing area for pastoralists, similar to other forest areas in the region. As a result, a number of vegetation types have been degraded, due to over-use during the dry season, and the unsustainable use and over-harvesting of trees for fuelwood (to supply Mopti city).

The baseline studies identified a number of productive activities based on biodiversity to enable the communities to improve their livelihoods, including honey production, processing of natural forest products, and using NTFPs (e.g. leaves of *Pterocarpus* and *Acacia* spp., *Anogeissus leiocarpus*, *Hyphaene thebaica*, *Boscia senegalensis*, *Adansonia digitata*, and *Ziziphus mauritiana*).

Sustainable forest management and restoration were agreed as key interventions. The Kelka forest has a management plan, developed between 1992 and 2004 with the participation of local communities. LLS built on this and facilitated the Kelka forest inventory and updated the participatory management plan, which is likely to be used as a template to help develop participatory forest management in the rest of Mali. The management plan includes zones for ponds and seasonal rivers (4.2%), areas for cultivation (6.9%), degraded areas (0.9%) in need of restoration, steppe and desert shrubs (39.8%), savannah woodland (33.2%), high canopy forest in the wetter flooded areas (14.8%), and protected forest (0.2%). People's participation in the development and revision of the management plan occurred at all levels, including in the design of the inventory of resources, participation in the inventory activities, counting of trees and wildlife for the baseline, designation of areas for different uses, and agreeing on areas for restoration.

---

<sup>3</sup> This draws heavily on Bathiono, Y., Bocoum, A., Diarra, R., and D. Endamana (2010): Productive Forest Landscape Management in the Kelka Area of Mali. IUCN. 26pp.

The areas available for natural restoration were agreed, and about 32 ha of indigenous trees have been planted by the villages so far in some of the degraded areas. The deepening of water ponds to support the population of sacred crocodiles, and prolong the supply of water was carried out through the construction of a 1.5 m *barrage* (or small dam). This resulted in increased numbers of crocodiles in the Batoma, Amba and Bore village ponds, from about 37 in 2006 to 192 in 2009. With the introduction of grazing management and restoration, there is increased awareness about the effects of degradation which has been reduced by at least 50%.

The zoning of the forest for different purposes, and the use of permits has made forest use more sustainable; it has also confirmed that there are a number of sacred groves in the area, where certain species cannot be cut. The 15 villages realize that sustainable management of the Kelka forest requires the involvement of other stakeholders as well, e.g. the decentralized collectives and technical forest services. As a result, natural resource management is integrated into local development plans.

Traditional medical practitioners now have renewed access to certain plants and herbs that come from natural restoration – an indicator of improving species diversity. Women who exploit NTFPs can now harvest products in a more sustainable way, as new rules implemented at the village level factor in the periods of harvesting of certain products such as baobab leaves, and the fruits of *Sclerocarya birrea* (Marula) and *Boscia senegalensis*. Capacity building for local people has been an important approach and over 875 people have received some form of training in aspects of sustainable forest management.

Renewing the inter-village Kelka forest management plan, combined with restoration, enhancement of water functions, and the sustainable use and marketing of NTFPs has been important in restoring and managing the landscape, and providing a more sustainable flow of goods from the forest. There are some immediate biodiversity gains (restored lands, increased crocodile numbers, demarcation and protection of the sacred groves). Revisiting the baseline studies in future will be important as a means to confirm further biodiversity gains from these various actions.



On the way to the market, Mali © Intu

## “Rights, resources and rewards”, Mount Elgon, Uganda<sup>4</sup>

Mount Elgon straddles Kenya and Uganda, covering approximately 772,000 ha, of which 221,000 ha consists of protected reserves and parks. The remainder is made up of farmland and settlements outside the protected areas and forests. The mountain is 4,321 m above sea level, and is the source of a number of rivers that feed into important river systems of Africa, most notably the Nile. Mount Elgon is an important area for conservation due to the richness of endemic plant and animal species (Howard, 1991), and is among the top 10 most species-rich forests in Uganda (Davenport *et al.*, 1996).

The LLS landscape, the Benet area in Kapchorwa District (named after the Benet people who live there), is relatively small, and comprises 6,000 ha of land adjacent to the national park. The Benet landscape is located on the northern edges of Mount Elgon National Park. The Benet were removed and resettled from central areas of Mt. Elgon forest when the area was declared a forest reserve in 1939 and a national park in 1993. The latter in particular, resulted in a period of conflict between the Benet and the national park

---

<sup>4</sup> This draws heavily on Barbara Nakangu, Chemonges Awadh, and Stephen Kelleher (2012). Rights, resources and rewards: Lessons learned on rehabilitating landscapes for livelihoods in the Benet landscape, Uganda. Gland, Switzerland: IUCN.

authorities. The 6,000 ha was excised from Mount Elgon National Park in 1983 for the settlement of the Benet people, who prior to that had dwelled in the forest. There are 12 villages in the Benet landscape, and this forms Benet sub-county of Kapchorwa District. Later surveys indicated that the area of land actually handed over amounted to 7,500 ha, and the difference of 1,500 ha reverted to protection in 1993. This has remained a source of conflict between the park and communities, leading to increased illegal use of resources in the park. The LLS work has helped in the process of resolving the conflict, which is still an on-going process due to on-going political interference (most recently in the 2011 elections), but this has led to improved relations with the national park authorities.

Landscape degradation was one of the main issues identified by all stakeholders, particularly in the landscape but also in parts of the national park, where there had been forest degradation. For the Benet, this manifested itself through soil erosion, silting of water supplies, occasional landslides and reduced access to fuelwood. One of the drivers of landscape degradation identified by the Benet community was the uncontrolled movement of livestock during the dry season, which was also seen as an impediment to restoration activities.

As various natural resources management arrangements were put in place such as contour tree and grass planting and the negotiation of Collaborative Resource Management (CRM) agreements, between UWA and the communities, attitudes began to change, and residents sought more detailed and firm land-use arrangements. This led to the demand for community-negotiated by-laws to govern land use.

LLS played the role of facilitator so that the villages (at the sub-county level) could define and develop their own by-laws, which comprised specific rules and regulations for land use. This need was identified by the communities, and the by-law approach was agreed to by the local government and, later on, the district authorities. A 'land care' by-law was developed to address unrestricted grazing and the resulting tree destruction (especially of recently planted trees). Key to this was attitude change, as community members agreed to address the issue as a collective problem.

The establishment of the land-care by-law was catalytic in enabling other joint actions such as soil conservation terracing and tree planting. The initial by-law was expanded to integrate other management aspects, such as control of farming and grazing in riparian zones. These by-laws became *de facto* management plans for the farmland areas, and helped foster greater trust, for example with the national park. The land-care by-law was formally approved for Benet sub-county of Kapchorwa District (4,940 households) and is in the process of being adopted by other sub-counties, and possibly being applied to the whole district.

Since the promulgation of the by-law, the Benet people in the area have constructed over 29 km of contour terracing and implemented tree planting in erosion-prone areas. A total of 236,418 mainly indigenous trees were planted in 2009 on 705 farms (approximately 600 ha), and a further 75,000 seedlings planted in 2010. This in turn paved the way for increased trust between the national park and Benet people. Based on CRM agreements with the national park, an area of 56 ha of degraded forest inside the park has been restored with indigenous species; this is part of a pilot area of 208 ha identified for forest landscape restoration, and is also part of a much larger area in need of restoration of approximately 5,000 ha. Contour planting of trees was established to enhance productivity and reduce erosion, and also resulted in greater ease of access to fuelwood and reduced incidence of landslides. Twelve CRM agreements, involving 12 parishes (approximately 3,950 households) bordering the national park have been signed. These allow communities access to important natural resources within the park, such as bamboo and NTFPs; over 300 bee hives have been placed inside the national park. The CRM included arrangements for communities to work with a local community-based organization (CBO) to restore a riparian zone from the park just outside the park boundary. Fencing is not practical so community members needed to actively keep animals away from the river bank while they replanted vegetation to reduce soil degradation and erosion and encourage trees to take hold.

An indicator of community-level organization in monitoring, managing and protecting the resource base as a whole, is the establishment of local community action learning groups known as 'task forces'. The eight task forces play a facilitation role in the implementation of by-laws and have also taken on the role of monitoring, mobilizing teams for collective action – an important longer-term empowerment process.

In this landscape better land and ecosystem management practices have been achieved principally through community empowerment. This was dependent on improving relations with government authorities, especially the national park authority, facilitating greater regulatory control of the landscape outside the national park, and allowing communities to benefit directly from goods collected inside the national park.

The livelihood gains are clear, but there are also clear indications of improved biodiversity conservation and ecosystem functionality. The increase in indigenous tree coverage outside the park can be expected to increase biodiversity directly and counteract the tendency of the park to become biologically isolated. CRM agreements helped reduce illegal timber harvesting from the park from approximately ten lorries (50 tons) per month to two – a significant contribution to enhancing restoration and conservation within the park. There has been direct piloting of community-based FLR inside the national park with indigenous species to restore degraded areas. This was achieved through collaborative agreements signed between the communities and UWA.

## Tacaná, Guatemala – native tree planting for watershed restoration<sup>5</sup>

The Tacaná landscape in north-western Guatemala, bordering Mexico, is a heavily degraded landscape consisting of several micro-catchments and a human population characterized by poverty and marginalization. The initial impetus for IUCN interest in this landscape came from the recognition, at least by outside agents, that the Tacaná watershed was degraded. Securing and improving water supplies was the starting point for IUCN interventions through the Water and Nature Initiative (WANI). However, it took Hurricane Stan in 2005 to make the significance of the degradation of this landscape apparent to a wider range of stakeholders, including the communities. Micro-watershed councils were established as multi-stakeholder fora which provided the negotiation space for various communities and other institutions to decide on objectives and actions.



In the nursery, Tacana © IUCN/Intu Boedihartono

The issue identified by LLS in Tacaná was how to develop forest-based restoration of the highland catchments to secure water provisioning and improve livelihoods, while enhancing biodiversity conservation in a landscape where, despite progress, institutional development and integration were still lacking.

LLS interventions began in 2007 in a subset of three of the micro-catchments of the landscape. In addition to the institutional strengthening begun under the WANI programme, another important opportunity had been identified – state support for tree planting through subsidies, and an emerging market for the sale of Christmas trees to supplement more traditional forest products such as timber. However, in order to facilitate reforestation, one of the key drivers of landscape degradation would need to be addressed – extensive sheep grazing. Two related strands of landscape restoration therefore emerged – the control of sheep grazing and tree planting.

**Tree planting:** The role of restoration subsidies in promoting landscape restoration activities was crucial. The Forest Incentive Programme for Small Holders and Agroforestry Lands (PINPEP) is managed by the state forest service INAB (Instituto Nacional de Bosques) and was designed particularly for forest users with unclear

---

<sup>5</sup> See [www.iucn.org/forest/lls](http://www.iucn.org/forest/lls) for more details and the landscape paper reporting on this landscape in detail.

tenure rights. IUCN acted as a facilitator building confidence in highland communities regarding the fact that interaction with government to secure subsidies would not expose them to scrutiny of their rights to use the land. IUCN supported the necessary training required to fulfil the obligation to submit a management plan as part of the application process for reforestation subsidies. LLS further improved the dialogue and relations between INAB and communities by facilitating the out-posting of forest offices in the region. Foresters are now more receptive and better positioned to give technical support (including facilitating access to subsidies), while at the same time they can help control tree felling and chainsaw use, which has improved through chainsaw registration.

**Sheep grazing:** Extensive sheep grazing on communal lands prevented natural restoration and is one of the principal causes of soil degradation and therefore watershed degradation. LLS supported, with technical advice, activities whereby sheep are now penned and zero-grazed. The number of sheep in the landscape is much reduced, with nearly 2,000 sheep in stables by the end of 2011 belonging to 165 families in the catchments of the Río Coatán and Suchiate rivers. Now they are better fed and therefore more valuable, there are also labour savings as the sheep do not require all-day herding.

The effect of reduction in grazing pressure on natural regeneration has not been monitored, although it is reasonable to assume improvement where scrub vegetation is now less intensively grazed. In any case the reduction of grazing pressure has improved/enabled conditions for forest restoration.

The positive changes seen in this landscape owe their success to better relations and agreements between the different institutions, in particular between communities through community-based development councils (COCODES), and the State through tenure arrangements, the PINPEP subsidy programme, and the State Forest Service – INAB.

The direct, measurable biodiversity benefit in this managed and restored landscape is an increase in native tree cover with 128 ha planted across seven micro-watersheds in a landscape that would naturally be forested; with the additional biodiversity benefit that the main species used, *Abies guatemalensis*, is considered threatened. Indirect and downstream biodiversity benefits can be expected from improved soil and water conservation, but are unlikely to be measured directly. In addition, reduced pressure from sheep grazing has helped create the conditions for longer-term ecosystem restoration.

This case study is an example of where interventions such as efforts to change grazing and enabling people to earn income from forest products led to livelihood changes. These livelihood changes led to changed land-use practices (such as tree planting on ridge tops) that also benefitted biodiversity and watershed function. Thus, a focus on livelihood benefits has also benefitted biodiversity. While local farmers have gained from more intensive sheep husbandry and forest subsidies, with the latter effectively re-invested in expectation of returns from sales of planted trees when they mature. Co-beneficiaries include those who benefit downstream from improved soil and water conservation, and the 'global' benefit of an increase in the local population of a threatened species.

## Improved biodiverse forest management optimizes benefit flows in Miyun, China<sup>6</sup>

The Miyun watershed (15,788 km<sup>2</sup>) is located to the north of Beijing, China's capital city. About one million people live in the watershed, with a further 13 million people in Beijing depending on the water provided by the wider Miyun watershed. Miyun lies on the dry northeast edge of the North China Plain, bordering the Mongolian Plateau. This is a fragile, semi-arid area with a mean annual rainfall of 549 mm, characterized by fluctuations as high as 50% from the mean. The Miyun landscape is a mosaic of different land uses,

---

<sup>6</sup> This section draws heavily on Jia, L. and L. Emerton (2010): *Moving Closer to Nature - the story of LLS in the Miyun Landscape, China*. IUCN, 32pp.

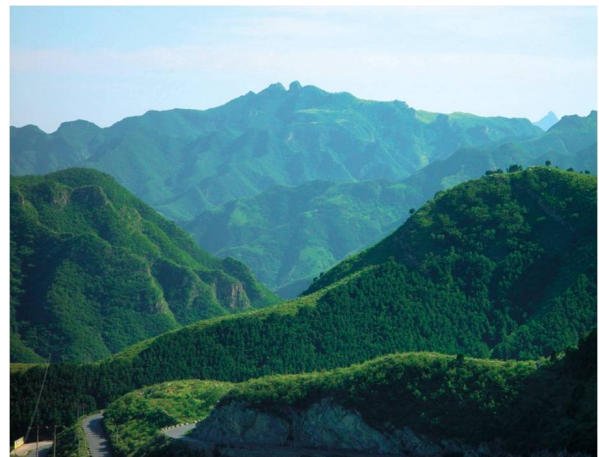


ecological zones, administrative boundaries and livelihood patterns. This combination of land uses in the wider Miyun watershed contributes to its sustainable management.

Formerly covered with mixed broadleaf forests, the vegetation of the watershed has changed as a result of rising human populations, changing settlement patterns, more intensive land-use practices, and reforestation and land conversion programmes instituted by the government. These efforts have increased forest cover over the last 30-40 years. Approximately 65% of the watershed is now covered by forest, comprising a mixture of natural (75%) and planted broadleaf, conifer, mixed and shrub land forest. Over 70% of the forests in the Miyun landscape are 'protection' forests, where human access and use are strictly controlled, and which are managed to safeguard ecosystem services such as watershed protection, soil and water conservation, and for biodiversity.

Forest management in the Miyun watershed was previously limited to fire prevention and pest control, carried out by nearly 47,000 local 'forest wardens' employed by the government. This was also seen as an effective way to distribute income at the local level. Beijing Municipality was the first in the country to establish a 'Forest Ecological Compensation' programme for forest wardens who were maintaining an area of 674,000 ha of forest in more than 100 townships and 10 districts and counties. The Payment for Forest Environmental Services (PFES) became a key focus for establishing a functional, long-term Multi-Stakeholder Dialogue (MSD) which involves multiple sectors and levels of scale in a process of joint planning and action.

A logging ban and conservative forest management systems meant that community access for livelihood benefits was restricted, even if biodiverse forests had been restored. Although about 25% are designated as 'economic' or 'production' forests, the current logging ban means that utilization is controlled. People are only allowed to extract limited amounts of fuelwood and non-timber forest products. What is notable is that the vast majority of both plantation forests and areas of natural forest restoration are relatively young and even-aged stands (40% less than 10-years old, and 95% below 40 years).



Miyun landscape ©IUCN/Li Jia

Landscape restoration through forest management was a major goal of LLS and the communities to improve the quality, structure and function of forests – in particular encouraging the restoration of the original broadleaved indigenous species, enhancing re-growth, and providing a more conducive environment for biodiversity conservation. At the same time, sustainable use and the selective harvesting of trees and forest products was envisaged as a means of providing more tangible benefits for local communities.

LLS established biodiversity baselines in both of the project's pilot sites, recording fauna and flora species and their richness, as well as noting rare and endangered species. Forest resource baselines were established to indicate forest areas, their composition and health. Indicators were formulated to measure landscape improvement, and were designed to track the effects of silvicultural treatments, including changes in forest structure, numbers of tree species, and proportion of indigenous species.

Village-based participatory planning led to the development of new local forest management plans. Use and management zones were agreed for water protection, tourism and forest exploitation, informed both by community needs and by the technical surveys carried out which documented forest status, resource availability and biodiversity. This process has helped harmonize technical information with local interests and knowledge. Silvicultural treatments for the major forest types were developed to improve the naturalness of forest stands.

Older planted stands were reaching maturity but could not be harvested. Local communities were therefore using restoration for household needs. Opening up of the canopy is a strategy expected to promote restoration and structural diversity in these forests and release to ‘target trees’ for use.

So far, these experimental treatments have been applied to about 80 ha (or 36 plots) in Huayuan village. The treatments are referred to as ‘close to nature’ silviculture, because they aim to modify forest structure and species composition towards those that existed in the landscape in the past. IUCN supplemented the application of these treatments with surveys of rare and endangered species. The results of the surveys influenced the selection of areas for treatment, marking of trees and plants for retention, and act as a baseline for longer-term monitoring. Local fuelwood harvesting has been organized around the application of these silvicultural treatments. Forest warden leaders have been trained in forest harvesting techniques, with the expectation that they will train others in how to collect fuelwood in the agreed ‘close to nature’ way. IUCN and the Beijing Forestry Society have assisted with the renovation of traditional wood-heating systems for *kang* beds to make them more energy efficient, thereby reducing the overall demand for fuelwood. These new tools and activities together provide a better means for local people to use the forests, while supporting watershed protection and conservation.

The share of benefits from these forests which accrues to local communities has improved. For example, in Huayuan village, the participatory forest management plan has been approved by the Forestry Bureau of Miyun County and the Beijing Municipal Bureau of Forestry and Parks. The Forest Department approved a small harvesting quota for timber of about 100 m<sup>3</sup> in 2008 – the first permit to be issued in more than 20 years, albeit for a small volume. At the same time, it is expected that well-designed management plans will ensure that this harvesting does not compromise the soil and watershed protection functions of the forest. A greater emphasis on benefit sharing with local communities has not altered downstream benefits.

While it is too early to be certain of biodiversity benefits, biodiversity baselines were established and included information on rare and endangered species which informed management planning; biodiversity benefits are expected as the forests of the watershed enter a more natural cycle of regeneration.

## Lao PDR<sup>7</sup>

The LLS landscape in Lao PDR is located in Pathoumhoune District in Champassak Province in southern Laos. The landscape consists of a Biodiversity Conservation Corridor and parts of the Dong Hua Sao National Protected Area (HS NPA) and the Xe Pian NPA which are joined by the biodiversity corridor to the north and south respectively. The dominant forest type in the landscape is lowland evergreen forest. The other major biophysical feature is the Beung Kiet Ngong wetland; there is an area of flooded forest adjoining the wetland.

The human population lives in a number of villages in both NPAs and in the corridor itself. The main livelihood activity is agriculture, particularly paddy rice cultivation. Cattle raising is a significant activity and the wetlands are a major source of protein from fishing and the collection of frogs and other aquatic animals. NTFP collection provides products both for subsistence consumption and income. Of the NTFPs sold for income the most important is the Malva nut (*Scaphium macropodum*).

The main biophysical focus of the LLS intervention was on addressing the lack of effective regulation of use of natural resources, including illegal logging (frequently by outsiders), pressures from peat extraction in the wetlands, conversion of the wetlands to paddy fields, and uncontrolled harvesting of Malva nuts which often entailed the felling of trees as a form of destructive harvesting. The LLS was concerned with preventing further damage rather than explicitly aiming to restore the landscape. However, improving biophysical conditions also required improving livelihoods of the local communities that depend on the landscape.

---

<sup>7</sup> See [www.iucn.org/forest/lls](http://www.iucn.org/forest/lls) for more details and the landscape paper reporting on this landscape in detail.

The goals of the LLS intervention were to improve livelihoods and conserve forests through sustainable management and marketing of NTFPs and to improve livelihoods through capacity building for the better management of the wetlands. The key to these interventions was creating the conditions for greater control of resource management.

For the NTFP management and marketing component, the focus was on Malva nuts. The activities included formation and training of Malva nut groups for harvesting, protection and marketing of Malva nuts, development of a permit system and regulations for non-destructive harvesting, and linking groups with purchasing companies to improve prices. Through these activities, income from Malva nut sale improved and there are indications of a significant decrease in illegal logging and cutting of Malva trees. More people are since then reporting illegal forest activities, and in 2008 the Province confiscated 26,000 m<sup>3</sup> of timber, 60-70 vehicles, 200 chain saws and approximately 850 tons of NTFPs. This was achieved thanks to the presence of Malva nut regulations and forest patrols. The general decline in illegal logging has been reported by the patrols. For Malva nut trees, a decline in illegal harvesting was recorded. This is relatively easy to monitor as the Malva trees are found in clumps. According to the District Agriculture and Forestry Office, 2,000 Malva trees were cut in 2008 before the management plan was implemented, two in 2009 and six up to September 2010.

The regular patrolling and the regulated harvest of Malva nuts are central to a major change in the way the landscape is managed. These are a result of group formation and the building of confidence to prevent illegal activities by outsiders, and wide acceptance of agreed rules about resource use within the local population. The expected gain for biodiversity conservation would be through enhanced connectivity resulting from greater tree cover in the Biological Conservation Corridor.

In the case of the wetlands management component, before LLS there was a long-standing conflict between villagers who relied on the wetlands for fishing (the poorer villagers), and others who wished to expand paddy farming in the wetlands. There had also been conflict over peat mining because obscured pits left in the wetlands by miners were a source of potential injury to grazing animals. Peat mining



Lao landscape © IUCN

provided no benefit to villagers as it was carried out by outsiders. Major activities in the wetlands management component therefore included the establishment of a multi-stakeholder management committee (including villagers and officials), the zoning of the wetlands and development and approval of management regulations. The Vice Governor has also banned peat mining.

The result of these activities has been that threats to the wetlands have been addressed and the wetlands remain almost unchanged. The benefits have been maintenance of the wetlands rather than restoration. Significantly the wetlands have been declared Lao PDR's first Ramsar site.

Before the commencement of LLS the main problems in the landscape derived from the fact that both forest resources (especially Malva nuts) and the wetlands were essentially unregulated, functioning as open access resources. The interventions turned the resources into managed resources and the landscape as a whole became better managed, with rules that were locally accepted and enforced and organizations that enabled collective action. The reduction in felling of Malva trees and more rational management of the biodiversity Conservation Corridor are expected to improve biodiversity conservation in the landscape.

## Lachuá, Guatemala – increasing connectivity of a protected area through landscape restoration<sup>8</sup>

The Lachuá landscape is an eco-region of high biological and cultural diversity in the Northern Transversal Belt in Guatemala. Within this 54,000 ha landscape is the 14,500 ha Laguna Lachuá National Park, a strictly protected area.

The region is dominated by the same forest type as the Lacandon Rain Forest Centre of Plant Diversity (Davis *et al.*, 1997), located 35 km to the north. Given its role in conserving humid subtropical forest and as a water catchment area, the park is one of the key elements in Guatemala's National System of Protected Areas. Outside of the park, forests are highly fragmented (over 50% deforestation by 1997). The importance of its biodiversity, which it owes in part to its unusual karstic topography (Kueny and Day, 2002), has resulted in its listing as a Ramsar site.

Prior to LLS, IUCN interventions focused on strengthening community organization through the creation of community-based development councils (COCODES) that act as institutions for community-level priorities. IUCN also supported the creation of a higher level organization, FUNDALACHUA, a forum created in 2006 to negotiate between government institutions, NGOs, and communities in landscape planning and development.

Of approximately 20,000 people living in the landscape more than 90% are indigenous people (Q'eqchí, Maya) considered to be living in extreme poverty due to their dependence on natural resources, insecure tenure and marginalization from relevant institutions and means of investment. At the time of IUCN's initial interventions in 1997 community-level organization was almost completely lacking given the social upheaval and continued mistrust within the community that resulted from disruption from the civil war that ended in 1996, a factor which contributed to the continued impoverishment of the people. However, given the importance of the national park, maintaining and improving biodiversity values in this landscape was also a high priority. These values are threatened by illegal settlement within the national park, and increasing isolation of the park caused by deforestation in the surrounding landscape.

Since the start of IUCN interventions there has been a continuous effort to establish *de jure* tenure. This process was completed under LLS. Households dependent on land considered either communal or national, and to which they had no legal right, now have confirmed private tenure. By 2009 a total of 152 households in five communities received property titles. Communal rights to forest areas were also strengthened by the registration of 54,000 ha of communal forest. This has made long-term investment in tree planting and management of existing natural forest a realistic option and, crucially, facilitated access to government tree planting subsidies through the PINFOR programme (Programme of Forestry Incentives). The income provided by this programme to offset tree establishment costs has had a major catalytic effect on forest restoration in the landscape. Acuña (2010) reports 15,000 ha of restoration in the ecosystem, making a significant contribution to forest cover and connectivity, both of which can be expected to enhance biodiversity protection.

However, while growing indigenous trees for timber represents an important diversification of livelihood options, it could only ever be one part of the rural economy. Accordingly, considerable work has been done to improve production and marketing of maize, honey, cacao, and pineapple as a means of diversifying and increasing income. Intervention here has focused on identifying markets and ensuring the quality of products sent to those markets.

Illegal settlement within the park is a long-standing problem. Through IUCN-supported intervention, 20 families illegally occupying the park near Milbirilix Pu were relocated with the support of a maize extension programme (i.e. alternatives where offered), and they were provided with secure tenure – an important point for these families' long-term security. Removal of illegal settlements from a protected area can be seen as a clear biodiversity gain. Illegal settlement continues to be a problem, but better community organization and

---

<sup>8</sup> See [www.iucn.org/forest/lls](http://www.iucn.org/forest/lls) for more details and the landscape paper reporting on this landscape in detail.

tenure security are seen by the members of these communities as a sign that they have a stake in the good management of the park and surrounding area. Communities are now both motivated and empowered, through FUNDALACHUA, to demand more effective action on the part of the government to solve such problems. This represents a considerable shift in that it is no longer outside stakeholders, such as IUCN, that advocate for the government to fulfil its responsibilities.

In this landscape, social capital has been strengthened through the creation of institutions (COCODES and FUNDALACHUA) and relations have improved between them, the markets, and government agencies. At the same time a greater use of biodiversity has been encouraged through diversification of production systems.

The incentive for better park management is at least in part derived from potential tourism and REDD (Reduced Emissions from Deforestation and Forest Degradation) revenues. Potential is the key word here; as of 2010 tourism-derived income was still a tiny fraction of family income in the landscape, and basic



Forest garden, Papua © IUCN/Gill Shepherd

infrastructure is still lacking. However, the site is now a pilot for REDD-readiness activity in Guatemala.

Management interventions have benefitted both biodiversity (mainly through planting and management of large areas of forests) and livelihoods. Most of the significant changes are happening outside the core within the wider landscape but those changes can be shown to have had positive impacts on biodiversity in the park through increases in the area under native tree cover around the park (connectivity) and reductions in the number of illegal settlers inside the core.

# Conclusions

The case studies discussed in this paper relate to an intervention that involved a change to ‘the way things are done’ in landscape management. In effect these are institutional changes. Here institutions refer to the norms, rules of behaviour and accepted way of doing things (Fisher *et al.*, 2008). They can be formal rules (such as laws) or informal (norms). Uphoff (1986) uses the term ‘institution’ to refer to a set of shared norms and behaviours.

The changes involved such things as changed ways of making decisions (Doi Mae Salong), minor changes to tenure and resource access (Lachuá), changes to livestock raising practices (Tacaná), multi-village approaches to integrated landscape management (Mali and Burkina Faso), or establishing locally accepted by-laws for resource use (Mt. Elgon). Often these changes were relatively minor interventions, but the process and increased tenure security seem likely to lead to more important long-term benefits both for people and conservation.

The new arrangements increased people’s confidence about access to resources and allowed negotiations and trade-offs about land uses on particular sites, as in Burkina Faso and Mali. Such changes and the breaking of barriers are not necessarily complex, as the grazing by-law in Mount Elgon shows. This resulted in important biodiversity gains as seen in both Uganda and Mali. Key to these changes has been the institutional innovation that removes barriers and turns potential resources into assets, which is a testimony to the importance of seeing people as part of ecosystems and demonstrates that ecosystems are not isolated.

In ‘lived in landscapes’, such as the LLS landscapes, demonstrating biodiversity improvement is not easy and major improvements are long-term processes. LLS has demonstrated some results in the shorter term, but long-term success is contingent on the institutions and social changes that are taking place, and is not necessarily reflected by the actual amounts of biodiversity conserved or restored in a short time period.

It is important to recognize that the interventions behind the trends to biodiversity improvement or potential biodiversity improvement are often aimed initially at improving livelihoods and livelihood opportunities. Where they are supported by local people, it is generally because improved biodiversity and natural resource management contribute to livelihoods, not because abstractions such as ‘improved biodiversity’ are strongly desired, or even understood, in themselves.

Most of the changes to biodiversity discussed relate to landscapes outside protected areas. In the cases where protected areas were involved (Mt. Elgon and Lachuá) the activities did not focus on the PA in isolation. The changes to land-use practices and institutions occurred at a broader level and the PAs benefited as part of wider landscapes, demonstrating the importance of understanding that PAs need to be understood as part of the surrounding land use and ecosystems.

What we do demonstrate is that various forms of active management, either on their own, or in partnership, or as part of collaborative management agreements result in improved biodiversity conservation as the conditions and institutional arrangements have been put in place for enhanced biodiversity conservation, sustainable benefit flows, and local community ownership. These biodiversity benefits may be seen as a by-product, as the biodiversity is being managed for livelihood benefits. Though this is not always the case, as the management of crocodiles (which are sacred) in Kelka (Mali) shows or the presence of sacred forest groves or trees highlight (Mali, Burkina Faso).

Taking a landscape approach creates opportunities for rural people’s engagement in conservation and land-use related activities, the means for them to benefit, and the institutional responsibilities for local-level management. Such engagement may express itself in diverse ways from, for example, managing and restoring their own forest area (community, inter-community forests), being actively involved in the management of forest assets under the legal responsibility of others (co-management), and restoring the goods and services of trees on rural landscapes (riverine, hills). Adaptive management of ecosystems and lands is important, and is often based on institutional growth and development. Working in more formally protected areas (Mount Elgon) or state-owned catchments (Miyun) demonstrates that taking a landscape

approach creates multiple livelihood benefits, enhances biodiversity and ecosystem functionality, and creates and builds trust between rural communities and state authorities.



Mangrove restoration, Cambodia © Gordon

# References

- Acuña, K. (2010). *Proyecto Laguna Lachuá: Sistematización de la experiencia*. San José, Costa Rica: UICN.
- Barrance, A.J., Flores, L., Padilla, E., Gordon, J.E., Schreckenberg, K. (2003). "Trees and farming in the dry zone of southern Honduras I: campesino tree husbandry practices. *Agroforestry Systems* 59: 97-106.
- Bathiono, Y., Bocoum, A., Diarra, R. and Endamana, D. (2010). Productive Forest Landscape Management in the Kelka Area of Mali. Unpublished landscape paper, IUCN Livelihoods and Landscapes Strategy, pp. 26.
- Bennett, A.F. (1999). *Linkages in the Landscape: the role of corridors and connectivity in wildlife conservation*. Gland, Switzerland and Cambridge, UK: IUCN.
- Boshier, D.H., Gordon, J.E. and Barrance, A.J. (2004). "Prospects for circa situm tree conservation in Mesoamerican dry forest agro-ecosystems". In: *Biodiversity Conservation in Costa Rica, Learning the Lessons in a Seasonal Dry Forest*. G.W. Frankie, A. Mata and S.B. Vinson (Eds). Berkeley, USA: University of California Press. pp 210-22.
- Bremer, L.L. and Farley, K.A. (2010). "Does plantation forestry restore biodiversity or create green deserts? A synthesis of the effects of land-use transitions on plant species richness." *Biodiversity and Conservation* 19: 3893-3915.
- Davenport, T. Howard, P. and Dickenson, C. (1996). *Mount Elgon Biodiversity Report*. Kampala, Uganda: Forest Department, Republic of Uganda.
- Davis, S.D., Heywood, V.H., Herrera-MacBryde, O., Villa-Lobos, J., Hamilton, A.C. (1997). *Centres of Plant Diversity. A Guide and Strategy for Their Conservation*. Cambridge, UK: WWF/IUCN.
- Finegan, B. and Delgado, D. (2000). "Structural and floristic heterogeneity in a 30-year-old Costa Rican rain forest restored on pasture through natural secondary succession." *Restoration Ecology* 8(4): 380-393.
- Fisher, B. and Christopher, T. (2007). "Poverty and biodiversity: measuring the overlap of human poverty and the biodiversity hotspots." *Ecological Economics* 62(1): 93-101.
- Fisher, R., Maginnis, S., Jackson, W., Barrow, E. and Jeanrenaud, S. (2008). *Linking Conservation and Poverty Reduction: Landscapes, People and Power*. London: Earthscan.
- Forest Restoration Research Unit (2008). *Research for Restoring Tropical Forest Ecosystems: A Practical Guide*. Biology Department, Science Faculty, Chiang Mai University, Thailand.
- Ghazi, P., Barrow, E., Monela G. and Mlenge, W. (2005). "Regenerating Woodlands: Tanzania's HASHI Project." In: World Resources Institute (WRI) in collaboration with United Nations Development Programme, United Nations Environment Programme and World Bank *World Resources 2005. The Wealth of the Poor - Managing Ecosystems to Fight Poverty*. Washington DC:WRI. pp. 131-138.
- Gordon, J.E., Hawthorne, W.D., Reyes-García, A. Sandoval, G and Barrance, A.J. (2004). "Assessing landscapes: a case study of tree and shrub diversity in the seasonally dry tropical forests of Oaxaca, Mexico and southern Honduras." *Biological Conservation* 117(4): 429-442.
- Harvey, C. A. and Haber, W.A. (1999). "Remnant trees and the conservation of biodiversity in Costa Rican Pastures." *Agroforestry Systems* 44: 37-68.
- Honadia, C., Sawadogo, S., Wandja, C, and Shepherd, G. (2010). *Sablogo Landscape, Burkina Faso*. Unpublished landscape paper, IUCN Livelihoods and Landscapes Strategy, pp. 26.
- Howard, P.C. (1991). *Nature Conservation in Uganda's Tropical Reserves*. Uganda: Forest Department/Ministry of Environment Protection.
- Jia, L. and Emerton, L. (2010). *Moving Closer to Nature - the story of LLS in the Miyun Landscape, China*. Unpublished landscape paper, IUCN Livelihoods and Landscapes Strategy, pp.32.



- Keenan, R., Lamb, D., Woldring, O., Irvine, T. and Jensen, R (1997). "Restoration of plant biodiversity beneath tropical tree plantations in Northern Australia. *Forest Ecology and Management* 99(1-2): 117-131.
- Kueny, J. and Day, M. (2002). "Designation of protected karstlands in Central America: A regional assessment". *Journal of Cave and Karst Studies* 64(3): 165-174.
- Maginnis, S. and Jackson, W. (2007). "What is FLR and how does it differ from current approaches?" In: Rietbergen-McCracken, J., Maginnis S., and Sarre. A. (Eds), *The Forest Landscape Restoration Handbook*. London: Earthscan pp. 5-20.
- Maginnis, S. and Jackson, W. (undated). "Restoring forest landscapes: Forest landscape restoration aims to re-establish ecological integrity and human well-being in the degraded forest landscapes". [www.iucn.org/themes/fcp/publications/files/restoring\\_forest\\_landscapes.pdf](http://www.iucn.org/themes/fcp/publications/files/restoring_forest_landscapes.pdf)
- Maginnis, S., Jackson, W. and Dudley, N. (2004). "Conservation landscapes. Whose landscapes? Whose trade-offs?" In: McShane, T.O. and Wells, M.P. (Eds), *Getting Biodiversity Projects to Work: Towards More Effective Conservation and Development*. New York: Columbia University Press.
- Maginnis, S., Rietbergen-McCracken, J. and Jackson, W. (2007). "Introduction". In: Rietbergen-McCracken, J., Maginnis S., and Sarre. A. (Eds), *The Forest Landscape Restoration Handbook*. London: Earthscan pp.1-4.
- Méndez, V.E. (2008). "Farmers' livelihoods and biodiversity conservation in a coffee landscape of El Salvador". In: *Confronting the coffee crisis: Fair Trade, sustainable livelihoods and ecosystems in Mexico and Central America*. Bacon, C.M., Méndez, V.E., Gliessman, S.R., Goodman, D., and Fox, J.A. (Eds). Cambridge, USA: MIT Press. pp 207-236.
- Nakangu B., Awadh, C., and Kelleher, S. (2012). Rights, resources and rewards: Lessons learned on rehabilitating landscapes for livelihoods in the Benet landscape, Uganda. Gland, Switzerland: IUCN.
- Olson, D. and Dinerstein, E. (2002). "The Global 200: priority ecoregions for global conservation". *Annals of Missouri Botanic Garden* 89: 199-224.
- Rattanasorn, T., Fisher, B. and Kugel, C. (2010). *Doi Mae Salong*. Unpublished landscape paper, IUCN Livelihoods and Landscapes Strategy.
- Rodrigues, R.R., Lima R.A.F., Gandolfi, S, and Nave, A.G. (2009). "On the restoration of high diversity forests: 30 years of experience in the Brazilian Atlantic Forest". *Biological Conservation* 142(6): 1242-1251.
- Uphoff, N. (1986). *Local Institutional Development: An Analytical Sourcebook with Cases*. Kumarin Press. West Hartford, CT.
- Shepherd, G. (Ed.) (2008). *The Ecosystem Approach: Learning from Experience*. IUCN, Gland Switzerland, x + 190 pp
- Sunderlin, W.D., Dewi, S., Puntodewo, A., Müller, D., Angelsen, A., Epprecht, M. (2008). "Why forests are important for global poverty alleviation: a spatial explanation". *Ecology and Society* 13 (2): 24 [online].
- Tischendorf, L. and Fahrig, L. (2000). "On the usage and measurement of landscape connectivity". *Oikos* 90: 7-19.



**INTERNATIONAL UNION  
FOR CONSERVATION OF NATURE**

WORLD HEADQUARTERS  
Rue Mauverney 28  
1196 Gland, Switzerland  
[daniel.shaw@iucn.org](mailto:daniel.shaw@iucn.org)  
[forests@iucn.org](mailto:forests@iucn.org)  
Tel +41 22 999 0000  
Fax +41 22 999 0002

[www.iucn.org/forest](http://www.iucn.org/forest)



LIVELIHOODS AND LANDSCAPES STRATEGY