



Food and Agriculture Organization  
of the United Nations

# PROTECTED AREAS, PEOPLE AND FOOD SECURITY

An FAO contribution to the World Parks Congress,  
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# INTRODUCTION

## The inter-relationships between people and protected areas

Satisfying humans' basic need for food puts enormous pressure on the environment. One of the key challenges facing the world today is how to meet the need for sufficient, safe and nutritious food without exhausting the resources available. While undernourishment is down from 1 billion people in 1992 to 805 million today (a fall of more than 17 percent in slightly more than 20 years), about one in nine people still suffers from chronic hunger,<sup>1</sup> and about 162 million children under the age of five are stunted due to chronic malnutrition.<sup>2</sup> This is unacceptable. In the words of FAO's Director-General, "when it comes to hunger, the only acceptable number is zero!"<sup>3</sup>

Protected areas have an important role to play in rising to this challenge. At a global level, millions of people depend on protected areas as a means of subsistence. In some cases they benefit directly, through the consumption of food produced or obtained in or around protected areas. In others, employment and income provide indirect benefits which contribute to sustaining livelihoods.

The benefits of protected areas extend far beyond their immediate environs. These areas serve as natural gardens, safeguarding and cultivating biodiversity, including the wild plant relatives of crops. The biodiversity of terrestrial and aquatic ecosystems has provided food, including fish, plants, seeds, honey, fruits, mushrooms and insects, as important components of the diets of local inhabitants for thousands of years. Protected areas also provide ecosystem services, such as pollination and pest control, with mountain areas playing a special role through their contribution to clean water and decreased disaster risks.

This paper aims to give a broad overview of the inter-relationships between people and protected areas, and how these areas can be managed to ensure that their benefits are sustained for future generations. It approaches the subject from a range of perspectives including agriculture and agroecology, heritage sites and systems, tenure rights and governance, sustainable use and conservation of genetic resources, use and management of terrestrial and aquatic resources, water and watershed management, sustainable financing systems, and restoration and landscape approaches.

In so doing, it draws upon the first International Conference on Forests for Food Security and Nutrition held in May 2013 by FAO, in partnership with Bioversity International, the Center for International Forestry Research (CIFOR), the World Agroforestry Centre (ICRAF) and the World Bank.<sup>4</sup>

### What is food security?

FAO defines food security as a state where all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life. The four pillars of food security are availability, access, utilization and stability. The nutritional dimension is integral to the concept of food security.

See: [www.fao.org/economic/ess/ess-fs](http://www.fao.org/economic/ess/ess-fs)

<sup>1</sup> FAO. 2014. *The State of Food Insecurity in the World 2014 – Strengthening the enabling environment for food*. Rome.

<sup>2</sup> FAO. 2013. *The State of Food and Agriculture 2013 – Food systems for better nutrition*. Rome.

<sup>3</sup> Speech delivered to the opening session of the Committee on World Food Security (CFS), FAO, 2012.

<sup>4</sup> See: [www.fao.org/forestry/food-security/en/](http://www.fao.org/forestry/food-security/en/)

This paper seeks to carry forward the Conference's five policy recommendations and expand their scope to encompass food security and nutrition in protected areas:

1. Provide secure land and forest tenure and equitable access to resources by applying the principles outlined in the Voluntary Guidelines for the Responsible Governance of Tenure of Land, Fisheries and Forests in the Context of National Food Security.
2. Develop mechanisms for coordination across the agricultural, forestry, livestock, fisheries, energy, mining and other relevant sectors to ensure stronger coherence of food security and nutrition interventions and better policy alignment.
3. Promote policies that increase access by smallholders to credit, technology, extension services and insurance, as well as to markets for their forest and tree products and ecosystem services.
4. Achieve gender equality in the formulation, implementation and evaluation of food-security, nutrition and poverty-alleviation policies and investment strategies.
5. Strengthen mechanisms for the collection and timely dissemination of data on the contribution of forests and trees to food security and nutrition for use in policy-making.

The debate and outcomes of the World Parks Congress concerning protected areas, food security, nutrition and livelihoods – especially through its Stream 4, “Supporting Human Life” – will feed into other fora where stakeholders and policymakers will be able to further advance knowledge-sharing and understanding on the theme, including at the upcoming World Forestry Congress being organized by the Government of South Africa and FAO in Durban from 7 to 11 September 2015.

## Peru's protected natural areas sustain both people and nature

Sustainable forestry, agriculture, fisheries and aquaculture provide both food and livelihoods for people living in the villages spread across Peru's 140 conservation areas. Thanks to a respectful use of natural resources, products cultivated or gathered in these protected areas help reduce poverty and improve the lives of the people living in and around them. These products include the tarwi crops (*Lupinus mutabilis*), or chocho as it is known by the local people living in Conchucos and Sierras Ancashinas) and the 111 potato varieties cultivated in this part of the Cordillera Blanca, all of which boast a long history of cultivation.

Much of what is now known as Peruvian cuisine has its origin in the Andes, and is based on the use of these native potatoes, as well as other local crops and meats.

In the community of Chichupampa which lies at 1 500 metres altitude, experts from the SERNANP (Peruvian service for protected natural areas) and the International Potato Centre,

based in Lima, are reintroducing these varieties in small family plots. The potatoes are organically grown and serve subsistence needs, as well as – to a lesser extent – local markets.

Peru's natural protected areas were created to protect Peruvian biodiversity, but thanks to an ecosystem-wide, integrated and participatory approach they also provide important benefits for people.

See: [www.iucn.org/knowledge/focus/supporting\\_human\\_life](http://www.iucn.org/knowledge/focus/supporting_human_life)



Shongos community members enjoy a mountain picnic at over 4 000 metres altitude with freshly-harvested organic products.

# PROTECTED AREAS AND AGRICULTURE – THE AGROECOLOGY APPROACH

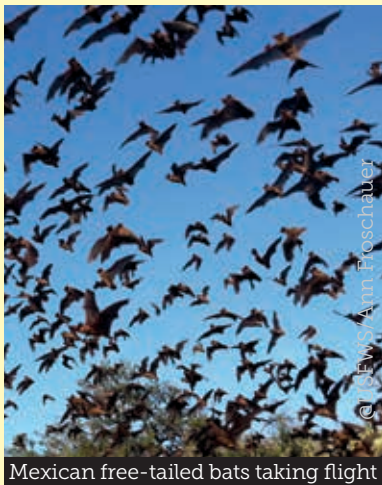
## A holistic approach to food production

Agroecology is the study of the ecology of the entire food system, encompassing its ecological, economic and social dimensions. The approach focuses on understanding – and working with – the interactions between plants, animals, humans and the environment within agricultural systems. Its focus on protecting the resource base while ensuring food production makes it especially relevant for meeting the needs of people dependent on protected areas.

This holistic approach to food production opens the way for the successful integration of protected areas and agricultural zones. Agroecological production is based on the sustainable use and maintenance of biodiversity, and well-informed farmers, fishers and pastoralists can produce substantial amounts of food from protected areas without harming biodiversity.

By bringing ecological principles to bear in agroecosystems, novel management approaches can be identified, building on key interactions and strengthening “virtuous cycles” in agricultural production. This includes the interchange of ecosystem services and reciprocal learning and innovation for a range of actors including farmers, farmer organizations and civil society, science, the private sector and representatives from local and national authorities.<sup>5</sup>

### Pest control, an important ecosystem service



Mexican free-tailed bats taking flight

Wildlife, such as birds and bats, that feeds on insects may have remarkable impacts on insect populations. For example, each year in the spring millions of Mexican free-tailed bats (*Tadarida brasiliensis*), most of which inhabit the protected “Cueva de la Boca” area in Mexico, migrate northward to form enormous colonies in limestone caves and bridges throughout the southwestern United States of America. Their primary food source consists of moths, including devastating agricultural pests such as the corn earworm moth (*Helicoverpa zea*) and the tobacco budworm moth (*Heliothis virescens*). They are therefore key to effective control of these pests, which also migrate from Mexico to Texas at the same time of year. Furthermore, the benefits conferred to agriculture by the bats’ consumption of these moths extend far beyond their immediate foraging areas (i.e. in Texas and New Mexico), as far afield as landscapes hundreds of kilometres away.

## The key role of family farmers

Of particular relevance here is the role of “family farmers”, a group of about 500 million people usually holding less than 2 hectares of agricultural areas. Family farmers preserve traditional food products, contribute to a diverse and balanced diet and safeguard the world’s agrobiodiversity, forming one of the largest groups influencing the use of natural resources. Family farmers are the custodians of a finely adapted understanding of local ecologies and land capabilities. Thanks to their local knowledge, they sustain productivity on often marginal lands, through complex and innovative land management techniques.

Any efforts towards real and lasting change, including in the relationship between agriculture and protected areas, must include targeted agricultural, environmental and social policy interventions in support of family farmers. The United Nations declared 2014 the International Year of Family Farming to call attention to this group’s important role in the sustainable use and conservation of natural resources.

<sup>5</sup> Proceedings of the FAO Agroecology Symposium for Food Security and Nutrition, in press.

## Organic agriculture and organic wild collection

Agroecological practices include organic wild collection and organic agriculture. There are around 40 million ha certified for organic wild collection. This is an example of a market mechanism developed to pay indigenous peoples and local communities for maintaining their forests and ecosystems by sustainably harvesting a range of wild collected products such as honey, mushrooms, lemongrass, medicinal herbs, wild silkworms, nuts and berries. This makes forests and wild areas economically more valuable to maintain in good condition than to clear for agriculture.

A report by the United Nations Conference on Trade and Development (UNCTAD) and the United Nations Environment Programme (UNEP) that reviewed 114 projects in 24 African countries, covering a total of 2 million hectares and 1.9 million farmers, found that organic practices increase yields on average by 116 percent (range: +54% to +176%) for projects in sub-Saharan Africa.<sup>6</sup> Innovative science-based methods provide the practices and inputs needed for soil nutrition and pest, disease and weed control in order to obtain good yields. These systems can increase the provision of essential macronutrients (nitrogen, phosphorus and potassium), as well as the trace minerals needed for high yields through a combination of green manures, composts, natural minerals and many other sources at much lower costs than imported synthetic fertilizers.

Eco-functional intensification, using functional biodiversity, natural minerals and agroecological methods, can ensure that the inputs for soil nutrition and pest, disease and weed control can be generated on farm and in protected areas at virtually no cost, or sourced locally at very little cost. The combination of higher yields, resilient biodiverse production systems and lower production costs can help achieve both food and income security for farmers.

## Virtuous nutrient cycles

Agroecological approaches have been shown to create virtuous nutrient cycles at field and farm scales. In sub-Saharan Africa, a study has shown that they also trigger higher level socioecological dynamics that enhance food security and livelihoods for smallholders.<sup>7</sup> Interventions involving the use of indigenous non-cultivated herbaceous legumes, planned sequences of integrated soil fertility management (ISFM) options and the introduction of conservation agriculture (CA) have shown potential for reversing the soil carbon decline, nutrient depletion and falling crop yields that are currently sustained under conventional agriculture.

The same study also highlighted the intricate non-linear interdependences among agricultural production, natural resource pools, social safety net systems, and access patterns to knowledge, production resources and technologies. Research and extension approaches that created platforms for co-learning and co-innovation of farmers with diverse actors, including those beyond agriculture, were critical for success. These approaches opened opportunities for farmers to share and pursue their livelihood objectives both within and outside protected areas, reinforcing the cycles and broadening horizons for further collaboration (but also conflict) as demands for new forms of resources, skills and technologies arose.

## Sustainable rangeland management

In the case of livestock, protected areas may sometimes impede livestock movement, which must also be taken into account in management plans. Livestock is a major production sector in arid and semi-arid lands in sub-Saharan Africa, South America and South Asia. It is dominated in some cases by pastoralists who have developed strong indigenous knowledge on sustainable land and water management practices.<sup>8</sup> For example, Mongolian and Maasai pastoralists have rich ecological knowledge that contributes to sustainable rangeland management. Movement of livestock during the dry and rainy season is determined by the availability of water

<sup>6</sup> United Nations Conference on Trade and Development United Nations Environment Programme (UNCTAD). 2008. *Organic Agriculture and Food Security in Africa*. Report of the UNEP-UNCTAD Capacity Building Task Force on Trade, Environment and Development. New York and Geneva, UN. Available at: [www.unep.ch/etb/publications/insideCBTF\\_OA\\_2008.pdf](http://www.unep.ch/etb/publications/insideCBTF_OA_2008.pdf)

<sup>7</sup> Mapfumo, P. 2014. *Creating virtuous cycles through agroecology*. Paper presented at the FAO International Symposium on Agroecology for Food Security and Nutrition. Rome, 18 September 2014.

<sup>8</sup> Nkonya, E. and Anderson, W. 2014. Exploiting provisions of land economic productivity without degrading its natural capital. *Journal of Arid Environments*. Available at: <http://www.sciencedirect.com/science/article/pii/S014019631400127X>. Fernandez-Gimenez, M.E. 2000. The role of Mongolian nomadic pastoralists' ecological knowledge in rangeland management. *Ecological Applications*, 10:1318–1326. Available at: [http://dx.doi.org/10.1890/1051-0761\(2000\)010\[1318:TRO MNP\]2.0.CO;2](http://dx.doi.org/10.1890/1051-0761(2000)010[1318:TRO MNP]2.0.CO;2)

and pasture and by pest and disease pressure. However, recent economic and institutional changes and the establishment of protected areas have made this sustainable transhumant livelihood less amenable, and land privatization has restricted livestock movement. Efforts to promote and improve indigenous land and water management by pastoralists, especially those living in and around protected areas, need to be increased.

## Successful ecological synergies – the Ifugao Rice Terraces System

To achieve sustainable agroecological land and water management systems, an integrated approach is required that builds ecological synergies between land, water and biodiversity, which remain highly sectoralized in many countries.

The Ifugao Rice Terraces System in the Philippines<sup>9</sup>, recognized as a Globally Important Agricultural Heritage System (GIAHS), is an excellent example of agroecological land management. Not only are biodiversity and land and water resources are being successfully conserved, livelihoods in local communities have been improved through the marketing and labelling of GIAHS organic products and the promotion of agro-ecotourism, further strengthened by the declaration of five of the terrace clusters as UNESCO World Heritage Sites in 1995. At the national level, the government has established its own criteria and procedure for identifying potential GIAHS sites and set up its own Nationally Important Agricultural Heritage Systems (NIAHS).

### Globally Important Agricultural Heritage Systems (GIAHS)

GIAHS are defined as “Remarkable land use systems and landscapes which are rich in globally significant biological diversity evolving from the co-adaptation of a community with its environment and its needs and aspirations for sustainable development”. Although they are not classified as IUCN protected areas, they overlap in some cases with protected areas and are a good illustration of successful interaction between humans and the environment. Over the centuries, generations of farmers, fisher folks and herders have developed complex, diverse and locally adapted agricultural systems, managed with time-tested, ingenious combinations of techniques and practices.

A Salient feature of GIAHS is their high degree of plant diversity in the form of rotations, poly-cultures and/or agroforestry patterns. Genetic diversity provides security to farmers against diseases, pest, droughts and other stresses, and improves stability of the cropping systems.

Building on generations of accumulated knowledge and experience, these ingenious “agri-cultural” systems reflect not only the diversity of cultures and civilization, but also the evolution of humanity. However, GIAHS are threatened by modernization and technological and economical changes.

In order to safeguard these systems, FAO launched the GIAHS Initiative during the World Summit on Sustainable Development in 2002.

Over the past 10 years of implementation, it has been demonstrated in 31 designated GIAHS sites, covering a total of 6 370 900 ha (including protected areas) in 13 countries, that their dynamic conservation can be achieved by raising awareness and implementing accompanying action plans.



Rice terrace in Ifugao, Philippines

See: [www.fao.org/giahs](http://www.fao.org/giahs)

<sup>9</sup> For more information, see [www.fao.org/giahs/giahs-home](http://www.fao.org/giahs/giahs-home)

<sup>11</sup> *Atlante dei prodotti tipici delle aree protette*. 2002. Available at: [www.atlanteparchi.it](http://www.atlanteparchi.it)

These rice terraces are the country's only remaining highland mountain ecosystem using a farming system which retains the characteristics of 2000-year-old organic paddy farming techniques and associated landscape management. The muyong, a private forest capping each terrace cluster, is an important complement to the rice terraces. Managed collectively through traditional tribal practices, it generally contains at least 250 indigenous plant species, mostly endemic to the region. The terraces form unique clusters of micro-watersheds and are part of the overall mountain ecology. They serve as a rainwater filtration system and are saturated with irrigation water all year round. The harmonization of cultural activities with the rhythm of the climate and hydrology management has enabled farmers to grow rice at over 1000 metres altitude.

## **The potential of agroecology**

There is substantial evidence that agroecology can respond to the challenges of limited natural resources and a growing world population. Its practices, research and policies have witnessed exponential growth in past decades across the world and prompted high expectations, especially from farmers' organizations and civil society. However, although it has been included in numerous national policies, agroecology has yet to be mainstreamed within the broader context of science and development work.

A wider adoption of agroecology, both inside protected areas and in agricultural landscapes, requires new programmes, policies, alliances and knowledge management. It represents a unique opportunity to identify new development paths for the 9 billion people projected to be living on our planet by 2050.

### **Federparchi: food production in protected areas in Italy**

One of the most biodiverse countries in Europe, Italy has more than 11 percent of its land under some sort of protection, corresponding to about 3 million ha managed by parks authorities. Italy's landscapes have always been characterized by a biodiversity-rich mosaic of natural areas and some sort of traditional agriculture practice. In the early 2000s, the Italian Ministry of the Environment initiated an assessment of traditional food products from within protected areas. The ensuing publication, an atlas of traditional products from Italian protected areas,<sup>11</sup> triggered significant demand for those products which, in some cases, provided a remarkable contribution to the visibility and financial status of the protected areas. Over the years, the market for these products greatly increased in Italy. They were often the result of traditional production systems using local breeds or varieties which had coexisted in protected areas for centuries, in some cases also contributing to shaping the landscape. Such visibility also contributed to an increased awareness of the importance of protecting both the environment and local traditions. Italy's famous gastronomic heritage, such as the chestnuts of Valle Castellana; the lentils of Parco dei Sibillini; Caciocavallo, a type of cheese from Parco del Gargano; and the buckwheat and different varieties of wheat in Arco dello Stelvio, is often the result of the interaction between environment, culture and genetic resources.



# SUSTAINABLE USE AND CONSERVATION OF GENETIC RESOURCES FOR FOOD AND AGRICULTURE

## The essence of biodiversity

Biodiversity is one of the earth's most important resources for food and agriculture. Crops, livestock, aquatic organisms, forest trees, microorganisms and invertebrates – thousands of species and their genetic variability – make up the web of biodiversity upon which the world's food production depends. Genetic resources are the raw materials that farmers, breeders and researchers have relied upon for centuries to improve food production and enhance the adaptability of production systems to new conditions, including social and environmental changes.

Genetic diversity in the area of food and agriculture is being lost at an alarming rate. The main reasons include:

- use of only a few commercial crop varieties, breeds of livestock and fish species, neglecting locally adapted varieties and breeds and their unique characteristics;
- loss of natural habitats and environmental degradation, including through deforestation, unsustainable agricultural practices and river-basin modification;
- lack of coordinated efforts between the agriculture, forestry and fisheries sectors for the conservation of genetic resources; and
- environmental changes such as climate change.

## Ex situ and in situ conservation

Conservation strategies that use a combination of *ex situ* (e.g. gene banks) and *in situ* (e.g. protected areas and on-farm conservation) techniques are best placed to safeguard the genetic diversity required to meet the needs of present and future generations. With respect to *in situ* conservation, despite the initiatives already in place, more knowledge is needed about which species of relevance to food and agriculture are conserved in protected areas, and their conservation status.

For instance, protected areas can constitute reserves of valuable aquatic genetic resources for current and future food production, and fisheries management can be considered as a form of *in situ* conservation. Since the wild relatives of the vast majority of aquatic species used for food still exist, special care should be taken to ensure that these valuable genetic resources are not lost. Characterization of the aquatic genetic resources found in protected areas should be an essential step in designing and managing the areas.

### Strategic Plan for Biodiversity 2011-2020

Governments have committed to maintaining genetic resources through the CBD Aichi Biodiversity Target 13:

*By 2020, the genetic diversity of cultivated plants and farmed and domesticated animals and of wild relatives, including other socioeconomically as well as culturally valuable species, is maintained, and strategies have been developed and implemented for minimizing genetic erosion and safeguarding their genetic diversity.*

## Protected areas and genetic resources for food and agriculture

Protected areas present a number of assets regarding the conservation of genetic resources for food and agriculture. These areas, among other things:

- conserve populations of wild relatives of plant varieties and animal breeds, including fish and other aquatic organisms, used for food and agriculture. These populations are an essential reservoir of genetic material to cope with social and environmental changes;

## Genetic resources: the figures

Of the approximately 8 700 recorded livestock breeds, 17 percent are at risk of extinction, and 7 percent have already become extinct. Food production from livestock draws upon a very small group of species: three species (cattle, chickens and pigs) account for about 88 percent of the world's annual meat production from livestock, two species (cattle and buffaloes) for about 96 percent of milk production and just one species (chickens) for about 92 percent of egg production. Yet different animal breeds are key elements in the delivery of ecosystem services in natural and semi-natural ecosystems, especially in protected areas.

Over 350 species of fish and aquatic invertebrates and plants are farmed around the world. The widespread domestication and selection of aquatic species is recent but is rapidly expanding. However, only ten species (comprised of shellfish, crustaceans, plants and fin fish) account for half of total aquaculture production.

There are over 80 000 tree species, but less than 1 percent of these have been studied in any depth for their present and future potential. As a result of pressures on forest lands and the effects of unsustainable use of forest resources, the great potential of forest genetic resources, including their potential for contributing to food security, is at risk of being lost before it can be identified, let alone utilized.

- preserve animal breeds in traditional production systems – such as in the GIAHS – allowing for their sustainable development and adaptation;
- host species in a more natural environment, which implies better conditions for the development of useful traits for breeding varieties adapted to changing conditions;
- can be used as “laboratories” to better understand the natural processes supporting sustainable agriculture, forestry and fisheries, including the contribution of pollinators, soil biodiversity and a wide genetic pool.

Protected areas are a key global and national tool to protect, *inter alia*, genetic resources for food and agriculture, protecting their habitats, their traditional production systems (where these exist within protected areas) and the natural evolutionary processes in which these species live. Development activities that affect terrestrial and aquatic ecosystems should strive to incorporate protected areas where genetic resources can be conserved.

Genetic resources for food and agriculture need to be considered as an important element in the process of identification, establishment and management of protected areas. Increased knowledge and characterization of the genetic resources found in terrestrial and aquatic protected areas is an essential step in this process.

Stronger and more coordinated efforts between the agriculture, forestry and fisheries sectors should be established to ensure the implementation of existing instruments for the conservation and sustainable use of genetic resources for food and agriculture and to help achieve CBD's Aichi Biodiversity Target 13.

## Existing instruments

Governments have adopted a series of instruments for the conservation and sustainable use of genetic resources such as the Global Plans of Action on plants, animal and forest genetic resources. These were negotiated and adopted by the Commission on Genetic Resources for Food and Agriculture which also monitors their implementation.

The International Treaty on Plant Genetic Resources for Food and Agriculture, negotiated within the Commission, also contributes to the conservation and sustainable use of plant genetic resources.

# PEOPLE'S PARTICIPATION IN PROTECTED AREA MANAGEMENT

## Involving local communities

Protected area management plans that not only address protection, but also incorporate sustainable use and involve local communities tend to be more successful in the long term. Co-management between government and communities can be a useful governance solution for protected areas, also offering an opportunity to incorporate the traditional knowledge of local people and their skills in monitoring and other management activities. Management tools such as hunting, fishing and gathering can be considered when appropriate.

The traditional knowledge and perceptions of local people are important for managing and conserving plant and animal species in protected areas. Women in particular often have specialized knowledge of forests, trees and wildlife in terms of species diversity, uses for various purposes, and conservation and sustainable management practices. Making better use of traditional knowledge and combining it with scientific knowledge has the potential to increase the role of protected areas in food security for local people.

## Hunting

The relationship between hunting and protected areas is not a simple one. Uncontrolled, unsustainable hunting has been responsible for considerable depletion and extinction of wildlife. Left uncontrolled, it is one of the most prevalent threats to wildlife species worldwide.

However, hunting, as well as fishing and gathering, are recognized and permitted activities in various protected areas across the world, and can be beneficial when well-managed. Many IUCN category IV areas are managed especially as game reserves, while category VI areas may include hunting and even category I wilderness areas may permit traditional hunting.

There are three principal categories of hunting in protected areas: subsistence, management-related, and recreation or sport. At times they may overlap, for example when recreational hunting provides valuable game meat or is used to support a management objective such as decreasing an excessive number of introduced species.

Although meat is the most common product from subsistence hunting, animals are also used for other livelihood purposes such as clothing, tools, medicine and material for handicrafts, as well as for rituals. Some animal products from hunting, such as ivory or products used in traditional medicines, have acquired commercial value over time in local, national, and international markets. Unfortunately this has fuelled an illegal market for these products, resulting in criminal activities. It should also be recalled that, although usually valued positively, animals may also be perceived negatively, such as when feeding on crops outside the protected areas, preying on livestock or humans, or transmitting diseases.

### *Wildlife refuges*

Hunting activities may also benefit from protected areas in which hunting is not permitted but that are indirectly part of hunting management units. As these refuge areas are protected from hunting, wildlife can benefit from a secure habitat while spilling over into areas where hunting is permitted.

### *Control of pest species*

Hunters can benefit protected areas by helping to control non-native and overabundant species. A number of countries have exotic game animals that were originally introduced into what are now protected areas. They are presently regarded as pests for which recreational hunting can be an important method of control. In addition, the inability of species to self-regulate population densities without carnivores that were once

<b>CATEGORIES OF PROTECTED AREAS</b>		
IUCN protected area management categories classify protected areas according to their management objectives.		
IUCN Category	Name	Short description
<b>Ia</b>	<b>Strict Nature Reserve</b>	Category Ia are strictly protected areas set aside to protect biodiversity and also possibly geological/geomorphic features, where human visitation, use and impacts are strictly controlled and limited to ensure protection of the conservation values. Such protected areas can serve as indispensable reference areas for scientific research and monitoring.
<b>Ib</b>	<b>Wilderness Area</b>	Category Ib protected areas are usually large unmodified or slightly modified areas, retaining their natural character and influence without permanent or significant human habitation, which are protected and managed so as to preserve their natural condition.
<b>II</b>	<b>National Park</b>	Category II protected areas are large natural or near natural areas set aside to protect large-scale ecological processes, along with the complement of species and ecosystems characteristic of the area, which also provide a foundation for environmentally and culturally compatible, spiritual, scientific, educational, recreational, and visitor opportunities.
<b>III</b>	<b>Natural Monument or Feature</b>	Category III protected areas are set aside to protect a specific natural monument, which can be a landform, sea mount, submarine cavern, geological feature such as a cave or even a living feature such as an ancient grove. They are generally quite small protected areas and often have high visitor value.
<b>IV</b>	<b>Habitat/Species Management Area</b>	Category IV protected areas aim to protect particular species or habitats and management reflects this priority. Many Category IV protected areas will need regular, active interventions to address the requirements of particular species or to maintain habitats, but this is not a requirement of the category.
<b>V</b>	<b>Protected Landscape/ Seascape</b>	A protected area where the interaction of people and nature over time has produced an area of distinct character with significant, ecological, biological, cultural and scenic value; and where safeguarding the integrity of this interaction is vital to protecting and sustaining the area and its associated nature conservation and other values.
<b>VI</b>	<b>Protected area with sustainable use of natural resources</b>	Category VI protected areas conserve ecosystems and habitats together with associated cultural values and traditional natural resource management systems. They are generally large, with most of the area in a natural condition, where a proportion is under sustainable natural resource management and where low-level non-industrial use of natural resources compatible with nature conservation is seen as one of the main aims of the area.
See: <a href="http://www.iucn.org/about/work/programmes/gpap_home/gpap_quality/gpap_pacategories">www.iucn.org/about/work/programmes/gpap_home/gpap_quality/gpap_pacategories</a>		

plentiful may lead to an overabundance of game animals. In some situations this may justify allowing humans to substitute the role of predators through hunting in protected areas, and can be considered as a contribution to efforts to restore and maintain healthy and biologically diverse systems.

### ***Difficulties related to hunting in protected areas***

In addition to potential problems related to uncontrolled or illegal hunting, the usefulness of hunting as a tool to support protected areas depends on the ecological, economic, and social context of the country and protected area concerned. For example, while trophy hunting can generate substantial funds for protected areas, some species do not have the biological characteristics to allow hunting to be sustainable or the relevant trophy features to attract tourist hunters. On the other hand subsistence hunting by local communities in the same areas may be acceptable. Likewise, in a context where laws prohibit all types of resource extraction, hunting cannot be used as a management tool unless there is a change in legislation.

### ***A means of ensuring economic value for protected areas***

Protected areas must generate sufficient funds to cover both their operating costs and the opportunity costs of foregoing other forms of land use. In some areas trophy and subsistence hunting may be both ecologically sustainable and economically competitive over the long term, relative to other land uses.

Social and biological monitoring systems need to be further developed to assess the impact of hunting and the trade-offs generated by hunting in protected areas. Adequate policies are needed to maximize the contributions of hunters towards protected areas while assuring the conservation of biodiversity.

### **Collaborative Partnership on Sustainable Wildlife Management (CPW)**

The CPW is a voluntary partnership of international organizations with substantive mandates and programmes for the sustainable use and conservation of wildlife resources. The mission of the CPW is to promote conservation through the sustainable management of terrestrial vertebrate wildlife in all biomes and geographic areas and to increase cooperation and coordination on sustainable wildlife management issues among its members and partners.

See: [www.fao.org/forestry/wildlife-partnership](http://www.fao.org/forestry/wildlife-partnership)

## **Fishing**

Fishing as an activity in and around protected areas can provide a source of food, as well as economic, cultural and recreational benefits. For multiple-use protected areas, such as category VI area, fishing within the protected area constitutes a legitimate activity to be managed using an ecosystem approach in accordance with the FAO Code of Conduct for Responsible Fisheries<sup>10</sup>.

When a protected area is established in marine or inland water systems, diverse groups within a community or within the fisheries sector may be affected in different ways. An important distributional issue is that the benefits tend to be diffuse while costs are concentrated. A potential cost to the fisher is that catch (and revenues) may be decreased,

at least in the short term, as a result of the implementation of a closed area, thus having an impact on food security for a family or community. Communities adjacent to the protected area, especially those with a high economic dependence on the fishery, may face a disproportionate impact as a result of aggregate reduction in fishing revenue. On the other hand, they might also capture most of the benefits in the form of reduced variations in aggregate catch levels, increased total catches or more valuable larger-sized fish catches. The way that costs and benefits are distributed will depend on the particular circumstances and the way the protected area has been designed – including access and tenure arrangements.

In recognition of the potential benefits as well as the risks from recreational fishing, the FAO Guidelines for Responsible Recreational Fishing<sup>10</sup> provides a framework and guiding principles to ensure both equity and environmental and economic sustainability.

Protected areas to support fishing activities must have associated management plans and monitoring systems in place to ensure the conservation, production, recreational and social objectives of the protected area are being met.

### **Existing instruments**

There are a number of instruments for the conservation and sustainable use of aquatic resources, including guidance on area-based measures, such as;

- Code of Conduct for Responsible Fisheries<sup>12</sup>
- Ecosystem approach to fisheries guidelines
- Marine protected areas technical guidelines<sup>13</sup>

<sup>10</sup> [www.fao.org/fishery/code/en](http://www.fao.org/fishery/code/en)

<sup>12</sup> FAO. 2003. *Fisheries management: the ecosystem approach to fisheries*. FAO Technical Guidelines for Responsible Fisheries 4. Suppl. 2. Rome. Available at: [www.fao.org/docrep/005/y4470e/y4470e00.htm](http://www.fao.org/docrep/005/y4470e/y4470e00.htm)

<sup>13</sup> FAO. 2011. *Marine protected areas and fisheries*. FAO Technical Guidelines for Responsible Fisheries 4. Suppl. 4. Rome. Available at: [www.fao.org/docrep/015/i2090e/i2090e00.htm](http://www.fao.org/docrep/015/i2090e/i2090e00.htm)

Full stakeholder participation, such as through community-based management or co-management, is an important factor for success.

Area-based management, including spatial management measures such as marine protected areas, has a long history in fisheries. Spatial measures play an increasingly important role as management of fisheries shifts towards an ecosystem approach, paying increased attention to ecosystem linkages and overall health. The challenge is how to use protected areas more effectively to fulfil multiple objectives in an integrated spatial management approach for the benefit of the aquatic environments and sustainable livelihoods.

## Chico Mendes Extractive Reserve in Brazil



Brazil nut collector in the Chico Mendes Extractive Reserve

The Chico Mendes Extractive Reserve (CMER) in Acre State, Brazil, is a protected area of the Brazilian Federal Government, where access to the land and harvesting of the natural resources is given to local people who depend on the forest for their livelihoods. The concept was led by Chico Mendes and the rubber tappers in the 1980s, as an innovative approach in the Brazilian Amazon. The bottom-up movement led by local rural workers' unions and the National Council of Rubber Tappers proposed the establishment of extractive reserves to resolve the basic problem of land tenure for sustainable development

by local communities. This is a pioneering example of the implementation of community-based multipurpose management of natural resources, harmonizing forest conservation and sustainable use, agriculture and livestock activities. The socioeconomic aspect of the Extractive Reserve aims to guarantee local development by creating employment opportunities and increasing income, and to help preserve the lives and cultures of traditional communities. The locals play a major role in the management of the natural resources, including the enforcement of land tenure rights and governance issues.

The CMER covers nearly 1 million ha, making it the largest extractive reserve in Brazil. It is rich in biodiversity and hosts many varieties of economically valuable trees such as mahogany (*Swietenia macrophylla*). Each household in the CMER must follow strict rules regarding land conversion for agriculture and livestock areas, associated with forest management planning. To date, there are 64 extractive reserves in Brazil, with an overall area of approximately 12 million ha.

## Gathering

For centuries, people have relied on wild plants, animals and insects for food, medicine, clothing, and spiritual sustenance. The harvesting of edible non-wood forest products such as leaves, fruits, seeds and nuts, roots and tubers, mushrooms, and honey have also been important components of rural diets that provide nutrient-rich supplements for local communities in and around protected areas. Approximately 60 million indigenous peoples depend on forests for their livelihoods, using traditional knowledge on agroforestry farming practices.

For millions of people living in poverty in rural areas, forest and tree resources not only provide food, fuel for cooking and heating, medicine, shelter and clothing, but they also function as safety nets in crises or emergencies.

<sup>14</sup> FAO. 2012. Recreational fisheries. FAO Technical Guidelines for Responsible Fisheries 13. Rome. Available at: [www.fao.org/docrep/016/i2708e/i2708e00.htm](http://www.fao.org/docrep/016/i2708e/i2708e00.htm)

Divergent interests and a lack of communication and understanding between different stakeholders may however cause conflicts in protected areas in terms of the use and conservation of natural resources. Bwindi National Park in Uganda is a good example of a protected area that succeeded in balancing conservation efforts and livelihoods, after much discussion, negotiation and agreement.<sup>15</sup> When the forest area was designated as a national park, all legal uses of the natural resources were initially banned, affecting the local people's livelihoods by increasing poverty, raising food and fuel prices, and reducing income. Through negotiated collaborative agreements for the use and management of park resources between the local communities and the park staff, they agreed upon a multiple-use strategy where limited amounts of resources are harvested by a small number of people. Monitoring and assessment is carried out to ensure that the annual harvest does not exceed the sustainable yield of the resources.



@ Josh Levinger

Edge of Bwindi forest

<sup>15</sup> Blomley, T. No date. Natural resource conflict management: the case of Bwindi Impenetrable and Mgahinga Gorilla National Parks, southwestern Uganda. Available at: [www.fao.org/3/a-y4503e/y4503e11.pdf](http://www.fao.org/3/a-y4503e/y4503e11.pdf)

# WATER AND WATERSHED MANAGEMENT

## A comprehensive approach

Watershed management is a sound approach to meeting the requirements for the establishment, planning and management of protected areas. Watersheds and mountain ecosystems cover 23 percent of the earth's land surface and provide a multitude of goods and services to humanity. These include the provision and protection of 60–80 percent of the earth's freshwater resources for domestic, agricultural and industrial consumption, the regulation of water flows, a natural resource base for local livelihoods, renewable energy, and the preservation of biodiversity, including agro-biodiversity.

## An integrated framework for organizing land uses

Watershed management considers the sustainable management of natural resources in a comprehensive way and makes the link between natural resources management, agricultural production and livelihoods in and around protected areas. It provides a framework for organizing different land uses (forestry, pasture, agriculture) in an integrated way. In addition, watershed management contributes to the reduction of risks of natural hazards, such as landslides and local floods, and creates local resilience to climate change as well as adaptation options. The consideration of upstream–downstream linkages and the development of payments for ecosystem services have the potential to create additional income for rural populations as well as marketing opportunities for local products. Finally, watershed management works at the political level, contributing to good governance, decentralization and specific policies. With all these elements, watershed management is not only a very sound approach to be applied in protected areas, but is ideally placed as a global approach to managing water, disaster risk reduction and food security issues.

## Mountain protected areas

Many protected areas are located in upland and mountain areas and are characterized by landscapes with a diversity of land-cover types and land-use systems. Accordingly, mountain protected areas contribute significantly to providing and conserving universally important environmental services such as clean water, disaster risk reduction and biodiversity resources and, ultimately, contributing to global food security. In order to ensure that these functions are maintained, the sound and integrated management of mountain protected areas is essential. A management approach is required which addresses on the one hand the protection and wise use of natural resources, and, on the other, the improved livelihoods of the local communities who are the custodians of the resources. The management of these protected areas requires a participatory approach in which the needs and indigenous experiences of local populations are taken into account and their access rights to land and resources are respected.

Upland watershed and mountain ecosystems are extremely vulnerable to global changes such as climate change, increasingly frequent natural disasters, population growth, the expansion of unsustainable agriculture, and urbanization, which compromise the role of these ecosystems. In addition, mountain communities – the stewards of upland watersheds and their globally important resources – are among the world's poorest and hungriest. Approximately 300 million mountain people are vulnerable to poverty, food insecurity and malnutrition. They lack access to basic infrastructure, credit, markets, education, and, as they live far away from the centres of power and decision-making, they are often marginalized in political, social and economic terms.



## **FAO and the Mountain Partnership, a voluntary alliance of governments and organizations committed to achieving sustainable mountain development around the world**

With its mandate to work on natural resource management, food security and livelihoods, and its attention to the social, economic, and environmental dimensions of sustainable development, the Food and Agriculture Organization of the United Nations (FAO) has played a leading role in watershed management and sustainable mountain development for many years. In 1992, FAO was appointed task manager for Chapter 13 of Agenda 21 entitled *Managing Fragile Ecosystems: Sustainable Mountain Development* (UNCED 1992) and acted as the lead agency for the International Year of Mountains in 2002. FAO is a member of the Mountain Partnership and hosts its Secretariat. From 2003 onward, FAO has also been mandated by the United Nations General Assembly to lead the annual observance of International Mountain Day on 11 December.

### **Strong institutional mechanisms and dialogue**

In the period 2002–2006, FAO's Forestry Department conducted a thorough review of past and current approaches to watershed management. This process, implemented in close collaboration with many partners worldwide, is described in the publication "The new generation of watershed management programmes and projects".<sup>16</sup> The review recommends a holistic approach, linking the natural, socioeconomic and land-use systems together. It puts particular emphasis on strengthening and establishing sound institutional mechanisms to create bridges across disciplinary and administrative boundaries, and on establishing a dialogue among administrative levels and stakeholder groups.



Chimborazo volcano, the highest mountain of Ecuador, is an important water tower, as well as being a national reserve for vicuña

<sup>16</sup> FAO. 2006. *The new generation of watershed management programmes and projects. A resource book for practitioners and local decision-makers based on the findings and recommendations of a FAO review*. FAO Forestry Paper 150. Rome. Available at: <ftp://ftp.fao.org/docrep/fao/009/a0644e/a0644e.pdf>.

# TENURE, FOOD SECURITY AND PROTECTED AREAS

## Ensuring rights for local people

The livelihoods of many, particularly the rural poor, depend on access to and control over land and other natural resources. These are the source of food and shelter; the basis for social, cultural and religious practices; and a central factor in economic growth. Tenure systems determine who can use which natural resources, for how long, and under what conditions. Tenure systems face the increasing stress of a growing population in need of food security, and of environmental degradation and climate change reducing the availability of land, fisheries and forests. Inadequate access rights to land and other natural resources for poor local communities, and insecure tenure of those rights, often result in extreme poverty and hunger.

It is important to look at protected areas in light of tenure questions. Protected areas are owned and controlled by state or non-state actors, and may also comprise a range of other types of tenure rights. For example, local people may have a long history of using a protected area through customary tenure rights and may regard these rights as being legitimate even if they are not recognized in formally-established legislation.

Although protected areas promote conservation, they can also result in increased hunger, poverty, displacement and social conflict when their establishment weakens or extinguishes legitimate tenure rights of local communities whose livelihoods depend on access to the designated natural resources.

## Responsible governance of tenure

In order for protected areas to contribute not only to conservation objectives, but also to food security and sustainable livelihoods, it is therefore necessary that principles of responsible governance of tenure are applied, based on the recognition, respect and safeguard of legitimate tenure right holders and their rights.

Applying these principles to protected areas means that:

- formal recognition is given to all tenure rights that are considered legitimate by society;
- protected areas are established and governed by policies and rules that lead to equitable and secure access to natural resources, and reconcile competing interests;
- decision-making process are transparent, participatory and gender-sensitive;
- conservation practices are flexible and adapted to the local context and can accommodate different governance mechanisms, including community-owned and -managed areas.

Local people's traditional knowledge should be tapped into for all policymaking, planning and programme implementation concerning protected areas. All those involved should strive to strengthen the capacities of local communities and their institutions; increase the rights to control and manage natural resources; and ensure a more effective representation of local people in decision-making processes.

*The Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries and Forests in the Context of National Food Security, and the Voluntary Guidelines for Securing Small-scale Fisheries in the Context of Food Security and Poverty Eradication*<sup>17</sup> can be used to ensure that conflicts and competition over natural resources in protected areas are appropriately addressed. These guidelines can be used by governments, conservation agencies and protected area managers to improve governance of tenure also in conservation areas, and provide a framework for use when developing tenure-related policies, legislation, programmes and activities and for assessing whether proposed actions constitute acceptable practices.

The guidelines set out principles and internationally accepted standards regarding responsible practices for the use and control of land, fisheries and forests. They were officially endorsed by the Committee on World Food Security, highest forum of the United Nations for reviewing and following up on policies concerning

<sup>17</sup> Available at: [www.fao.org/docrep/016/i2801e/i2801e.pdf](http://www.fao.org/docrep/016/i2801e/i2801e.pdf)

world food security, on 11 May 2012. Since then implementation has been encouraged by G20, G8, Rio+ 20, and the United Nations General Assembly.

The Voluntary Guidelines are based on five general principles:

States should,

- recognize and respect all legitimate tenure rights and the people who hold them;
- safeguard legitimate tenure rights against threats;
- promote and facilitate the enjoyment of legitimate tenure rights;
- provide access to justice when tenure rights are infringed upon;
- prevent tenure disputes, violent conflicts and opportunities for corruption.

### **Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries and Forests in the Context of National Food Security**

These guidelines promote secure tenure rights and equitable access to land, fisheries and forests as a means of eradicating hunger and poverty, supporting sustainable development and enhancing the environment. The guidelines are the first comprehensive, global instrument on tenure and its administration to be prepared through intergovernmental negotiations.

See: [www.fao.org/nr/tenure/voluntary-guidelines](http://www.fao.org/nr/tenure/voluntary-guidelines)



Residents of Ethiopia Mago National Park.

# FINANCING PROTECTED AREAS FOR IMPROVED LIVELIHOODS AND INCOME

## **Sustainable financing of protected areas: a vital need**

Protected areas form the core of conservation efforts around the world, as well as playing a crucial role in food security and livelihoods. With the increasing recognition of their role in sustainable natural resource management, there has been a ten-fold increase in the number of protected areas in the last three decades. Yet, financing their management through sustainable and reliable funding continues to be a challenge.

Protected areas receive funds from diverse sources. Since they are managed by government agencies in most countries, public sector budget is critical for their long-term funding. Bilateral and multilateral funds including donor support are also important sources of funding in developing countries. Many protected areas with flexible management systems have also generated funding through financing mechanisms that reward private sector and local community participation. Payments for ecosystem services including ecotourism are also gaining importance in many countries with the establishment of dedicated institutional structures such as conservation trust funds for effective capitalization and utilization of financial resources.

## **Continuing challenges to mobilizing finances for protected areas**

The number and area of protected areas continue to increase, as well as the demands placed on them due to growing public expectations of what such areas should deliver. The cost of managing protected areas is also increasing. However, public sector funding for protected areas has hardly kept pace. Many governments fail to honour their commitments to conservation made under various treaties.

At the same time, there has been low awareness, particularly among policy- and financial decision-makers, of the role of protected areas in supporting sustainable development objectives such as poverty reduction and food security.

Designing fiscal systems that reward conservation and discourage the destructive use of ecosystems and biodiversity is a major political and capacity constraint in many developing countries. Strategies that incentivize the extractive use of natural resources for short-term benefits continue to be relatively popular.

Many countries also lack inclusive policies that encourage local community participation and benefit-sharing and that entail decentralization and devolution of budget management to local levels. These are hard to establish.

Fostering protected area resource-based enterprises including ecotourism that could help generate additional resources is constrained by a lack of enabling environments and limited availability financial services such as credit and market information.

## **Potential measures to promote sustainable financing of protected areas**

Despite these challenges, globally, there is progress towards enhancing the financial basis for protected areas. New and innovative ways of augmenting financial sources, particularly by adopting strategies that make protected areas more relevant to local people and their socioeconomic progress, are emerging. Moving forward, protected area financing needs and opportunities will continue to grow and it is important to have appropriate strategies in place to ensure sustained financing.

### ***Sustained public sector support***

With the majority of the world's protected areas publicly-owned, public-sector finance plays an important role and is often the only source of funding for their management, especially when this is focused on delivering

social and environmental benefits. It is therefore important to reframe how funding for protected areas is sought, particularly by highlighting their potential role in addressing pressing global challenges such as climate change, poverty and food insecurity. Strong public sector support is also needed for the provision of financial incentives (e.g. subsidies and tax breaks) for targeted investments.

### ***Multi-stakeholder engagement including the private sector***

Sustainable financing requires support from all key sectors and stakeholders and this broadening of the funding base may be seen as a prerequisite for the long-term financial sustainability of protected areas. Indeed, some protected areas have successfully articulated how their sustainable management could contribute to a wide array of development objectives and attracted funds from other sectors such as ecotourism, environment, and rural development. A proactive private sector is also key to promoting investments in protected areas, particularly in areas where entrepreneurial and business skills are needed. The growing number of public-private partnerships in various protected area management activities is an indication of this trend.

### ***Innovative financing mechanisms including payments for ecosystem services (PES)***

There is also a need to further expand and adopt innovative protected area financing mechanisms which include the incentive- and market-based approaches that are increasingly used to guide economic decision-making. Some areas of action include improving the efficiency of revenue collection through market-based price determination, reducing leakages through strengthened regulation and institutional capacities, privatizing selected commercial functions of protected areas, establishing dedicated funds to facilitate financing from multiple sources, and promoting investment diversification and value-addition (e.g. ecotourism, bio-prospecting).

Protected area management is increasingly justified in terms of the ecosystem services that they provide, be it the natural water filtration function of wetlands or the storm protection function of coastal mangrove forests which benefit the entire global community. Currently these services are typically enjoyed by offsite consumers at low or zero cost and thus make little contribution to protected area finance. Payments for ecosystem services (PES) have been developed to correct this lacuna. While very often the payments or contributions from beneficiaries may be voluntary, consumer demand for ecosystem services could also be mobilized through legal obligations to avoid, minimize or offset environmental damages, such as biodiversity/carbon offsets. PES schemes have good potential in areas where the ecosystem services are clearly defined, highly valued, and legally protected under rules that encourage markets and trade.

## **Sustainable financing: more than just mobilizing funds**

It is however important to note that sustainable financing is not just about raising money. It is also influenced by how the funds are spent. Successful cases of protected area financing underline the need for strengthening the knowledge and skills of protected area authorities in business and financial management. This also includes enhancing administrative and communication skills so that protected area administrations can win the confidence of investors and make a convincing case for increased investments.

Viable and lasting partnerships between protected areas and other sectors and strong local community involvement in management and benefit sharing are vital. A case in point is the Bi Duop National Park in Lam Dong Province of Viet Nam where local households receive payments worth nearly 80% of their annual income (US\$410) PES from the provincial government, paid mainly by the hydro-power plants operating in its watershed. However, PES can often become complicated when multiple ecosystems services and institutional arrangements are involved, as seen for example in the Cat Tien National Park in Viet Nam which is spread over three provinces. A shared vision among different actors on the roles, functions and modus operandi of protected area financing, preferably in the form of a long-term financing strategy, is needed to undertake advocacy and communication to mobilize the required political will and actions. Thus a sustainable financing strategy could indeed serve as an important tool to improve protected area management as well.

# RESTORATION AND LANDSCAPE APPROACHES IN PROTECTED AREAS

## The urgent need to restore degraded lands

Forest and land degradation is a problem at global scale resulting in significant losses to livelihoods and key ecosystem services and contributing to GHG emissions. The total area of degraded land in the world today is estimated to be the size of South America. Every year, around 13 million hectares of land are deforested,<sup>18</sup> an area the size of Greece. Although more than half the loss is compensated for by afforestation and natural expansion of forests, a significant amount of forest and other productive land is lost annually. Protected areas and the well-being of communities living in their vicinity are also threatened by deforestation and land degradation. Unsustainable land use practices are not only having a negative impact on the natural resource base in these areas but are also contributing to poverty and food and nutrition insecurity.

In recent years, the need and potential for restoring degraded lands has gained attention globally, thanks in large part to two major initiatives that have contributed significantly to raising political awareness and setting quantifiable targets for restoration. The first is Aichi Biodiversity Target 15, agreed to at the 10th Conference of the Parties to the Convention on Biological Diversity (CBD) in October 2010, which calls for countries to restore at least 15% of their degraded ecosystems by 2020. The second is the Bonn Challenge, established at a ministerial conference in Bonn, Germany in September 2011, which sets a target of restoring 150 million ha of degraded land by 2020. In addition, several international processes and partnerships, such as the Global Partnership for Forest Landscape Restoration (GPFLR), the Landscapes for People, Food and Nature (LPFN) initiative and the International Model Forest Network (IMFN) have served to raise awareness of the importance of restoration of degraded lands and to enhance collaboration and joint action among several international organizations, including FAO, IUCN, the World Bank, the World Resources Institute and others.



Private land under cultivation near Iguazu National Park, where a local conservation organization has worked with private landowners to encourage agroforestry and restoration practices.

<sup>18</sup> FAO. 2010. *Global Forest Resources Assessment 2010*. Main report. Forestry Paper 163. Rome.

## **FAO support to restoration of degraded lands**

FAO has been involved in the restoration of degraded ecosystems, including in and around protected areas, for many years. Drawing on the Organization's depth of technical expertise and a long history of practical experience on the ground, FAO has produced a wide variety of approaches, tools, methodologies, guidelines, training and extension and other materials that have been used in many field projects throughout the world.

For example, the New Generation of Watershed Management Programmes and Projects has taken the lessons learned over many years of watershed management field experience, inside and outside FAO, to provide guidance to project designers and implementing agencies for improved ways of restoring and maintaining the bio-physical functioning of watersheds as well as improving the well-being of those communities living in and around them.

In dryland ecosystems, FAO was a key partner in developing the LADA (Land Degradation Assessment in Drylands) approach, which has been successfully applied in many dryland countries to successfully restore degraded lands. Additionally, FAO has recently committed to a concerted effort focused on assisting countries in engaging in wide-scale restoration of degraded lands, by establishing the Forest and Landscape Restoration (FLR) Mechanism. The FLR Mechanism facilitates a country-driven multi-stakeholder process to plan, finance and implement restoration activities that aim to achieve commitments toward the Bonn Challenge and/or Aichi Biodiversity Targets related to ecosystem restoration.

These and other FAO programmes and initiatives are contributing to the restoration of degraded ecosystems in many parts of the world. However, effective partnership amongst many international organizations, governments, NGOs and the private sector will be essential in order to reach the level of support that will be required to achieve the goals set forth by the Aichi Targets and the Bonn Challenge – including a strong focus on the restoration of protected areas and surrounding lands.

## **The concept of restoration**

Restoring degraded land in and around protected areas is often referred to as “ecological restoration”, given the focus on addressing biodiversity loss and the maintenance or enhancement of the provision of ecosystem services. Restoration activities can have several objectives, such as enhancing the conservation or recovery of individual (sometimes endangered) species, restoring ecosystem functioning and the provision of important ecosystem services such as clean water, improved resilience and adaptability to climate change as well as other biophysical benefits. Some protected areas are in urgent need of significant restoration efforts due to their highly degraded state and the significance of the biodiversity within them.

But restoration can also be important in areas adjacent to or surrounding parks, reserves and other protected areas, in order, for example, to provide buffer zones that can make conservation more effective, or to provide corridors that connect two or more protected areas and allow improved movement of species and ultimately genetic variability.

## **Productive restoration**

Beyond the biophysical benefits and enhancement to biological diversity, restoration can also provide important socioeconomic benefits to communities living in or around protected areas and help to improve their overall well-being. Better functioning ecosystems and more productive land can allow people to grow more food, have access to better nutrition, adequate supplies of clean water and energy sources, generate employment and provide many other benefits, as well as reduce pressures that lead to further degradation.

The idea of “productive restoration” is highly relevant in land surrounding protected areas as it more specifically addresses the restoration or rehabilitation of land that is normally used for agriculture and other productive purposes. More productive land, if well managed, can be used more intensively, thereby reducing pressure on the conservation areas it surrounds.

## **A people-centred approach**

Whereas outdated approaches to the conservation and restoration of degraded ecosystems focused more on excluding people from access to protected areas and natural resources on which their livelihoods often depended, modern restoration principles have shifted significantly to a realization that the most promising solutions involve a more people-centred and balanced approach that take into accounts the needs and knowledge of local communities. Although multi-stakeholder inclusion can be complex and challenging, most experts today agree that it is the only way to ensure long-term and sustainable solutions to restoring degraded ecosystems and ensuring that the root causes of the degradation are adequately addressed.

Carrying out restoration at landscape scale can also be an important factor of success. Many landscapes contain multiple land-use systems, in which both productive activities (e.g. agriculture, livestock and forest plantations) and conservation activities (e.g. protected areas) can be found. A mosaic approach to restoration in such landscapes can enhance the chances of successful interventions, given the interconnectivity that often exists between the different land-use systems.



## CONCLUSION

In the words of Henry David Thoreau, “It is in vain to dream of a wildness distant from ourselves.”<sup>19</sup> For better or for worse, humans and human activity have left an indelible mark on the planet. In the best cases, humans have established a balance, enabling them to reap the benefits of nature without depleting its resources. In the worst, precious natural resources have been seriously degraded or even irreparably damaged. Protected areas constitute a powerful means of restoring and preserving the balance where it is in danger of being lost.

However, the future of the planet cannot be envisaged without taking into account not only the effects of human activity, but the needs of the human population. As shown in this paper, protected areas have the potential to contribute to all three pillars of sustainable development: environmental, economic and social; and are already making important and far-reaching contributions to food security.

The theme of the 2014 World Parks Congress is “Parks, people, planet: inspiring solutions”. It is important to remember that no solution will be viable unless people have a say in the management of the land on which they depend.



Rice paddies around Andringitra National Park, Madagascar.

<sup>19</sup> Journal, August 30, 1856.

