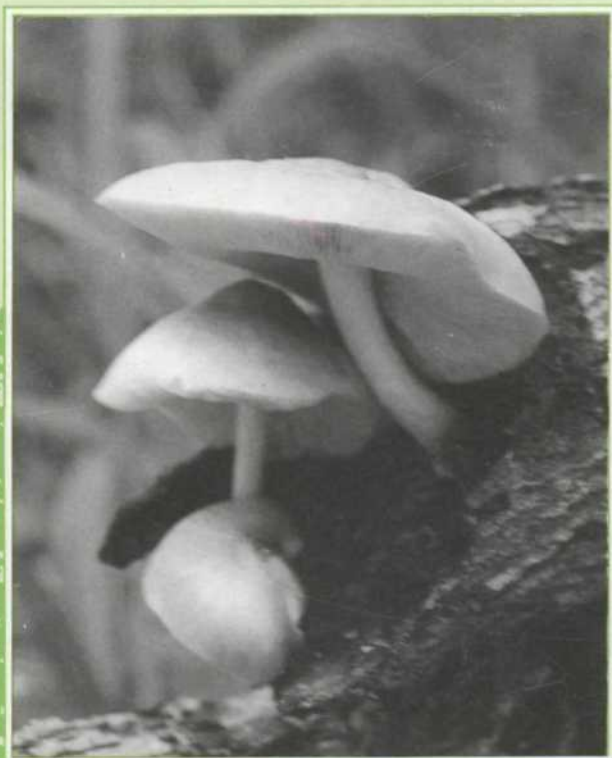


IUCN Forest Conservation Programme

Non-timber Forest Products

value, use and management issues in Africa,
including examples from Latin America

S.A. Crafter, J. Awimbo
and A.J. Broekhoven



IUCN
The World Conservation Union

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Editors:

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INTRODUCTION

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Background

Utilisation and management of non-timber forest products (NTFPs) has often been overlooked in strategies and programmes for forest conservation and management. In October 1992, two seminars were jointly organised by IUCN and the Commission of the European Union in Amacayacu (Columbia) and Manaus (Brazil) to assess the situation of extractivism and extractive reserves in Latin America (Ruiz Perez et al, 1993; Murrieta Ruiz and Rueda Pinzón, 1995).

The success of the two workshops in South America encouraged IUCN and the Commission of the European Union, with additional financial support of the Commonwealth Science Council and the Government of France, to organise a third workshop to analyse the situation and to explore the viability of extraction of NTFPs in Africa. Between 8 to 13 May 1994 a pan-African workshop on NTFPs was organised by IUCN and held in Naro Moru, Kenya. This workshop was one of various initiatives undertaken by IUCN to improve knowledge and understanding of the role and potential of NTFPs in forest conservation.

These workshops are part of a larger programme as various field-based projects are currently being implemented or developed in, amongst others, Latin America, Laos, Philippines and Uganda, to test and gain experience with NTFPs in forest conservation strategies. In southeast Asia, IUCN is involved in a network on NTFPs and in Eastern Africa a recent workshop was jointly organised with CIFOR to assess research priorities for NTFPs.

The workshop in Naro Moru

The aim of the workshop was to provide a forum for individuals and institutions working on NTFPs to exchange information and experience and to analyse the (potential) role of NTFPs in forest management and conservation strategies. The meeting was attended by 43 people from 14 (francophone and anglophone) African countries and 4 Latin American countries. Participants included representatives of research institutions, forest departments, field projects, NGOs and international organisations.

The meeting included presentations and discussions in smaller groups and in plenary. Two visits to local communities were made to discuss issues related to the extraction of NTFPs.

This publication is the result of the workshop. It consists of three parts:

- a summary of the workshop discussions (page 3-15);
- a selection from the papers on thematic topics (page 3-15) that were presented and discussed during the workshop;
- country overviews of 15 countries, covering crucial issues related to NTFPs and including maps of the forest reserves where the information was available (pp 118-161)

Non-timber forest products

Non-timber forest products have been defined in different ways by different authors. De Beer and McDermott (1989) emphasise the physical properties of the product and define NTFPs as "all biological materials other than timber, fuelwood and carbon, which are extracted from natural forest for human use". In the definition by Falconer (1990), emphasis is on the extraction of forest products by local people for home consumption and for sale, to be distinguished from large-scale extraction for timber and pulp. She defines NTFPs as "those forest products, include by-products such as bushmeat and mushrooms, that are not processed by large industries". Both definitions are useful because they capture different aspects of NTFPs. However, as the presentations and discussions during the workshop in Naro Moru emphasised the linkage between NTFPs and the interests and situation of local communities, Falconer's definition seems to be more appropriate for this publication.

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I DISCUSSION GROUPS

AN OVERVIEW OF THE WORKSHOP DISCUSSIONS AND SUGGESTIONS FOR FOLLOW UP

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Introduction

Throughout the workshop, various sessions were held to discuss specific themes related to non-timber forest products (NTFPs). These discussions were important elements of the workshop. They focused on identifying major issues in relation to NTFPs and opportunities for follow-up activities by the participants and others.

This section of the proceedings presents a summary of these discussions. It is based on the notes and presentations of the rapporteurs of the various discussions and does not necessarily reflect the opinion of the compiler.

Values, valuation and impact of NTFPs

The values of NTFPs

NTFPs can generate both direct (commercial and subsistence) and indirect (ecological processes, biological diversity, cultural, ritual/heritage) benefits.

Direct benefits

Commercial extraction of NTFPs is extremely important for many rural communities, but this is usually poorly reflected in national statistics because the market systems are underdeveloped and much trading of NTFPs takes place in the informal sector. The importance of NTFPs as commercial products seems to be growing due to a reduction of government support to the poor sectors of society and due to increasing international demand (e.g. "green consumerism"). On the other hand, subsistence extraction of NTFPs often fulfills basic needs for rural communities for food, energy, health, housing, etc.

Indirect benefits

Culture was defined as a combination of language, customs, beliefs, religion, knowledge systems, dress, food habits and social structure. Examples of cultural and social

values of forests are summarised in Table 1. Cultural values are as diverse as there are communities and cultures; and values are constantly changing through adaptation or adoption and external imposition. Cultural values are inextricably linked to socio-economic and political factors. However, appreciation of economic values often causes decision-makers to overlook and disregard the importance of cultural and social values.

Table 1. Examples of cultural and social values of forest resources

<p>1. Trees Cultural and social values of trees include:</p> <ul style="list-style-type: none">• Certain tree species in the Amazon region may not be cut because of a local belief that the tree acts as transporter between the physical and spiritual world.• Another belief, also from the Amazon region, suggests that if a person cuts certain tree species he/she will be eaten by a crocodile.• Trees may represent mediators in decision-making.• Trees are used to demarcate property. They can play a role in land tenure systems and in establishing land rights (e.g. planting and/or harvesting a tree in a certain area can constitute proof of possession of the tree and the land surrounding it). <p>2. Forest locations Forest sites with social and cultural significance include:</p> <ul style="list-style-type: none">• Sacred groves,• Sites of initiation ceremonies,• Venues for political and social meetings. <p>3. Cultural and ceremonial objects In parts of Uganda, bamboo is used during the circumcision ceremony.</p>
--

Various communities place tremendous value on cultural objects, activities and places in the forest. These cultural values of forest-dependent societies usually support conservation, yet cultural values are passed on less and less to the next generation and "modern" society is losing its connection with nature and forests. However, cultural change must be voluntary and it must come from within a culture. People can be mobilised when their cultural identity is respected and promoted.

All social categories (age, gender, ethnicity, wealth, region) affect the extraction of NTFPs, but they do it in different ways and in different intensities. Some categories do not change with time (gender, ethnicity), whereas others do (age, wealth). Therefore, the relation of individual people with NTFPs changes as well.

Surveys of the use and value of NTFPs

Surveys of resource use and of NTFPs have contributed to the knowledge about and recognition of the value of NTFPs for local communities and others. Although various alternative techniques have been developed to value NTFPs, several problems in valuation remain. This is because in many cases:

- there is no market price, or the market price is distorted;

- there are few substitutes for forest resources (to calculate values on the basis of prices of substitutes);
- it is difficult to assess the volume and frequency of use, in particular the domestic or subsistence use in a non-cash economy.

Preliminary questions

When designing a survey, several key questions should be addressed including:

What is the purpose of gathering the information? and: What is the information intended to be used for?

In the case of NTFPs, the purpose of measuring their cultural and social values is often to provide a tool for making decisions that will lead to improved forest conservation and improve livelihoods for communities dependent on forest resources.

Who will use the information?

There are two obvious user groups: forest dependent communities, and planners and policy-makers at all levels (local, regional, national, international). Forest-dependent communities usually have an inherent knowledge of the value of the forest and its products and their information needs may be very specific.

Information about social and cultural values is often qualitative, rather than quantitative and therefore not appreciated by policy-makers, who use quantitative information. Since appropriate quantitative measurements do not exist, it was suggested that it is important to change the way policy-makers use and compare information on forest values. This would, hopefully, ensure that qualitative and descriptive information on cultural and social values is considered on an equal footing with quantitative economic and ecological values.

Possible methods for measuring social and cultural values of NTFPs

During the discussions, some research and information priorities were identified (Table 2). It appeared that the research priorities for Latin America and for Africa were very similar.

A major consideration was that a manual of approaches and methodologies for resource-use surveys would be useful for field staff, researchers and managers alike. The manual should include:

- a discussion on the different types of information required;
- identification of key constraints that have been commonly encountered and how to avoid or deal with these constraints;
- examples of appropriate and locally adapted methodologies with adequate room for adjustment;
- guidelines for long-term and interdisciplinary monitoring of the use of NTFPs;
- a description of the linkages, which should be recognised between various aspects of the use of NTFPs, to ensure that integrated and applied studies are being carried out.

The impact of harvesting on biodiversity and ecological processes

Using the collective wisdom of the participants, two steps were undertaken:

- The potential impact of harvesting vegetable resources was analysed. The potential impact was classified on a relative scale with reference to structure, species composition, and recruitment. The following categories of plant parts

Table 2. Important research topics (not in order of priority)

<ul style="list-style-type: none">• Assessment of past and current resource use, including traditional knowledge, past and present management systems, and local management capacity. Mapping, qualitative and quantitative analysis would be used.• Ecological studies of forest resources to determine optimal and maximum harvesting levels and the impact of forest resource use.• Research into community attitudes towards protected areas, the utilisation of forest and other natural resources, and the role of awareness building.• Assessment of economic factors and circumstances at local, regional, national, and global levels, as it affects forest resources and resource use.• Research into new products and new extraction techniques for increased efficiency and possibly reduced impacts.• Analyses of gender issues, land tenure systems, extent of and opportunities for participatory management, the role of communities, access rights to resources and decision-making processes.• Analyses of present markets and their development potential.• Effects of international conventions and the role of international agencies on the use and management of NTFPs.• Assessment of factors that foster non-sustainable use of resources and how to alleviate these factors.• Potential and constraints for domestication of forest species to relieve pressure on natural forest, and the development of alternative resources and products.
--

included: fruits, roots, dead wood, bark, charcoal, leaves, fibres, resins, poles, honey. An assessment was then carried out by the participants on the level of information available on each resource (see Table 3).

- Parameters for the measuring of impact of harvesting NTFPs were listed (Table 4). It was suggested that the objectives for an impact assessment must be clear. The aim will often be to set levels of extraction.

Quantitative information about the effects on biodiversity is generally lacking. Therefore, there is a need to develop rapid assessment methods and to make these methods available through the publication of manuals and guidelines. It was noted that the current literature about methods for impact assessments is not used by field-based officers.

Approaches to sustainable use and conservation of NTFPs

Building NTFP use into management plans

General principles

NTFPs need to be incorporated into management plans (including forest, wildlife, national park and wetland management plans and master plans) to enhance sustainable use of NTFPs and to promote appropriate management of the wider forest ecosystem. Before

Table 3. Assessment of impact of harvesting of NTFPs and of the availability of information

Plant part	Factor	Impact	Availability of Information
Stem for timber	S	+++	Local
	C	+++	Some
	R	+++	Good
Fruits	S	n	Lacking
	C	n	
	R	+	
Roots	S	+	Lacking
	C	++	Lacking
	R	+	Lacking
Bark	S	+	Local
	C	++	Local
	R	+	Local
Leaves	S	n	-
	C	n	-
	R	n	-
Resin	S	n+	Some
	C	n	Some
	R	n	Some
Branches	S	+	Some
	C	+	Some
	R	+	Some
Dead wood non-woody plants	S	n	Some
	C	+	Some
	R	+	Some
Whole plants	S	+	Some
	C	+++	Some
	R	+++	Some

KEY:

- S Structure of the ecosystem
- C Species composition
- R Recruitment
- n no impact
- + some impact
- ++ reasonable impact
- +++ significant impact
- The participants were unable to make an assessment

Table 4. Various parameters and criteria to measure the impact of harvesting of NTFPs

<p>1. Extraction</p> <ul style="list-style-type: none">• intensity• seasonality• methods• who is extracting• part of plant and type of product <p>2. Legal aspects</p> <p>3. Social & cultural aspects</p> <p>4. Economics</p> <p>5. Time scale of impact</p> <p>6. Species/resource</p> <ul style="list-style-type: none">• species composition• the occurrence of rare species• the use of key species• the impact on key species that depend on the forest• the occurrence and impact on key species• the vegetation structure• the prevailing climate & micro-climate• size of resource or forest• taxonomy• ecology & population dynamics• productivity• phenology• vegetation type <p>7. Topography and soil</p> <p>8. Techniques for measuring impacts</p>

the actual planning process starts, there must be awareness and recognition of the need to pay attention to NTFPs in management plans by those who prepare and approve the plans. Policy and legislation should allow for incorporation of NTFPs in the plans.

NTFPs should be taken into account in all stages of the development of the plan itself. The following steps were identified as particularly crucial:

- identification of the issues and problems in the area under consideration;
- definition of the management plan objectives;
- assessment of the resource (biophysical survey);
- assessment of the demands and values of the resource (socio-economic and cultural surveys);
- formulation of the management strategy;
- determination of the sustainable levels of extraction and the methods of extraction;

- determination of the compatibility between the various management objectives and programmes, e.g. wildlife conservation, timber exploitation; partition of the reserve into zones with different management objectives and from where NTFPs may be extracted. Zones may be created for extraction, research, rehabilitation, transition, a buffer, core protection and exclusion;
- development of a continuous monitoring, research and evaluation programme.

Recent developments

Although there is increasing awareness about the value and use of NTFPs, few examples exist of explicit attention being paid to NTFPs in policies, programmes and management plans. These examples include:

- In South Africa, an extraction plan was developed in 1981 for *Romorha adiantifolia*; a fern that is commercially exploited from forest reserves.
- Kenya is in the process of developing a master plan which will include extraction of NTFPs, in particular orchids.
- In Cameroun, Moçambique, Malawi, Zimbabwe, policy review processes are under way which includes NTFP use.
- Botswana has developed a utilisation and management programme for NTFPs in conjunction with the National Conservation Plan.

The role of governments and NGOs in community participation

Greater cooperation between Governments and NGOs would be beneficial to enhance appropriate and effective community participation. Table 5 shows the current situation in different countries. National networks of NGOs could facilitate contacts with the government and coordination of activities. Important constraints and limitations to better cooperation between the different parties include:

- Both government and NGOs may have special interests or their own (hidden) agendas regardless of the real needs of the community.
- The capacity to assist community participatory activities is generally limited. Many NGOs are inexperienced (many have been established in the past 5 years), and they are usually initiated by intellectuals and civil servants. These NGOs are often city based, with weak linkages to rural communities.
- Rural communities lack the confidence to establish their own NGOs.
- Both NGOs and governments can over-awe communities with technological ideas causing the initiative to move from the communities to the assisting agency.

Suggestions to improve participatory processes include:

- The process (including the introductory Participatory Rural Appraisal) should only be initiated if the facilitating institution (NGO or government) has the long-term commitment and resources to follow it through.
- Village-based researchers should be used whenever possible. NGOs should be firmly rooted in the community: bottom-up community participation and initiatives by local and traditional institutions have sometimes more chances of success.
- NGO initiatives should be fine tuned with government development plans.
- Institutions which facilitate participatory processes (NGOs and governments) should be flexible and adaptive to the needs of communities.

Table 5. A summary of comments by the workshop participants on the situation of community participation in their countries

1. Kenya, Tanzania, Botswana

- Governments recognise the failure of top-down approaches and now encourage community participation.
- As yet, there are no cases of communities taking the first initiatives.
- Governments and NGOs come with their own ideas resulting in some participation; the low government and NGO success rate is probably due to inexperience in preparation and implementation.

2. Zimbabwe CAMPFIRE programme

- Community structures were destroyed during colonial era.
- The mobilisation spirit did not work.
- Level of participation was limited to adoption of ideas suggested by government.
- Yet, later it was found essential to work with communities as facilitators and catalysts.
- Coordination at national level is very difficult.

3. Benin

- It is essential that religious beliefs are respected when participating with communities.
- Foreign NGOs were inclined to operate through the government, bypassing local NGOs without consultation: this caused failure and recrimination.
- Local NGOs work well with communities.

4. Côte D'Ivoire

- Donors sometime withdraw due to lack of participation by all sectors of the community.
- Initiatives to start projects are usually by people outside the community.

5. Gabon

- Constraints within NGOs vary between ethnic groups.
- The national NGO congress is recognised by the government.

6. Senegal

- The attendants at workshops often do not share the information gained with activators in the field.
- The main motivation for involvement by communities is cash income and land tenure.
- There is a lack of follow-up by NGOs.
- Interventions by NGOs are often too narrowly focused.
- There is not enough coordination amongst NGOs and too much replication.
- The government does not encourage coordination as more are interested in money coming into country.

7. Other francophone countries

- People are confused because the governments used to be dictatorial but new policy wants community participation. However, government officers have difficulty in changing attitudes.
- Governments ignore NGOs because they are regarded as competitors.
- NGO problems vary from country to country.

8. Brazil

- Some grassroots NGOs have a very narrow interest base.
- A confederation of 400 NGOs exists, which has a strong relationship with the government.

9. Central America

- In the early 1980s international agencies put a lot of money into lobbying for the rights of Amazon people. Later these leaders became power hungry.
- In the mid 1980s, a US NGO discovered an Amazon community which had successfully developed itself and protected its rights over a period of 20 years. A series of scientists investigated the community to find out why it had been so successful. These intrusions have tended to destabilise the community.
- In the 1990s, 44 villages established a federation of villages and inter-village forest and lake reserves. They plan to get government recognition for the delineation and development plans. No donor funds have been provided, no outside NGOs have provided any form of assistance.

It is important that research and surveys be carried out in close cooperation of the communities, in order to enhance community-based ownership of these activities. Collaboration should include:

- negotiation of the Terms of Reference of the survey with the community;
- participation of members of the community in the actual survey activities;
- consultation with and presentation of progress of the activities with the community, particularly before the results are published;
- publication of the results in the local language;
- when appropriate, listing of community members as authors of the publication.

Policy, legal, and institutional issues

Policy and legislation

Most forest policies and laws do not specifically address issues related to NTFPs. Conservation and sustainable management of NTFPs are not appropriately regulated and guaranteed, because of the lack of priority given to them in policy and legislation. However, in a number of countries, initiatives to review forest policies and laws are underway. These initiatives are likely to result in more prominence given to NTFPs in policy and legislation. An important first step will be, as indicated before, a recognition by policy makers of the importance of NTFPs, particularly as subsistence items for low income groups.

Appropriate forest policies are not the only ones relevant for the conservation and sustainable management of NTFPs. Policies in the area of property rights, patents, biodiversity and access to genetic resources need to be accommodated at national and international level.

Appropriate laws should include the following features:

- recognition of and incorporation of economic, social and cultural values of NTFPs;
- development and utilisation of NTFPs;
- empowering communities in management of NTFPs;
- enabling economic elements for sound utilisation of NTFPs;
- recognition of the value of decentralisation and integration of institutions at the grassroot level as a mechanism to effectively develop and utilise NTFPs.

Property rights and land tenure systems

Land tenure

Various types of land tenure were reviewed and an assessment of their potential impact on the management of forests and NTFPs was made (Table 6).

It was suggested that participatory management can improve control of resource use. Therefore, efforts should be made to organise local communities to promote effective participatory management of natural resources. In situations where government control over state-owned land is effective then there may be less need for local participation.

Treetenure

The recognition of tree tenure is relevant to forest conservation particularly in relation to extension activities, tree planting and gender issues. Property rights and claims associated with trees are referred to as tree tenure. This may include the rights to cut, plant and harvest

Table 6. Land tenure systems and their impact on forest use

<p>1. Private land</p>	<p>Private ownership may be a disincentive to conserve natural forest when the value of natural forest is less than other land use types and compensation is insufficient.</p> <p><u>Exception:</u> Zimbabwe. The land owner has total control over trees (conservation committees are made up of private owners to control use).</p> <p>Even on private land, use rights over trees are always limited either by:</p> <ol style="list-style-type: none"> 1. The Government who protects selected tree species (or even all tree species), or 2. Conservation committees (e.g. Zimbabwe).
<p>2. Communal land</p> <p>i. Reserved under the Government or as County Council land</p> <p>ii. Controlled under local community management system</p>	<p>The benefits do not necessarily go to the local community. Use is often limited to subsistence, except where concessions are awarded. Access is often also limited and management is entirely the responsibility of the government.</p> <p>When the local management has broken down, there is an open access situation. Again, concessions may be awarded to outsiders.</p>
<p>3. State land</p>	<p>Two examples:</p> <p>National parks: in many cases the management regime is totally exclusive: no use is allowed.</p> <p>Forest reserves: limited use is often allowed, but the limits are defined by the government.</p> <p>Yet, in practise, control mechanisms are often insufficient and illegal use is common.</p>

produce. Tree tenure can be different from the tenure of the land on which the tree grows. In other words, the tree may belong to an owner other than the owner of the land.

Genetic rights and property

The importance of fair compensation to communities, regions and countries that have and provide genetic resources was recognised. It is necessary to identify and to implement appropriate mechanisms to provide this compensation. These mechanisms must be specific to the different levels (communities, regions, country).

Education and training

Appropriate education, training and research should be put in place as well as other mechanisms to build the capacity of management institutions at various levels to deal

with NTFPs. NTFPs should become an integral part of relevant educational curriculums (for foresters) as education and training of foresters is overly oriented towards timber.

Opportunities for follow-up

General

The workshop generated a wide variety of ideas for follow up, both for individual institutions, for collaboration on a one-to-one basis and for collaboration in a larger group or network.

Follow-up meetings

Various suggestions were made for the organisation of follow up meetings, including national fora, a similar meeting in francophone Africa, and national or regional workshops and meetings on specific themes related to NTFPs.

Networking and sharing of information

There is a need to establish and maintain information exchange systems on NTFPs among participants and with others through tours, workshops, meetings, training and exchange of publications. A network should be established to link national institutions with institutions in other continents. This might be an area for cooperation between FAO, IUCN and others. FAO intends to set up a database of people and institutions working in the field of community forest management for multiple use in Africa. IUCN could complement this effort. Also, cooperation between NGOs should be encouraged, not only at the central level but also at the community level.

Information exchange could take place about a range of subjects including technical and economic evaluation methods; marketing and markets; advances in field activities; and actual production and potential of NTFPs.

Furthermore, there is a need to establish regional resource centres for different products. The proposed regional resource centre of Veld Products Research in Botswana should be supported as it could have the potential to provide valuable training and research activities.

Regional agreement

Regional policies and treaties should be developed to promote NTFPs and the fair utilisation and sharing of genetic resources and their benefits. Policies for regional cooperation on genetic resource sharing should be reviewed, in particular for species with economic potential.

Awareness and education

Throughout the meeting, it was suggested that policy makers should be made more aware of the importance of NTFPs. It was furthermore suggested that apprenticeship programs should be supported to maintain and pass on traditional knowledge on NTFPs to future generations.

Research and pilot activities

Suggestions for further research included issues such as methodology development (participatory methods, techniques for resource assessment, and economic evaluation especially for non-cash and non-market situations at the household level); external cultural

penetration affects cultural values of NTFPs and their management and use; the role of cultural values in conservation; collection of appropriate baseline data, extraction levels and monitoring; a comparative study of policy, legislation and land tenure in Africa.

Handbooks and manuals

There is a need for the publication of handbooks and manuals on various aspects of NTFPs. It was noted that several initiatives are underway to fill this gap.

South-south cooperation

Using the benefit of having representatives from various parts of sub-Saharan Africa and from Latin America present, the opportunities for south-south cooperation were discussed. In general terms, the sharing and exchange of information and experiences were seen as important elements of south-south cooperation. Such cooperation should be encouraged, in particular, between African institutions and Latin American NGOs, especially as the latter have more practical experience in assistance to community participation processes, product development and marketing. African NGOs can gain experience and understanding of national organisations of indigenous people. Donors should be stimulated to make funds available for south-south cooperation.

Tentatively, IUCN and CIFOR were requested to coordinate such a network and cooperation.

Acknowledgement

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II CASE STUDIES: AFRICA

VALUING HOUSEHOLD USE OF NON-TIMBER FOREST PRODUCTS

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Summary

The economic value of non-timber forest products is significant but often remains unstated or underestimated because it is sometimes difficult to calculate. Non-timber products are of particular significance to the rural subsistence economy, and are especially difficult to value in this context. There are economic and practical problems involved in valuing domestic forest use and a method has been devised, using a game involving picture cards, to estimate these values.

Introduction

Forests provide a wide range of non-timber forest products (NTFPs) with great value for many different groups of users. Non-timber forest products include subsistence and commercial items, non-extractive uses such as tourism and education, and a range of environmental goods and services. Forests, and the resources they contain, also yield existence value—a certain intrinsic worth that is unrelated to actual use.

It is important to appreciate the economic value of NTFPs. When decisions are made about conserving forests, they inevitably rest on judgements about the relative benefits to be gained from different forest management alternatives. If the sustainable value provided by NTFPs is ignored, then the true worth of forests will be underestimated. The usual valuation of forests lies solely in terms of their commercial timber value and ignores the importance of non-timber products to local communities and as potential commercial commodities. This has encouraged logging options over the often more sustainable extraction of non-timber products.

Non-timber forest products may provide a range of income-generating possibilities for local people but their primary value usually lies in domestic and subsistence use. Alternative sources of goods, such as plant medicines, foods, fibres and fodder, may be unavailable or unaffordable elsewhere to forest-adjacent communities. By failing to fully value such use, a large proportion of the value of forests is thereby disregarded, and the vital role of non-timber products in the household economy is ignored.

Problems in valuing household forest use

Attempts to assess the value of subsistence use of NTFPs, however, involve problems of just how such a valuation exercise should be carried out. The value of forest resources has traditionally been calculated by using their market prices as a guide, or by taking the price of the next best alternative available to forest goods as a proxy. In some cases, it is possible to calculate an economic price for forest goods and services by working back from market prices or prices of substitute goods. Yet finding suitable prices to use as a basis for valuation is often impossible in the case of non-timber products which are used domestically, because there is no market or price for them or they are only consumed within the household and are not bought or sold. In a non-cash or subsistence economy, market prices may not even be an appropriate indicator of value. Furthermore, there are often no close substitutes available for forest products, either because of certain unique characteristics they may hold, or because the provision of non-forest alternatives are unlikely to ever be a realistic option in forest adjacent areas. Finally, forest products may hold an additional value for local people over and above the price they fetch when traded. This is because of the vital part they play in the household socio-economy, for cultural or traditional reasons, or because goods originating in forests are preferred above those coming from other sources.

For these reasons, it is not always possible to simply cost non-timber forest products in terms of market prices, and alternative methods of valuation must be found. The problem of valuation encompasses the joint difficulties of:

- calculating a suitable price for non-traded forest products,
- including people's own perceptions of the value of such resources, and
- ultimately finding some way of expressing this value in monetary terms.

There have been several attempts to do this, and most rely on some form of the contingent valuation method.

Use of contingent valuation methods

Contingent valuation, an economic procedure that is used when it is impossible to find a market price for a good or service, has wide applications in the valuation of environmental resources. It involves setting up a hypothetical market for a good, and eliciting bids from users in order to ascertain their willingness to pay for the commodity in this imaginary situation where the good is available for purchase. Alternatively, people may be asked what financial compensation they would be willing to accept for the loss of a non-marketed good or service. Such methods have primarily been developed and applied in the West but have rarely been employed in the case of non-cash economies.

Thus, although contingent valuation provides a useful framework for valuing the use of NTFPs, it must be modified in order to be appropriate to the case of rural households in developing countries. Whereas most contingent valuation relies on asking people to state the amount of cash they would be willing to pay for a good or service, the use of monetary bids is not relevant when looking at the subsistence use of NTFPs in a non-cash economy, where cash sums do not directly enter forest use.

To date there have been few applications of the contingent valuation methodology to household use of environmental resources in developing countries. However, examples

include the valuation of tree resources in the Zimbabwean smallholder farming sector by comparing the perceived importance of tree products to willingness to pay for a pit latrine and a borehole (Lynam *et al.* 1991) and an assessment of the value of forest use in Madagascar by using sacks of maize as a numeraire to assess local peoples willingness to accept compensation for loss of forest use (Kramer *et al.* 1992).

Valuing household use of non-timber forest products in Kenya

In Kenya, the domestic use value of non-timber forest products to local households is large but remains unreflected in national statistics, which deal with licensed use and wood extraction alone. However, recent surveys have found that selected NTFPs account for nearly 40% of the overall value of quantified household forest use in Kenya, or over \$13 million annually. If the full range of non-timber forest products were to be taken into account, this value would increase still further. Work in individual forests has also underlined the importance of NTFPs to the household economy (see Figure 1).

Much forest utilisation by local households takes place outside the licensing system, and is therefore perceived to be illegal. Consequently, it is often difficult to obtain direct information about forest use. Pilot surveys have shown that respondents are much more willing to elaborate on their use of the forest, and to become involved in discussions about forest activities, when questions are not posed directly. Therefore, a methodology involving the use of games has been developed in order to elicit information about forest utilisation and perceptions of the values provided to the household from forest products.

The relative importance of different forest activities was determined by a ranking exercise, using picture cards to represent the major forest products used by households (Figure 2). Respondents are given these cards and asked to order them in terms of their perceived importance to the household. After ascertaining the importance of different forest products to the household, their value must also be found. Often it is necessary to find an alternative indicator of worth to cash. This is done by selecting locally important wealth items that can easily be converted into monetary values, are widely owned by households, and of which respondents have a clear idea of the market price. These will vary between different areas, but such items as bicycles, radios and milk cows have been used (Figure 2).

To evaluate the overall worth of different forest products to the household, counters are allocated as 'points' or 'value indicators', and distributed by the respondent between the picture cards representing forest products, and the additional cards representing the chosen wealth items. This gives an idea of the value of use of different forest products relative to the perceived value of locally important wealth items. Respondents are asked to state the purchase price for the wealth items, which provides the means for forest products to be translated into wealth item equivalents, and ultimately into cash amounts that can be discounted to give an annual household use value.

Conclusion

The procedure described above has provided a useful means of valuing the domestic use of non-timber products by households living around indigenous forests in Kenya. It has also yielded data that can be used in forest management decisions, including the total value of forest utilisation, the distribution of forest benefits between groups and the

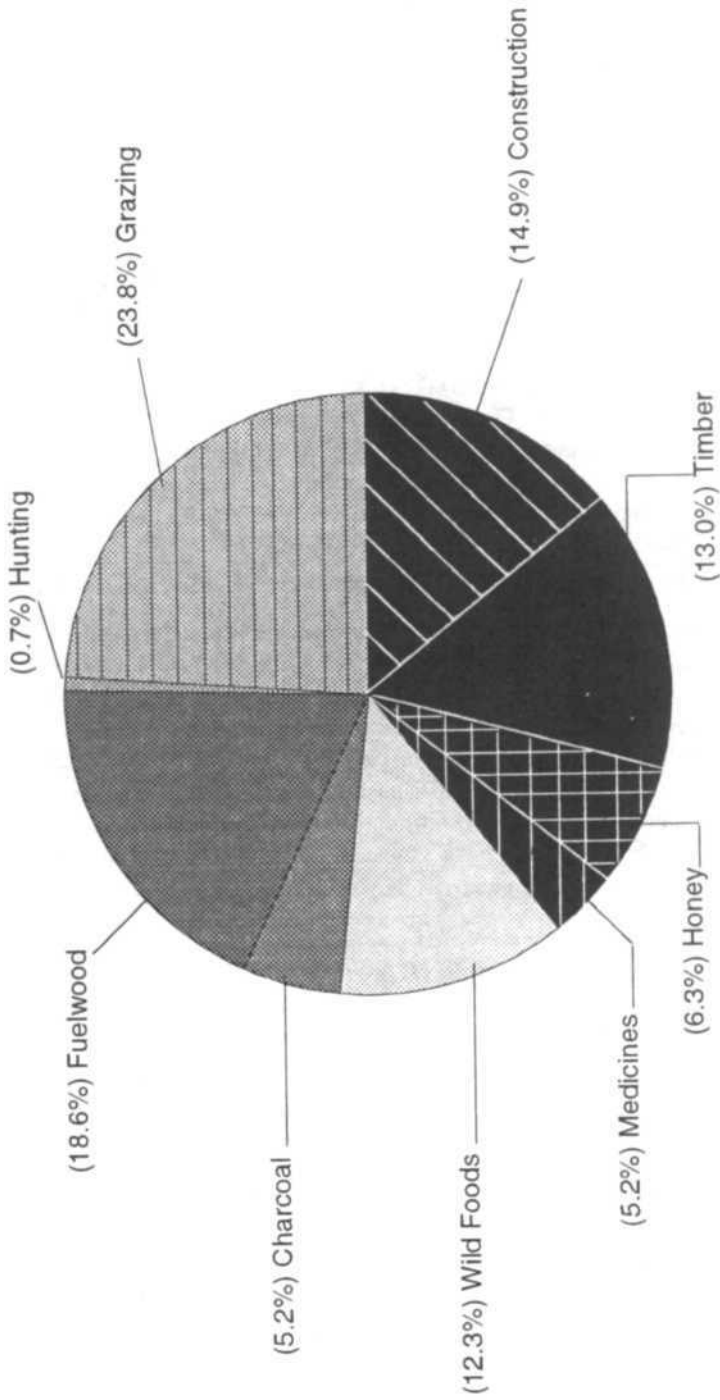


Figure 1. Perceived value of forest products in households surrounding Mount Kenya. Average annual value of forest products is equivalent to US\$200/household; non-timber forest products make up 48% of this value. Source: Emerton (1994)

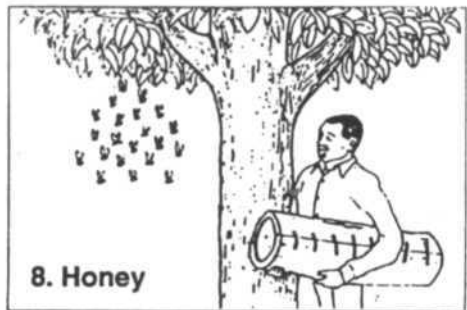
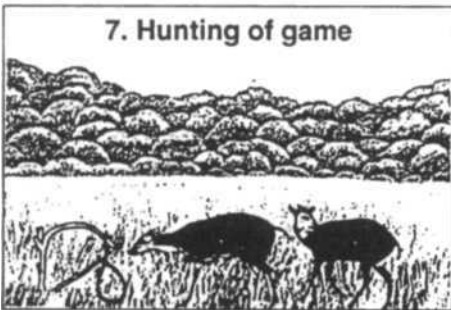
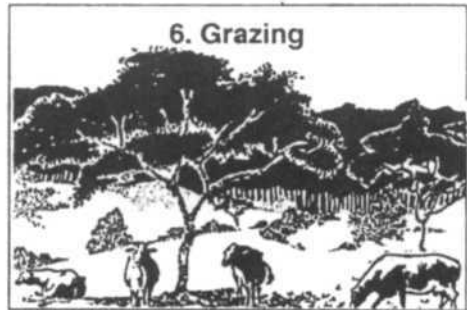
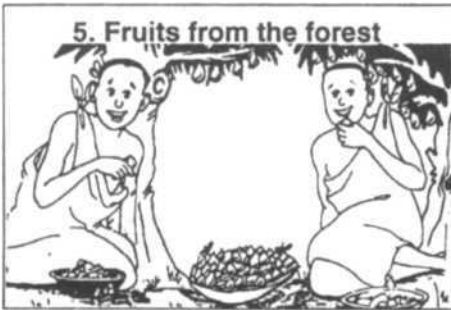
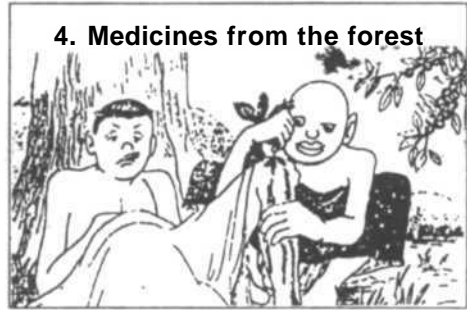
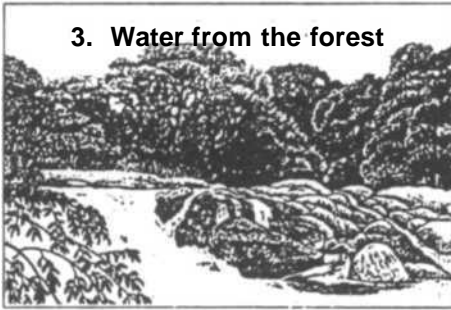
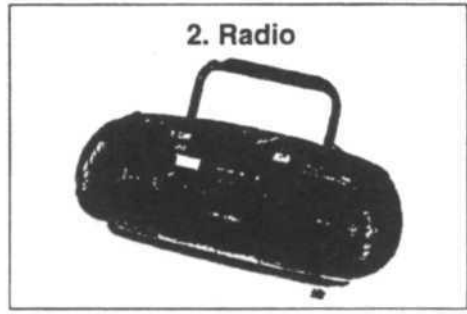
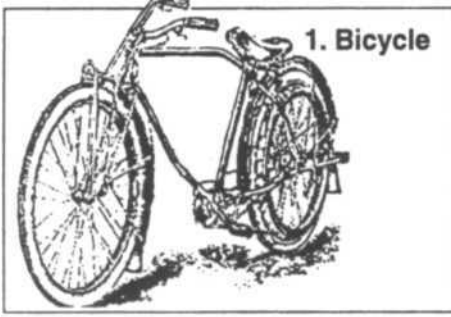


Figure 2. Picture cards representing locally important wealth items (1 & 2) and forest activities (3—8)

impact of different management alternatives on this, and the relative profitability of pursuing different options of sustainable forest use. Unless such attempts are made to value household use of non-timber forest resources, fully informed forest management decisions cannot be made, and the impact of such decisions on rural households cannot be wholly assessed.

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CAMPFIRE AS A MODEL FOR COMMUNITY-BASED RESOURCE MANAGEMENT: A ZIMBABWEAN PERSPECTIVE

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Summary

CAMPFIRE programmes give district councils in Zimbabwe the right to use the natural resources, including wildlife, occurring naturally on their lands. Managed utilisation of the wildlife both conserves the resource and gives direct financial benefits to the communities. Local institutions are strengthened and communities are assisted in the wise management of the natural resources under their control. In Zimbabwe, there is general consensus that conservation of natural resources requires the involvement of those communities who depend economically on those resources.

Introduction

Zimbabwe has some of the finest wildlife populations in Africa. This is despite immense pressure on the land by a large and growing human population, many of whom live in debilitating poverty and amid severe environmental degradation. Zimbabwe's wildlife owes much of its existence to unique and progressive conservation policies such as CAMPFIRE (Communal Areas Management Programme for Indigenous Resources).

During the colonial era, communal people were stripped of their traditional rights to utilise wildlife. Anti-poaching laws turned the centuries-old practice of subsistence hunting into a crime and transformed the perception of wildlife from a valuable commodity to that of a threat to crops, livestock and people.

The CAMPFIRE concept was first mooted in 1963. Efforts to develop the concept eventually culminated in the Parks and Wildlife Act of 1975, which defined 'Appropriate Authorities' responsible for wildlife on all alienated land in Zimbabwe. The act gave landholders of alienated land the right to use wildlife on their land, thereby giving them a reason to invest in wildlife. Today some 500 commercial farmers incorporate wildlife management into their land use.

Following Zimbabwe's independence in 1980, the Act was amended and the Minister of Environment, Natural Resources and Tourism declared district councils to be the Appropriate Authorities for wildlife in the communal lands. This devolved control of wildlife to communities and gave rise to CAMPFIRE, which is now widely recognised as a innovative approach to sustainable rural development.

The major strategies used by CAMPFIRE are:

- The promotion of natural resource utilisation, including wildlife, as an economic and sustainable land use approach to both the conservation of environmental resources and the relief of poverty.
- The ownership of natural resources in communal lands is transferred to local communities and, therefore, direct financial benefits from the exploitation of such resources accrue to the community.
- The establishment and strengthening of local institutions has equipped communities with the skills to use their natural resources in a sustainable way and enables them to become wise and committed stewards of their resources.

CAMPFIRE areas and activities

CAMPFIRE was designed to improve natural resource management on communal lands. The programme has largely focused on the remote communal lands where rainfall is low and soil generally poor (Figure 1). These arid and semi-arid regions and cover approximately one third of the country and support a population of about 2 million people. The low human population densities in these areas (15/km²) mean that significant woodland and wildlife resources still exist outside of the limited arable areas. Extensive animal production, complemented by non-consumptive use of other wildlife resources, is the best land use in the non-arable regions.

CAMPFIRE seeks to assist resident communities in such areas by:

- obtaining the voluntary participation of communities, through their districts, in a flexible programme that incorporates long-term solutions to resource problems;
- introducing a system of group ownership, with defined rights of access to natural resources;
- providing the appropriate institutions under which resources can be legitimately managed and exploited by the resident communities for their direct benefit;
- increasing local employment and incomes through diversifying employment opportunities in the sustainable utilisation of natural resources;
- providing technical and financial assistance to communities joining the programme to enable them to realise these objectives.

The status of CAMPFIRE

CAMPFIRE is a voluntary programme that can be adopted by communities and their respective districts. The programme was formally launched in January 1989, upon the delegation of Appropriate Authority status to two districts in the Zambezi Valley (Nyaminyami and Guruve). As a result of the encouraging example and experiences of these districts, 21 other districts have applied and have been granted Appropriate Authority status for the wildlife resources in their jurisdiction. Thus 23 out of the total 57 districts in Zimbabwe have been granted authority and CAMPFIRE is now becoming a national programme.



Figure 1. Zimbabwe's protected areas and CAMPFIRE districts

CAMPFIRE applies particularly to community-based wildlife resources. Communities are organised in villages and wards with adjacent wildlife habitats, termed 'producer communities'. Technical and Financial assistance is provided to producer communities to enable them to manage their natural resources in a sustainable way and to benefit directly from financial gains derived therefrom.

Revenue so earned is shared between the council and producer communities according to guidelines of the Department of National Parks and Wildlife Management. Revenue distribution to producer communities has either taken the form of household cash dividends or has been allocated for community projects such as schools and health clinics. CAMPFIRE revenues earned were Z\$654,000, Z\$ 1,364,000, Z\$3,105,000 and Z\$7,296,000 in years 1989, 1990, 1991 and 1992 respectively.

Programme implementation agencies

CAMPFIRE, under the direction and coordination of the Department of National Parks and Wildlife Management, is a strong collaborative effort between Government and non-government organisations. The collaborative arrangement reflects CAMPFIRE'S multi-disciplinary structure, which ensures successful implementation, administration and management of the programme. Six agencies comprise the CAMPFIRE Collaborative Group (CCG), which, under the chairmanship of the CAMPFIRE Association, reviews activities, discusses problems and coordinates future activities.

The following agencies comprise the CCG:

- The Department of National Parks and Wildlife Management is the statutory authority responsible for wildlife management. The Department provides direction and coordination to the CCG on all wildlife matters and offers technical assistance and guidance to councils and local communities.
- The Ministry of Local Government, Rural and Urban Development is the responsible authority for the district councils that are granted Appropriate Authority status to manage their wildlife resources. The Ministry advises and assists the CCG on its policies and procedures with respect to CAMPFIRE.
- The CAMPFIRE Association is the organisation elected by producer communities to coordinate, advise and support them and to promote and serve their interests at national and international levels.
- The Zimbabwe Trust assists local communities, district councils and institutions to develop and strengthen both their management ability and the skills needed to manage their wildlife and other resources
- The Centre for Applied Social Sciences (University of Zimbabwe) is responsible for socio-economic research and institutional and policy analysis of CAMPFIRE as well as post-graduate training.
- The World Wide Fund for Nature—Multi-Species Animal Production System Project helps communities and councils to understand and manage the physical and technical nature of the wildlife resources in their areas.

CAMPFIRE: achievements and constraints

Achievements

CAMPFIRE has proved an extremely popular land use option and has provided an incentive for local people to invest in communal resource management. Poaching in these areas has been drastically reduced and the threat to forest woodlands ameliorated.

National parks and protected areas, which constitute 12% of Zimbabwe's total land area, have also greatly benefited from CAMPFIRE. It has re-opened traditional migration routes of animals within the country, thereby contributing to the preservation of biodiversity and the natural environment.

Given the right circumstances, communities can provide effective institutions for natural resource management. The management of common property resources can act as a catalyst for development of communal institutions. It has been observed that the power of communal property resources to generate local institutional development is

especially relevant if the resources in question have a high market value e.g. wildlife. CAMPFIRE is both a community and institutional development programme, based on the sustainable use of natural resources, and a 'bottom-up' conservation programme where local communities have significant participation. Wise use of the environment becomes an internalised practice, encouraged by governments with enabling legislation, policies and a market framework.

In Zimbabwe, CAMPFIRE has greatly altered the perceptions of the general public to the conservation of natural resources. Both the government and the public acknowledge the fact that the conservation of much of the country's resource base cannot be achieved without the intimate involvement of those whose livelihoods depend on these resources.

Constraints

Centralist policies of African governments, inherited from colonial governments, have negated many traditional, local-level institutions, alienating them from the natural resources on which their cultures depend. Communal management systems, such as CAMPFIRE which seeks to empower communities, carry a risk of securing inadequate political and policy support from some central, provincial and district authorities. This is because empowerment may be perceived as undermining the powers of these authorities. This risk cannot be underestimated and such authorities must be handled in a sensitive manner.

Another threat to community-based natural resources management programmes might come from proponents of open access to natural resources. Such access represents a private gain to, say, opportunistic settlers and local economic elites.

Unless appropriate Government sectoral agencies and district councils are prepared to put authority for natural resources into the hands of communities, there is likely to remain a gap between who decides on resource use, who manages, who pays costs and who benefits.

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THE ROLE OF NON-TIMBER FOREST PRODUCTS IN PARTS OF IRINGA REGION, TANZANIA

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Summary

The communities adjacent to Tanzania's natural forests extract forest products for domestic use. The most important non-timber forest products are bee products, herbs and medicinal plants, fuel and pole wood, handcraft materials, fodder and cultural values. The community's access to these products is secured by the DANIDA-supported Soil and Water Conservation Project (HIMA).

Introduction

The dependence on non-timber forest products (NTFPs) from natural forests has a long tradition in Tanzania and is becoming increasingly popular among rural communities due to an increase in living costs. Examples of NTFPs that benefit surrounding communities include food, medicines, fuelwood and materials for use in local house construction, baskets, eating utensils and mortars. Participatory and sustainable forest resource management can be assisted by a clear understanding of the values of NTFPs by policy-makers, professionals and urban and rural communities.

Project objective and area description

The DANIDA-supported Soil and Water Conservation Project (HIMA), in Tanzania's southern highlands, supports sustainable management of existing forest reserves (FRs) and environs that form part of the famous Eastern Arc Forests. The Project liaises with the Division of Forestry and Beekeeping to secure the community's access to forest products. Of prime importance is the promotion of community participation in forest resource management.

The HIMA Project addresses the management of forest reserves in Iringa, Njombe and Makete Districts in Iringa Region (Minja, 1992a; Minja and Moyer 1992). The main forest types represented are: moist closed forest; moist open forest with occurrence of bamboo; miombo woodland; and bushed grasslands.

Utilisation of non-timber forest products

Forest reserves in Iringa Region are managed for multiple benefits such as water catchment, soil protection, biodiversity conservation, stabilisation of climate, timber, NTFPs and amenity. Forest resources within the HIMA Project area used by forest-adjacent populations include bee products (honey, beeswax, apilarnil, and propolis), herbs and medicinal plants, poles and fuelwood, hunting, fruits and food, fodder, fibers and dyes.

Commercial timber exploitation removed most of the valuable timber species such as *Podocarpus usambarensis*, *P. latifolius*, *P. falcatus*, *Ocotea usambarensis*, *Militia excelsa* and *Olea capensis* from the forest reserves. Unfortunately, remote urban dealers enriched themselves at the expense of the surrounding communities and the environment. It is estimated that some of the forests will take 150—200 years to recover from this over-exploitation (Ruffo, 1991).

Subsistence utilisation of forest resources by surrounding communities does not have a destructive impact on the forest ecosystem (UNESCO, 1978). Tools used for subsistence wood collection are much slower at felling trees than those used by commercial timber dealers. Harvesting of mushrooms and herbs is much less destructive than timber exploitation (Hamilton and Mwashu, 1989). Removal of bamboo from FRs is carried out selectively and stands regenerate quickly (Munyuku, 1992b).

Table 1 shows the six most common categories of forest use (not including medicinal uses) and indicates their frequency of use in the forest reserves. The demand for non-timber products is expected to grow in proportion to the population growth rate.

Table 1. The occurrence of forest product use in three forests, Iringa Region, Tanzania

Name of forest	area (ha)	incidence of forest utilisation*					
		Ps	CB	PeFc	GR	HeP	HoN
Kisinga Rugaro	14,164	486	0	17	0	167	199
Image	9,156	558	0	12	6	204	192
New Kidabaga/ Ulangambi	3,700	707	22	373	0	332	328
Total	27,020	1,751	22	402	6	703	719
Percentage		48.6	0.6	11.1	0.2	19.5	20.0

Ps = pitsawing

CB = charcoal burning

PeFc = pole and fuelwood collection

GR = grazing

HeP = hunting

HoN = honey collection

*The data shows the number of sightings during a survey of a 1 % sample of 27,020 ha. Source: Munyuku (1992 a—c)

Products from bees

Honey is used for food, medicine, local beer and sale. In addition, forest bees play an important role in the pollination of agricultural plants. Honey collection was the NTFP encountered most frequently during a survey of the forest reserves carried out in 1992 (Table 1).

The presence of bee forage species such as *Dombeya burgessiae*, *D. rotundifolia*, *Maesa lanceolata*, *Diospyros whyteana* ('msisina'), *Caesalpinia decapetala*, *Syzygium* spp. ('mivengi'), *Croton macrostachyus* ('muvulungu'), *Uapaca kirkiana* ('mikusu'), *Vitex mombassae* ('msasati') and *Myrica salicifolia* ('mwefi') in the forest reserves indicates that a significant honey industry could be supported (Minja, 1991; Munyuku, 1992b; Kihwele *et al.*, 1993).

The villagers collect honey from traditional log hives or from the forest trees and underground openings. In Kising'a Rugaro FR, the project has identified beekeeping groups and is assisting them with protective clothing, traditional or modern bee hives and bee smokers. The promotion of modern and appropriate beekeeping practices will assist the forest-adjacent communities to obtain bee products while concurrently reducing the risk of fire (Minja, 1992b).

Honey is mostly consumed by children and pregnant women (Meshack and Kaijage, 1992; Minja, 1992b), while honey and beeswax can generate substantial income to the beekeepers. In Iringa, an individual can earn Tsh45,000 annually per hive (Lwoga, 1993). As a local medicine, honey is used to treat pneumonia, stomach troubles, wounds and burns.

Herbs and medicinal plants

Forest-adjacent communities rely on FRs for herbs and medicines (Minja, 1991, 1992a). A detailed report on the monetary gain to local communities by selling medicinal products has not been completed. However, data to hand indicates that in Ujuni village in Makete District, a handful of dried herbs for treating stomach ulcers is sold for Tsh600 while a root measuring 30 by 3 cm for treating diarrhoea is sold at Tsh500. Table 2 lists tree and shrub species commonly used for medicinal purposes.

Processing of traditional medicines often involves pounding, grinding and boiling of the leaves, bark, seeds and roots collected from forests. In New Kidabaga Forest Reserve, 16 plant species with local medicinal values have been identified (Kayombo, 1992). These plants fulfill a very important role in local health care. Rapidly increasing prices of imported industrial drugs, coupled with the removal of Tanzania's free medical services in 1993, compel many people to use local medicine. In addition, many villages are located far from hospitals or clinics and transport facilities are often unavailable.

Fuelwood and poles

The majority of local people depend on fuelwood for cooking and heating (1.5–2.0 m³ wood/person/year), while poles are used in the construction of local houses (Kaale, 1984). The extent of extraction of fuelwood from forest reserves by villagers is highlighted in Table 1. Fortunately, the demand is supplemented by exotic species (*Pinus* spp., *Acacia mearnsii* and *Eucalyptus* spp.) planted by the community. In the montane upland forests

Table 2. Examples of common medicinal species and their uses

Scientific name	Vernacular (Hehe)	Condition treated
<u>Moist forest species:</u> <i>Maesa lanceolata</i>	mguti	dysentery, breast, skin diseases
<i>Zanthoxyium gillettii</i>	mlungulugu	stomach, chest ache
<i>Tecomaria capensis</i>	mnunu	amoebic dysentery
<i>Parinari sp.</i>	msaula	chest pains, TB
<i>Ocotea usambarensis</i>	mheti	amoebic dysentery, fever
<i>Bridelia micrantha</i>	mwitsa	cough, TB
<i>Ficus spp.</i>	mdamba	rubbed on ankles to stop pains
<i>Osyris lanceolata</i>	mdunula	pneumonia, fever
<i>Clausena anisata</i>	mnung'anung'a	mental disturbance
<i>Vernonia spp.</i>	mtugutu	stomach ache
<u>Miombo species:</u> <i>Amylogonocarpus andongensis</i>	mhulungu	mouth ulcers
<i>Dicostachys cinerea</i>	mgelele	stomach ulcers
<i>Gardenia jovis-tonantis</i>	mlemandembwe	sexually transmitted diseases
<i>Indigofera barbata</i>	mpangipangi	infant convulsions
<i>Markhamia obtusifolia</i>	mguvani	child epilepsy
<i>Maytenus senegalensis</i>	mvambandusi	syphilis, growth
<i>Phyllanthus engleri</i>	mkingiliti	bilharzia, tooth removal, gonorrhoea
<i>Protea chionantha var divaricate</i>	mnyigi	worms in cattle
<i>Turraea nilotica</i>	lukali	stomach ulcer, snake bites
<i>Vangueria infausta</i>	mzambalau	stomach cramp, to induce birth

Source: Tuite (1991)

Bersama abyssinica, *Macaranga kilimandscharica*, *Albizia gummifera*, *Parinari excelsa*, *Rapanea melanophloeos* and *Diospyros whyteana* are used for fuelwood (Kayombo, 1992).

Species collected for building poles include a tree fern (*Cyathea sp.*), *Phoenix reclinata*, *Neoboutania macrocalyx* ('mkiwi'), *Parinari excelsa* ('msaula') and *Maytenus acuminata* ('mtamu').

Baskets and handicraft materials

Extraction of bamboo from the forest reserves for manufacture of baskets and other products is a common practice. Stems of *Sinarundinaria alpina* are widely used for the manufacture of baskets used for long-distance transportation of fruits to markets. The role played by this bamboo is economically significant: bamboo baskets cost between Tsh800 and Tsh1,000 in Iringa town; bamboo leaves are used as roofing materials; and small-scale industry produces furniture and household articles such as trays and lampshades from *S. alpina*. A set of cane furniture is sold for Tsh30,000. The stems of *S. alpina* are used to make cups for tapping sap from the bamboo *Oxytenanthera abyssinica*; the sap is brewed to make beer.

In the mountainous area of Udzungwa, the tender young leaves of *Agauria salicifolia* ('mwefi') and bark of *Bridelia brideliifolia* are used as a dye to decorate baskets and mats. The bark of *Dombeya torrida* is beaten to produce strings and ropes while latex from

Ficus spp. is used as a glue (Kayombo, 1992). Reeds ('milulu') and fronds of *Phoenix reclinata*, a montane forest palm, are gathered to make mats and baskets (Lovett, 1992).

Farm implements and domestic tools

Different domestic and farm tools such as spoons, hoes and knife handles, pestles and mortars, and wooden wheel-barrows are manufactured locally from materials collected in the forests. *Bridelia micrantha*, *Brachystegia boehmii*, *Burkea africana*, *Dalbergia nitidula*, *Diospyros mespiliformis* and *Faurea speciosa* of the 'miombo' woodland have hard, insect-resistant timbers that are used for making implements, carvings, mortars and bee hives (Tuite, 1992). The very hard wood of *Millenia dura* is used to make axes and hoe handles and the easily worked woods such as *Albizia gummifera* are used to make mortars for pounding grain (Lovett, 1992). *Polyscias fulva* ('mdeke') is used to make wheels for wooden bicycles (Kayombo, 1992).

Harvesting of forest fruits and hunting

A variety of indigenous fruits (see Table 3) and edible mushrooms can be collected from the forests. *Uapaca kirkiana* ('mkusu') is one of the most popular indigenous forest fruits harvested within 'miombo' and upper transitional dry woodlands in the Project area. The fruits are sold for Tsh150/kg in Iringa market. Elders state that these fruits were a source of food during the famine periods of 1934 and 1974. The fruits of *Myrianthus holstii* are common in Udzungwa mountain forests. Within cultivated lands *M. holstii* trees are protected by village by-laws. A single fruit fetches Tsh50 in the urban markets of Iringa town (Minja, 1994).

Table 3. Common fruit tree species

Scientific Name	Vernacular name (Hehe)
<i>Azanza garckeana</i>	mtoo
<i>Flacourtia indica</i>	mgola
<i>Myrianthus holstii</i>	mfutsa
<i>Parinari curatellifolia</i>	msaula
<i>Rhus natalensis</i>	mhehefu
<i>Syzgium cordatum</i>	muvengi
<i>Tamarindus indica</i>	mkwadju
<i>Uapaca kirkiana</i>	mkusu
<i>Vitexdoniana</i>	mfudu
<i>Vitex mombassae</i>	msasati

Source: Lindström and Kingamkono (1991), Tuite (1992), Minja (1994)

Editor's note: Tsh500 = US\$1 in 1993

Indigenous vegetables derived from these forests include *Solanum nigrum* ('mnafu'), *Sesamum* spp. ('mlenda') and *Gynandropsis gynandra* ('mgagani') (Lindstrom and Kingamkono, 1991). The bark of *Ocotea usambarensis* (camphor wood, 'mheti') is used as a spice. *Allanblackia stuhlmannii* ('msambu') fruits produce a fat of high molecular weight that can be used in the manufacture of soap, candles and cooking fat (Ruffo, 1989; Pocs *et al.*, 1990; Lovett, 1992).

Traditional hunting of wild animals offers food and protein supplements (Meshack and Kaijage, 1992). Among the most popular animals hunted are Kirk's Dik-dik (*Rhynchotragus kirki*), Cape Hare (*Lepus capensis*), Bush Pig (*Potamochoerus porcus*), Tree Hyrax (*Dendrohyrax arboreus*), Warthog (*Phacochoerus aethiopicus*) and wild birds such as the Helmeted Guinea Fowl (*Nuida meleagris*) (Ruffo, 1991).

Livestock fodder

Within Iringa Region there are distinct wet and dry seasons, especially in the lower areas. During the long dry season, livestock grazing and browsing within forested or wooded areas becomes important. In the 'miombo' woodlands, up to 11 tree and shrub species are browsed, usually coppice regrowth containing high nutrient levels (Lawton, 1982; Tuite and Gardine, 1991). Within the drier woodlands, bushed grasslands and grasslands occur. Herbaceous production is considerable (Fresson, 1973). Both grazing and browsing occurs within forest reserves, usually when resources within public lands have been exhausted. The higher forests of New Kidabaga/Ulangambi and Kising'a Rugaro Forest Reserves are not used as fodder reserves.

Cultural values

Traditionally some forest reserves have been used by local people for cultural purposes such as the Mount Chugi Forest inside the Udzungwa FR, which is used for ritual ceremonies. The forests are sacred and respected. In addition, beliefs relating to sacred forests or those harbouring spirits succeed in preventing entry of pit sawyers precious-stone prospectors without the consent of village elders. In West Kilombero FR on 'Nyumba Ngitu' (House of the People), traditional mountain ceremonies are held annually and the area is of importance to the Hehe people (Lovett, 1992).

FRs are used for cultural purposes such as praying to ancestors for rains (Meshack and Kaijage, 1992). In Lupila village in Makete District a forest has been named after a famous herbalist, Mama Maria ('Msitu wa mama Maria') and is respected because of her great spiritual powers. She used the forest for extraction of herbs and medicines and performance of ritual sacrifices.

Tenure

Within Iringa Region, there are at present at least 300,000 ha of forest lands which have been gazetted as Government Forest Reserves. One important role for these forests is in terms of catchment and watershed protection. In 1993, the Tanzanian Government prohibited further exploitation of commercial timber from Catchment Forest Reserves. Within public lands, a ban was placed on felling timber within water sources and along major river banks. At present if someone wishes to harvest NTFPs, such as honey, livestock fodder, fuelwood and poles, from within Government Forest Reserves, they can apply for a standard license. There are few restrictions on the collection of medicinal plants, gum and dye.

Within public forests and woodlands, NTFP extraction is carried out within the framework of district council bye-laws, and specific village bye-laws.

Conclusion

The importance of NTFPs in supporting forest-adjacent communities cannot be over-stated. Since the forests support communities in a variety of ways, everybody has some responsibility to ensure that the forests, their resources and ecosystems, are managed sustainably. Within the project area, the roles of NTFPs are many and diverse. They supplement diet, contribute to local health care without incurring high costs, generate cash, or act as exchange or barter items for local families. Harvested fuelwood contributes to local energy requirements, and implements, tools and domestic items are used in the household and during agricultural activities. In a broader sense, forests protect valuable catchment areas, and conserve the biodiversity of the Eastern Arc Mountains.

The value of these forest resources and their ecosystems can be perceived in different ways. Apart from looking at social, cultural and economic values, it is also useful to appreciate that local families may perceive the value of the forest resource in one way, while outsiders perceive them in another. Thus, in relation to conservation of the resource, local perceptions must be seen as a key to success.

With regard to conservation of these forests and their ecosystems, supporting extraction of NTFPs could contribute to forest conservation. Most of these forests rely on natural regeneration, providing a range of species of different ages and with different properties and uses. This in itself is important from the point of view of NTFP extraction and conservation of the ecosystems.

Finally, we should bear in mind the words of the first president of Tanzania, Julius Nyerere, on participation in conservation:

"The mass of our people are poor. If they are to be involved, for example, in protecting our forests, our flora and our wild-life, they must be able to recognise a direct benefit from doing so. Local democratic participation in the conservation of our natural resources, and in their development is essential. We forget that at our common peril" (Nyerere, 1994).

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ASSESSMENT OF GRASS, HONEY, AND EDIBLE CATERPILLARS IN SOME FOREST RESERVES IN MALAWI

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Summary

*Most forest reserves in Malawi are in 'miombo' woodland, which covers a large area of southern and central Africa. Malawi's forest reserves are dominated by the genera *Brachystegia*, *Julbernardia*, *Isoberlinia* and their associates. 'Miombo' has been viewed as a low productivity forest because its timber production is lower than in equatorial rain forests. However, communities surrounding 'miombo' forest reserves benefit by harvesting non-timber products such as honey, edible caterpillars, mushrooms, wild fruits, medicines and fodder.*

With the inevitable reduction in the area of the forest reserves, due to encroachment resulting from land shortages, renewable natural resources in forests are under threat. It is suggested that if these non-timber products are given appropriate value at both local and world markets, local communities will preserve the forest reserves.

Introduction

Most of the natural forest resource in Malawi is a dry, deciduous woodland called 'miombo', which stretches across much of eastern Angola, through southern Zaire, Zambia, central Zimbabwe, Moçambique, southern Tanzania, Uganda and Malawi. This woodland is dominated by the genera *Brachystegia*, *Julbernardia*, *Isoberlinia* and their associates.

The estimated total biomass of 'miombo' in Malawi, is 460 million m³. Much of this natural forest is found in the northern region of the country (47%), while the central and southern regions have 31% and 22% respectively. Much of this woodland is on customary land, with most of the remainder in forest reserves (Coote *et al.*, 1993).

Malawi's single rainy season lasts for about 5 months, from November/December to March/April. The cool dry season is from May to August, when the minimum night temperatures may fall to freezing point in certain areas, and the warm dry season is from

mid-August to October/November, when night temperatures do not fall below 10°C and day temperatures may reach 36°C. Dry season temperatures determine the length of the deciduous period of the vegetation: a cold spell accompanied by strong winds causes many species to shed their leaves and remain bare until the temperature rises and new leaves emerge. If the weather remains mild, the senescent leaves will be retained until they fall at the time of the new flush, which occurs when the temperature rises in August, although this is over two months before the beginning of the rains (Lawton, 1982).

'Miombo' usually occurs on shallow soils with low cation exchange capacity and low organic matter content. Most trees and shrubs have root systems that descend to a depth of 5 m and are, therefore, able to tap the moisture-retaining layers of the soil during the dry season. These forests show considerable variation in structure and composition and offer opportunities for economic exploitation and utilisation.

Despite these multiple benefits to communities adjacent to forest reserves, policy makers have regarded 'miombo' areas as primarily protecting soil and water catchments, or conserving native flora and fauna. Thus forest reserves have been deemed to have a low value and given minimal management, such as the implementation of fire policies and protection against deforestation, while allowing limited exploitation of selected hardwood for timber.

The natural resources of Malawi's forest reserves

'Miombo' forest reserves are viewed as unproductive ecosystems. However, some of the forest reserves support large wildlife populations and others are well supplied with perennial streams. Therefore, it might be argued that the lack of productivity in this ecosystem is partly due to our inability to manage it.

The 'miombo' woodland yields a few commercial timber trees, of which *Pterocarpus angolensis* is probably the most important. Trees also provide firewood, building materials, hoe handles, charcoal, and carvings. The traditional method of charcoal burning is wasteful and attempts are being made to introduce kilns to improve the efficiency of charcoal burning both in quality and quantity. Non-timber forest products are also collected from such ecosystems and include mushrooms, honey, edible caterpillars, wild fruits, medicines, grass for thatching houses and fodder.

Edible caterpillars

Some 'miombo' trees are defoliated by edible caterpillars which are a good source of animal protein. Caterpillars are usually collected by villagers, especially women and children, and dried before being used as food; any excess is sold in local markets.

April and May are the months when most caterpillars are collected from *Julbernardia paniculata*, *Brachystegia microphylla*, *Brachystegia spiciformis*, *Albizia antunesiana*, *Piliostigma thonningii* and *Diplorhynchus condylocarpon*. One species of caterpillar, *Elaphrodes lacteal*, is the most favoured. If this resource could be improved, it could substitute for meat or fish, which are too expensive for the local people.

Annual assessment of caterpillar yields began in Malawi in 1990 in Kasungu National Park. Plots of 50 x 50m were established as fire treatment plots within the park. The

study showed that highest caterpillar yields were observed in those plots that were burnt early and annually, followed by plots that were not burnt at all. Late, hot fires produced the lowest caterpillar yields. This information could be used to encourage participating families to help minimise wild fires in these forest reserves.

The above experiment determined the effects of controlled burning on the availability of caterpillars. A more detailed study would be required to monitor changes in caterpillar populations throughout the year and on different tree species. Such studies would generate information that would enable the participating families to monitor caterpillar densities and to harvest them during the peak periods of the different tree species. This will help them to develop a sustainable harvesting programme and the information will also help ecologists to conserve the tree species that are most favoured by these caterpillars.

Forest honey

A good stand of mature woodland has the potential for commercial production of honey as most 'miombo' trees and shrubs are a source of bee forage. Honey was an important part of early man's diet and even today provides him with a good source of energy. Honey is used for home consumption and is sold in local markets; it is also used for the production of alcoholic beverages in the rural areas.

Some tribes in Malawi, in particular the Tonga living in the Viphya Mountains around the Usumara Forest Reserve, are traditional beekeepers. They use techniques that enable them to harvest honey in harmony with the bees and the forest. Hives made from the bark of selected tree species are placed deep in the forest many kilometres from the villages. These hives are suspended from high branches to avoid army ants and honey badgers. During the flowering season, swarms of bees occupy the hives and after two years the hives are ready to be harvested.

In Malawi, a project funded by GTZ is working with the local people to improve the traditional methods of beekeeping. Modern hives are now being introduced to improve efficiency of honey collection and their popularity suggests that they will replace traditional methods.

Honey yields are largely determined by characteristics of the vegetation and staggered flowering times of different tree species spread the honey harvest over much of the year. In many of the forest reserves, small quantities of honey are collected by local people from wild colonies of bees. These villages are now becoming aware of the potential value of this resource and wish to start beekeeping as an enterprise.

Despite this development, there are no official assessment methods available in Malawi for quantifying the honey collected in the forest reserves. Thus it is very difficult to ascribe an economic value to wild honey. Currently the weight of honey collected per hive at each harvest is recorded. These data focus principally on honey collected through official channels and under improved methods of management. The small quantities of wild honey collected from natural hives by local people are ignored and a long term study on this resource is essential.

Forest grass

The forest reserves are a source of grass for thatching houses and for cattle fodder. During the latter half of the dry season, when the grass is dry and grazing is of low nutritive value, villagers collect this grass from the forest for thatching houses, granaries and for making fences. Most houses in rural Malawi are made of grass thatch and this is unlikely to change in the future with the worsening economic status of the villagers. Dependence on forest reserves for this resource is, therefore, inevitable.

So far, no official figures are available for the amount of grass being removed from the forest for such purposes and the impact of thatching grass on the wellbeing of forest-adjacent communities.

Villagers also graze their animals during certain periods of the year in the forest. The Forestry Research Institute of Malawi is currently assessing the amount and nutritive value of grass eaten by cattle in the forest reserves. The information generated from such a study will demonstrate the value of this resource to the livestock kept by the local people. This will partly justify the need for conserving forests and at the same time should indicate the correct management to sustain productivity.

Conclusion

'Miombo' has been considered to be an ecosystem of low productivity but this paper has shown that local communities derive income and nutrition from the forest products. Deforestation, which is estimated at 3.5% annually, poses a threat to increased production of the renewable NTFPs mentioned in this paper. A large proportion of this deforestation has resulted from encroachment by the local people in need of new agricultural land, as a result of the increasing human population of Malawi.

It could be argued that for forests to be preserved, it is essential that local people benefit economically from forests. They do not want to remain in a backward way of life: they want to combine traditional village life with some of the benefits of modern technology. This can happen if the forest products are given appropriate value in both local and work markets, thus bringing a reasonable income to the forest-adjacent communities.

The value of these products can only be estimated if their availability and distribution are quantified and officially recorded. A multi-resource inventory in the forest reserves should be given a priority. This will underline any silvicultural prescriptions that are designed to improve the productivity of such forest resources.

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UTILISATION OF NON-TIMBER FOREST PRODUCTS FROM MOUNT ELGON NATIONAL PARK, UGANDA

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Summary

There has been a recent and positive trend in the involvement of local communities in management of and legalised sustainable extraction of resources from Uganda's forests. In a number of forests, sustainable extraction of resources, primarily non-timber products has been allowed by the Government of Uganda. The potential of this approach in the Mount Elgon National Park was assessed and it was concluded that sustainable harvesting of forest resources was feasible and could be used as a management technique.

Introduction

Mount Elgon National Park covers an area of 1,145 km² and is situated in the east of Uganda (Figure 1). It has long been recognised that the forest is an important resource to adjacent communities, although the extent and nature of this dependency was unknown. A survey was designed to gather information on the use of non-timber forest products (NTFPs) around Mount Elgon National Park. It was hoped that information gained could be used as a basis for joint management of the forest resource between Uganda National Parks (UNP) and the community. At the time of implementation (November 1993), the administration of the Mount Elgon Forest was in the process of changing from the Forest Department to UNP. Other forest estates (e.g. Bwindi (Impenetrable) National Park) were becoming involved in joint management of resources and it was felt that this concept could be introduced to the Mount Elgon community.

The survey of NTFP use in Mount Elgon National Park

The aims of the survey were as follows:

- to determine and assess specific forest resources used by local communities and their location within the forest;
- to determine and assess the uses of forest resources by various segments of the communities, i.e. identification of user groups based on wealth and distance from the forest;



Figure 1. Map of Uganda showing the location of major forests.
Source: Howard (1992)

- to assess the total economic value of the current use of forest resources;
- to have full participation of the different sections of the communities in resource-use assessment.

The survey was carried out in six of the 58 parishes adjacent to the Mount Elgon Forest (see Figure 2). Data were collected at four levels: parish, village, household and in-forest.

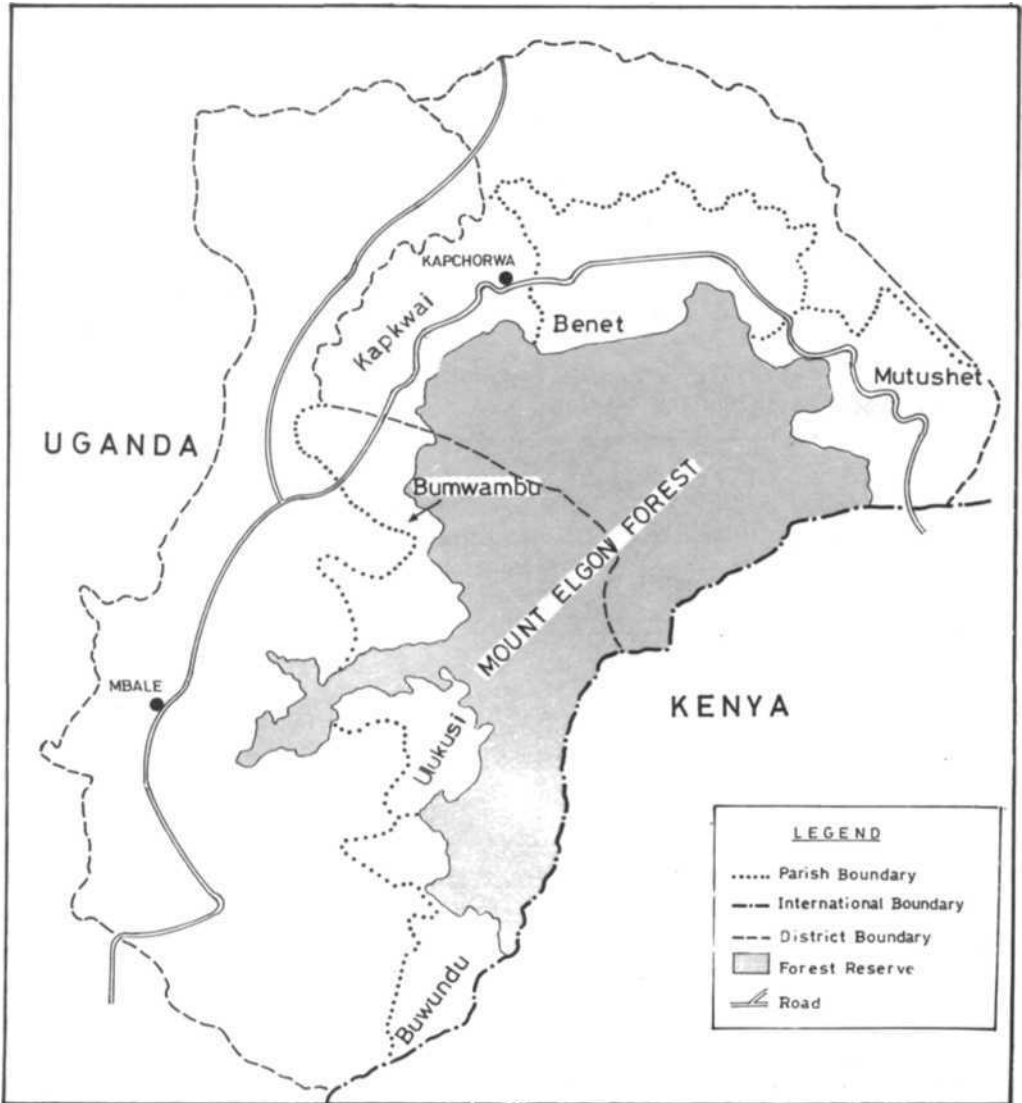


Figure 2. Distribution of the parishes surrounding the Mount Elgon National Park that were assessed for NTFP use in the study

Parish level: A meeting was held with selected members of each village within the parish, as well as political representatives and specialist resource users to: outline the proposal, discuss forest resources, map forest resources and select villages for in-depth assessment.

Village level: A village profiling exercise was carried out in two villages in each parish; one forest-adjacent (FA) and the one furthest (FF) from the forest boundary. Each household was assessed for its wealth and use of forest resources.

Household interviews: 10 households were selected from each village list for detailed, quantitative interviews on the use, collection and sale of forest resources.

In-forest assessment: Consultants, resource users and the Forest Officer carried out forest walks to determine management regimes and user trails and to collect specimens of resource plants.

Forest resources

The forest provided the adjacent communities with a wealth of resources. Important uses of forest resources are listed in Table 1.

Table 1. Uses of NTFPs deemed important to the communities neighbouring the Mount Elgon National Park.

*Bamboo stems	*Crop stakes	*Honey	*Medicine	Saltwater
*Bamboo shoots	Fertilizer	*Hunting	*Mushrooms	Sand
Ceremonial sites	*Firewood	Weaving materials	*Polewood	Termites
Charcoal	Fruit	Wild banana leaves	*Ropes	Thatching grass
*Craft material	*Grazing	Withers	*Saltlick	*Vegetables

* indicates key resources for the community

Forest use

Resource use is not confined to households living close to the forest but extends, with diminishing magnitude, throughout the forest-adjacent parishes but not beyond them. Resource users include both collectors and buyers of forest products. The resource-collector sub-community corresponds to the half of the parish closest to the forest and is characterised by the intensive collection of NTFPs for domestic use and sale; the resource-buyer sub-community is the half of the parish furthest from the forest, where NTFPs are primarily bought from the resource-collector community.

Household use of resources

During the survey, householders were categorised as buyers, collectors for home use and collectors for sale. Table 2 shows the average number of resources used, collected and collected for sale by households within the villages representing the two sub-communities. The 'used' category indicates the full demand for NTFPs and includes those who both collect and buy forest products. The 'collected' category includes NTFPs gathered for both domestic use and sale and indicates forest dependency. A high level of dependency within the forest-adjacent villages was evident.

Ten of the key resources shown in Table 1 were used by over 95% of households within the FA villages. The majority of resource collection was for domestic use, while a few resources (bamboo shoots, bamboo stems and mushrooms) were collected primarily for sale.

Table 2. Average number and range of resources used, collected and sold in the villages neighbouring Mount Elgon National Park

Average Number of Resources	Forest-Adjacent villages (N=6)	Forest-Far villages (N=6)
Used	12.4 (6—9)	8.3(4—12)
Collected	8.2 (2—12)	1.9(0—7)
Collected for sale	1.7 (0—9)	0.5 (0—3)

The influence of wealth on forest use

A high level of wealth homogeneity was observed in the communities neighbouring Mount Elgon National Park; the majority of households were poor, which compelled a high degree of dependence on the natural resources of the forest. The communities surveyed are marginal communities, with minimal access to markets, communication and alternative employment. Restrictions to forests access would have reverberations throughout the entire community.

There was little difference in the number of forest resources used or collected between the wealth categories. The slight decrease in the number of resources collected for sale with increasing economic wellbeing is not surprising because the very poorest are more in need of the small income derived from the sale of forest products.

Valuing the use of forest resources

The relative importance of resources was assessed through ranking exercises, which took into account cultural and economic importance. In addition, an assessment of the extent of dependence on forest resources was carried out by quantitatively assessing the value of them to neighbouring communities. These assessments provided useful insights into the community's dependence on NTFPs.

The household labour employed on forest resource collection

Labour is one of the most important resources to the rural community and choices are made on the use of labour, based on economic, cultural and pleasure values. By estimating the amount of labour spent on in-forest activities, an indication of the value of the forest to the community can be achieved. Discussions with the selected villages of the forest-adjacent community lead to a 'guesstimate' of 3,000 man-hours/household/year of forest based labour, by assuming that each household spent a total of 10 hours per day on economic activity.

In the FA villages, over 40% of the labour economy was allocated to in-forest activities. This figure was less in the FF villages (12%) where it still represented a considerable slice of the labour cake, and supported the assertion that the entire parish community relied heavily on forest resources. Table 3 presents the hours spent annually on the exploitation of forest resources for FA and FF villages. These figures are underestimates as information was not collected for medicine, crafts and timber resources.

The vast majority of the labour time spent on in-forest activities is for the collection of resources for domestic use. Thus the dependence on the forest is primarily consumptive and reduced forest access will severely affect the lives of most collectors.

Table 3. Average number of hours spent per household annually on various in-forest activities for villages neighbouring Mount Elgon National Park

Resource	FA Villages (hours/household/yr) (N=6)			FF Villages (hours/household/yr) (N=6)		
	Total	Consump	Sale	Total	Consump	Sale
Bamboo shoots	130	64	66	48	21	27
Bamboo stems	81	9	72	6	1	5
Firewood	300	297	3	129	124	5
Grazing	425	425	0	43	43	0
Honey	32	23	9	1	1	0
Mushrooms	30	25	5	4	3	1
Polewood	11	10	1	0	0	0
Ropes	7	6	1	1	1	0
Saltlick	21	21	0	1	1	0
Stakes	16	10	6	0	0	0
Vegetables	128	115	13	42	38	4
Others	30	30	0	86	44	42
Total	1211	1035	176	361	277	84

(Note: Information was not collected for timber, medicinal plant collection, craft making and hunting. Within the FA villages, the time spent on in-forest grazing was distorted by one parish with a high dependency on forest grazing.)

The monetary value offorest use

The financial valuation of forest resources disregards non-quantifiable values such as cultural importance and environmental services. The net value of resources was estimated by the market value minus the labour cost incurred in collection. While the result was considered to be an underestimate because not all forest resources could be valued, it indicated an order of magnitude.

Average value of household consumption of each resource, not including timber, medicinal plants, hunting, grazing and crafts, is summarised in Table 4. The total financial value of forest use for the FA villages was estimated to be Ush58,520. This is considerable in the rural context. Due to the sheer volume of collection, firewood and vegetables stand out as financially the most valuable resources. Both resources were collected primarily for domestic consumption and, with limited land availability, the forest was evidently vital to the survival of many households.

Bamboo stems and bamboo shoots showed relatively low financial worth. As they were ranked as very important resources during parish and village meetings, the financial worth did not appear to reflect their true value to the community. This underlines the importance of a broad approach to the analysis of value, extending perspectives beyond pure monetary assessments. The fact that such a high proportion of the population is prepared to spend so much time in the collection of resources for minimal financial benefit may indicate that there are few alternative sources of income.

Financial value extrapolated to the wider community

The estimate of forest value calculated in Table 4 can be extrapolated to all parishes neighbouring the Mount Elgon Forest to estimate the monetary value of the forest to the local community.

There are 66,909 households within the 58 parishes neighboring the Mount Elgon National Park. Extrapolating the forest values for FA and FF villages, a figure of between Ush1,500 million and Ush2,700 million was estimated as the total value of the forest to the entire community. This represents an annual consumption value of between US\$1.5 million and US\$2.7 million, without taking into account cultural, existence and environmental values. The figure is impressive, particularly if compared with the estimated value of the annual, sustainable offtake of timber, which is under US\$240,000.

Table 4. The average annual financial value of non-timber forest resources to the FA and FF villages of Mount Elgon National Park

Resource	Value of resources (Ush/household/yr)	
	FA Villages	FF Villages
Bamboo stems	321	7
Bamboo shoots	752	349
Crop stakes	1,536	8
Firewood	25,518	793
Honey	8,726	97
Mushrooms	2,940	100
Polewood	1,394	2
Ropes	87	1
Saltlick	686	2
Vegetables	14,785	329
Others	1,775	10
Total	58,520	1,698

The sustainability of non-timber product use

From such an appraisal, it was impossible to offer an accurate assessment of the sustainability of the current levels of NTFP use. However, until it was declared a National Park, the Mount Elgon area endured intensive and extensive agricultural encroachment for two decades. It is estimated that encroached and degraded land covers 20% of the Park. During the in-forest assessment, the collection areas for particular resources were mapped. While resource collection extends up to 10 km (5 hours walk) into the Park, the majority of resources are collected from the areas close to the villages. The vegetation type most heavily utilised, and with the greatest variety of resources, is encroached land—formerly considered useless.

Firewood and vegetables, the most frequently collected resources, were almost exclusively harvested from encroached land. Stems from coppiced stumps provided poles for crop staking, granary construction and rope-making. The majority of in-forest grazing was carried out in the grassed areas where there is less risk of cattle rustling. These results suggest that encroached areas, not closed forest, currently offers the most important resources to the people.

The importance of the upper regions of the forest should not be underestimated. Although the number and volume of resources from this area is not high, some resources, such as medicinal plants and bamboo, cannot be obtained from other areas. Restricting collection to within the areas of the Park closest to the villages would deny people access to important resources that cannot be easily substituted by on-farm alternatives.

Harvesting activities within the higher areas of the Park is likely to raise issues related to sustainability. It is unlikely that harvesting of medicinal plants is damaging as the majority of collection is carried out by specialists who follow a traditional code of protecting their resources. A study on the utilisation of bamboo demonstrated that current levels of extraction from Mount Elgon are well within sustainable limits (Scott, 1994a). Therefore, it is likely that the major activities carried out within the forested area can be continued without compromising the objectives of forest conservation.

Although harvested primarily from the encroached areas at present, the collection of polewood may be a problem as current demands are relatively high and likely to increase. However, the community's polewood and even timber needs could be satisfied by community-based enrichment planting (and maintenance) initiatives in exchange for rights to sustainable harvesting.

The role of sustainable NTFP extraction in future management and conservation endeavours

The issue of the future role of the local community in conservation of the forest is pertinent. Dependency on the forest will continue for the foreseeable future and many of the most important in-forest activities can be carried out sustainably. However, a forest of the size and topography of Mount Elgon, with very limited vehicular access, will be almost impossible to police effectively. The cost to hire and equip officers is considerable, and future income from the Park is unlikely to be able to sustain this. Current dependency levels are so high that policing activities appear to have little impact on collecting activities, except to increase the tension and animosity between the community and Park authorities.

The community is well aware of the values of the forest; joint management of forest resources can offer rights of access on a sustainable level in exchange for agreed-upon responsibilities. The community emphatically expressed their interest in becoming involved in the decision-making processes and were willing to take on some management responsibility. Forest-neighbouring communities are fully aware of activities within the forest yet, while the forest is under external ownership, there is no incentive for the community to either monitor or intervene in illegal and destructive activities.

Through a process of negotiation between the community and the official management body, rights to harvest sustainable resources can be made conditional on the control of activities that are agreed as presently unsustainable (illegal timber extraction, hunting, agricultural encroachment, harvesting of vulnerable species). Through carefully established links and cooperation between the community and official patrols, the chances of effectively monitoring activities within the forest may increase. The official management body could also offer support to their partners, the community, in providing a more effective level of protection from the cattle raiding groups within the forest.

Conclusion

The communities neighbouring Mount Elgon depend on the forest for consumptive use of resources. Any restriction on the use of the forest by these communities would adversely affect their economic and nutritional status.

No matter what interventions to improve community wellbeing are embarked upon, with increasing population density, land shortage and an increase in relative poverty within the rural communities, the future trend will almost certainly be an increase in forest dependency. The issues of forest use are here to stay and therefore appropriate strategies to ensure that this use is sustainable are imperative.

Sustainable harvesting of forest resources may represent a significant component in forest management and conservation. Rather than view the collection of NTFPs as an unfortunate necessity, it should be seen as an opportunity to offer the community rights to resources they value in return for taking a role in the conservation of the forest. NTFP collection may, in fact, be the key to maintenance of the integrity of Mount Elgon National Park.

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CHITSANZE SACRED GROVE (KAYA CHITSANZE), KENYA

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Introduction

The following is an account of a visit to 'Kaya Chitsanze' in March 94 and stresses the concern of elders for areas of cultural and ecological significance and their difficulties in dealing with the rich or powerful. A 'kaya' is a sacred forest; it is a 'spiritual home' and is used for cultural purposes. Kaya Chitsanze is situated in Kwale District on the Kenya coast (Figure 1).

Visit to Kaya Chitsanze

The group from the Coastal Forest Conservation Unit was accompanied by Mzee Said Mwakaribu, Mzee Meachiwanje Makoti and Mzee Rashid Mohamed Mwadindima.

Mzee Rashid M. Mwadindima first explained the need to maintain the tree population in the area to hold the large rocks in their present positions. Mzee Abdalla Said Mwatsumo Mwanyuchi and Mzee Swalehe Hamisi Chapa joined us and we then settled on some smooth boulders under the shade of trees.

The following answers were given by the elders to a series of questions posed by the Coastal Forest Conservation Unit.

Is Chitsanze a 'kaya' or private property?

The Golini elders unanimously agreed that Chitsanze is not a 'kaya' and it has never been a 'kaya'. However, the elders further explained that the grove is, by and large, a sacred grove and has never been farmed. The grove was surrounded to the west and north by farmlands and until 1973 no resources were removed from it other than medicine and water, since it was treated with reverence by all the villagers.

Why is the grove sacred and how did it acquire that status?

The elders explained that before the Digos settled at Kwale town (Kaya Kwale) they had settled at Kaya Mtae and farmed just below Chitsanze grove. One night, a medicine-man

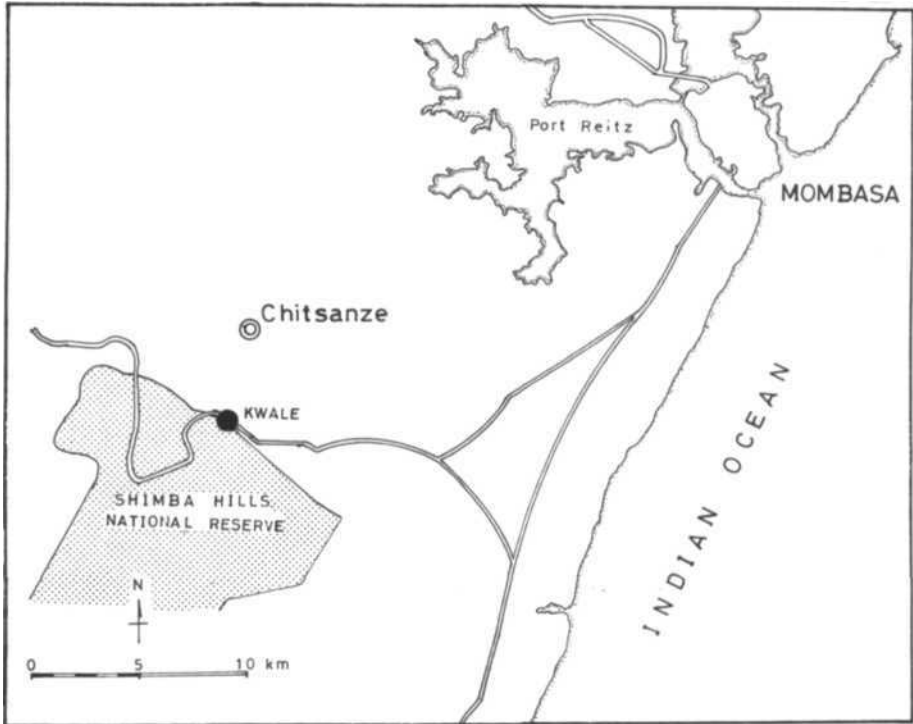


Figure 1. Location of the Chitsanze sacred grove, Kwale District, Kenya

from Kaya Mtae started singing at midnight and woke up the villagers. He led them to Chitsanze Mkubwa, Chitsanze Mdogo and to a hill called Pengo, which is to the west. He informed them that these three areas were shrines and in case of drought, disease, war or any calamity they could come to visit these areas to pray, and all their problems would end.

Chitsanze Mkubwa (the main water falls) was the most sacred shrine and should only be visited when there was a serious problem, affecting the whole community, which could not be settled at Pengo and Chitsanze Mdogo. When in prayer, elders said they usually gave sacrifice of a black chicken and seven kinds of local food seeds. They would promise to either bring a present of a black goat or sheep, grain or cloth should their prayer be answered. They must fulfil this promise or else suffer serious consequences.

The villagers were informed that in that sacred grove lived African and Arab spirits who were muslims. The elders explained that in the grove it used to be very common to see ladies with long hair, cattle, and a lady clad in a 'buibui' who would disappear in the blink of an eye. Mysterious drums were heard in the grove at night. Only medicine-men dared enter Chitsanze Grove alone.

The grove was a major fort during the first world war. The place is used today for spiritual purposes although the elders explained that from 1992 they had a lot of problems since the European owner has been chasing the traditional medicine-men away.

How did it come about that the grove is private property and owned by a European?

The elders became very sad at this question and told the following story with bitterness.

During land demarcation of the Golini area in 1972, this grove, Plot No. 1110 of 130 ha, was set aside as a sacred grove for the community. Among the ten families that resolved to set this area aside were: Rashid Mohammed Mwandindima (Mwakitunza Mwadzikowa), Said Mwakaribu Munguni, Meachuo Mwazema (Rashid Mwachuo Magaga), Said Mwazikoa, Masudi Mwenda Tumbo, Masa Mwavuala.

The land was set aside and registered under the Kwale County Council and named "Chitsanze Shetani". The late Chief of Shimba, Mr. Hamisi Ali Marumu, lodged a complaint to the Department of Lands that the Kwale County Council had fraudulently acquired the Chitsanze Shetani. He did this in compliance with some of the clerks in the Department of Lands and in the Kwale County Council.

A date was set for the hearing of the complaint between Kwale County Council as the defendants and the late Marumu as the complainant. On that day, the officer who was to represent the Kwale County Council did not appear. The case was ruled in favour of the late Marumu, in total disregard of the elders of Golini whose views should have been represented in that hearing. The entire community that used Chitsanze was not aware of this development. However, the late Chief Marumu did not stop elders or medicine-men from any spiritual use of the grove.

Problems in this area started in 1974 when the late Chief Marumu started cutting 'mvule' (*Milicia excelsa*) trees for timber. Never before had anyone been known to have cut a big tree in that area. He first deployed some Kisii youths to fell a very large 'mvule', which was one of the oldest and was referred to as "Mvule wa Chahirani". 'Chahirani' is a bird's nest, and a nest of an eagle was known to have been in this 'mvule' for years immemorial. When the tree fell it bellowed so loudly that everybody around Golini heard the noise. The Kisii men took off never to return.

The community was quite concerned but as it was the chief who cut the tree, and it was a dead tree, people decided not to follow up on the matter. Cutting of 'mvules' on a large scale followed and elders went to the Chief to complain but he was very rude. Since he was known to be very knowledgeable in the use of charms or black magic, people feared him. He cut over 100 'mvules' before 1980.

A court case in 1975 at a Kwale Magistrate's Court scared the people of Golini. One of the elders, Mr Kanere Mwadudu, sued the late Chief Marumu for cutting the first live 'mvule'.

The case was postponed several times but eventually the Magistrate, Mr Masudi, decided to hear the case. One of the witnesses, Mr Hamisi Mbwana Masa, was sworn in and he started to give his evidence. He finished explaining how Chitsanze Mkubwa was a shrine then he started talking about Chitsanze Mdogo. Just as he said "Mdogo" he got mixed up and murmured some words, then he looked dizzy and about to fall. Several elders rushed to his rescue and lowered him to the floor. As he reached the floor he was already dead. When they looked up at the bench, they found that the Magistrate had disappeared. They looked at the audience and to their surprise they saw everybody on his heels scampering for the door. Before

they could decide what to do the court was empty. That was the end of the case, which appeared in the local dailies as the first of its kind in Kenya.

How did you find out that the grove is private property?

In 1989, Mzee Rashid Mohammed Mwadindima went to the Survey Office in Momhasa to get some details about their family land, which was to the north of Chitsanze Shetani, and he was surprised to learn that the land was private property.

Mr. Mwadindima informed others that an Indian owned the grove and the information started reaching the people gradually. When the elders sought more information about this sale, they found that the Chief sold the place between 1981 and 1983, shortly before he retired from his post. He sold the plot to a Kikuyu, but once he received the money he developed a mysterious disease and died in 1983, before he used any of the money. The money was then divided between his two wives who always lived with him at Golini, and the five children of two wives who lived in far-off parts of Kwale.

According to elders, the late Mwarumu was barren and the children he had were not his biological children but his legal children, as he had paid bride-price for the wives, who remained in their parents homes. The two women who lived with him at Golini never gave birth and, although by tradition his relatives could have sired children for him, no man could dare venture in his homestead.

The Kikuyu then sold the owners of a hotel in Diani Beach. In 1992, they deployed people to clear the bushes within the plot. The elders were infuriated and sought redress from the local administration. They were told that the land was private property and nothing could be done about it.

The elders then went to a lawyer in Mombasa and opened a file for the case. Unfortunately the elders could not raise the money to proceed.

How is Chitsanze Shetani administered?

Chitsanze Shetani was not administered by a Mwanatse (religious leader) like the 'kayas' since it was never a 'kaya'. Instead, it was administered by traditional village priests who did not necessarily come from one clan.

Among the priests who have recently led prayers at this sacred grove are: Kulola Mwayogwe, Mwenda wa Tumbo, Mwameli Mwenda and the late Mwwakanzere Kanzere. The elders asked if they could be helped to save the grove from destruction.

How else is the grove significant?

Chitsanze Shetani is the home of the rain spirits in Kwale. Before it rains in the area, the first signal will appear at the grove. For about a week there will be white mist in the grove and no one living below the slope of the grove and to the west would see the sun until late morning. The rains would start; in the old days there was always enough rain, not like today. The falls also used to provide a free film in the form of a rainbow, which used to flash at regular intervals. The colours were only yellow, blue and white. The water under the fall was ice cold and young people collected snowflakes at any time of the day. All these features have now gone.

Chitsanze is reputed to be the home of all water flowing from the two main lakes (catchment areas) of Kwale. In severe droughts, Chitsanze is the saviour of the Golini people, since it never dries up. The biggest worry of the elders is that at present the surface water level at Chitsanze Mkubwa and Mdogo has reduced by over 75% and cutting of the surrounding trees could lead to it drying up completely. This would eventually kill the trees and dislodge the many rocks being held together by the trees.

Can you explain this story of the lakes?

The elders explained that one of the lakes is underneath the Kwale District Headquarters and when it overflows it spills into the Kwale Post Office and the Kwale Prison. The other underground lake is at Kwale Forest, just after the Kwale Cereals Board. The elders drew a map and named the springs, streams and water-drawing points. Some can no longer supply water except during the rain while others are operational throughout the year.

Why is the water now underground in most areas?

The elders said it was definitely because of cutting of trees about the lakes (the catchment areas) particularly in Kwale town and in the river valleys, which were once heavily wooded. The elders wanted to be assisted to replant all those areas. They felt that everyone growing crops in the valleys, and particularly those planting rice at Goli Kulu, should be stopped forthwith since these areas had been set aside by the elders as suitable for conservation.

What is the source of Marere Springs?

Marere Springs, in Shimba Hills National Reserve, comes from a lake which is under the Longo-ya-Mwagandi grove. The elders criticised the modern generation for cutting trees carelessly without knowing that without trees man cannot live on earth.

Conclusion

This investigation, by the National Museum of Kenya's Coastal Forest Conservation Unit, highlights the existence of strong traditional beliefs that have governed the local people's perception and concern for their environment. Administrative conspiracy in the increasing alienation and destruction of this cultural site originates in modern education's distaste for the old customs, a lack of respect for indigenous knowledge and a sad scramble for easy money.

The elder's concept of the hydrology of the Shimba Hills may be fanciful but, quite possibly, contains an element of truth, which developers ignore to the cost of the entire community.

HOUSEHOLD USE OF HONEY AND WILD MEAT AROUND MAU COMPLEX AND ARABUKO-SOKOKE FOREST RESERVES

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Summary

Until recently, environmental resources were allocated an economic value lower than their real value to society. This is attributed to the problems encountered when valuing such resources and services. Forest products contribute a great deal to Kenya's economic and social development. Nonetheless, non-timber forest products are seldom reflected in the national economy's statistics and hence little economic significance is attached to these products at the national planning level. There is an urgent need to search for ways of including the economic value of these vital resources in calculations of the value of the Kenyan economy.

KIFCON (Kenya Indigenous Forest Conservation Programme) has attempted to value some non-timber forest products. This paper addresses the economic value of two major non-timber forest products; honey in the Mau Complex Forest Reserve and wild meat in the Arabuko-Sokoke Forest Reserve.

Introduction

Kenya relies on its renewable natural resources (including forests) to support local and national economies. Currently, the formal forestry sector contributes 3.3% to Kenya's GNP (Central Bureau of Statistics, 1993). Given that the forestry sector provides other goods and services not easily measured by market prices, and do not pass through the formal markets, it is most likely that its contribution to the national economy is undervalued. Kenyan forests, both natural and planted, play a crucial role in industrial development, sustenance for local communities and, at the same time, form a fundamental base for environmental conservation.

Non-timber forest products (NTFPs), including fodder, honey, wild meat, fibres, fruits, nuts and medicines, form a pivotal part of local household economies. The Kenya Indigenous Forest Conservation Programme (KIFCON), in pursuit of its objective to find innovative strategies to enhance sustainable conservation and management of

indigenous forests in Kenya, has attempted to determine the real value of NTFPs in Kenya. Experience has shown that environmental goods and services without obvious cash values (mostly considered as free) receive limited attention in development proposals and may be misused or over-used. By valuing NTFPs, KIFCON hopes that the true value of Kenya's forest heritage will be recognised and hence conserved.

Two NTFPs that are extracted on a regular basis are honey around the Mau Complex Forest Reserve (which includes Eastern Mau, Mau Narok, Southern Mau, South West Mau, Transmara and Western Mau Forest Reserves) and wild game in Arabuko-Sokoke Forest Reserves. Both these products have small commercial markets, which have formed the basis for calculating their value to the respective forest-adjacent communities. This paper is based on extensive socio-economic surveys implemented by KIFCON on local utilisation of indigenous forests between 1991 and 1993 (Mogaka, 1991; Jama, 1991; Wily 1991; Emerton, 1994).

The value of honey gathering in the Mau Complex Forest Reserve

The Mau Complex Forest Reserve, in western-central Kenya, are some of the largest indigenous forest blocks remaining in Kenya. The forests contain a wide range of habitats that support several plant and animal species of considerable economic, scientific and conservation significance. These forests are home to the Okiek, one of the few tribes in Kenya who pursue a hunter-gatherer lifestyle. About 2,000 Okiek families still practice their traditional way of life in the Forest Reserve, while others live outside the forest (as agro-pastoralists). Both groups depend to a large extent on the forest for their livelihood (Government of Kenya, 1990).

Economic uses of forest resources range from logging to the traditional activities of honey gathering and collection of grasses and medicinal plants. Subsistence honey gathering is one of the most important components of forest utilisation and household subsistence for the Okiek living in and around the forest reserves.

Honey collection

Traditional beekeeping in the Mau Complex Forests Reserve involves the placing of log hives in trees. Honey is used for brewing alcoholic drinks, preparation of medicines and as a sweetener. From the surveys carried out by KIFCON, it was estimated that 20,000 hives had been placed in the forest by 2,000 Okiek families, including those living outside the forest. Although removal of any forest product without licence is illegal, honey gathering is considered a non-degrading forest use and is generally allowed to continue without a formal licence. It is important to note that recently, due to increased forest inspection and protection, the number of families involved in honey gathering has declined.

The monetary value of honey

Although honey has a commercial market value, from which it is possible to calculate an economic price, wild honey's value has not been integrated into the economy's statistics as there is scant information on the extent and level of honey gathering by the forest-adjacent communities in Kenya. However, considerable efforts have been made to estimate the extent and value of honey gathering for subsistence purposes in the Mara Complex Forest Reserves (Jama, 1991).

Approximately 110,000 kg of honey (5.5 kg/hive) is collected annually from the Okiek traditional hives placed in the Mau Complex Forest Reserves. In addition to this, over 25,000 kg of wild honey is collected each year. The total value of this honey may be US\$50,000 annually.

The value of hunting and trapping in the Arabuko-Sokoke Forest Reserve

The Arabuko-Sokoke Forest Reserve is the largest remnant of coastal forest in East Africa and has immense importance to the local population. The primary role of the reserve to the adjacent communities is in the provision of subsistence requirements. As well as supplying fuel, building materials, water and medicines to the forest-adjacent communities, other NTFPs such as fruits, honey and wild meat are important nutritional supplements. Most of these items are not part of the household cash economy and, therefore, it is difficult to value them.

This Forest Reserve has long been a site of intensive utilisation by hunter-gatherers and at a later stage, agro-pastoralists. The forest has traditionally been an important source of wild meat to the local communities. Originally, hunting of large game was prevalent; today, declining numbers of large game and increased vigilance by government has resulted in a change towards hunting and trapping of small game, for example Common Duiker (*Cephalophus grimmia*), Bush Pig (*Polamochoerus porcus*), Aardvark (*Orycteropus afer*) and Kenya Crested Guinea Fowl (*Guttera pucherani*).

KIFCON carried out a survey to establish the extent of hunting and trapping in the Arabuko-Sokoke Forest Reserve (Mogaka, 1992). The survey revealed that the majority of the local population appreciated the role played by wild meat in their household economies. Besides the nutritional and financial benefits from hunting and trapping, the local households also derived benefits of pleasure, adventure and enhanced physical and mental health from the pursuit of wildlife.

Table 1 shows the estimated value of wild meat caught by communities adjacent to the Arabuko-Sokoke Forest Reserve as \$26,400; of interest is the high value of occasional trapping. The survey established that about two-thirds of the hunting and trapping takes place outside the Forest Reserve. Therefore, the total value of wild meat caught in the Forest Reserve is US\$8,800. Hunting and trapping outside the forest depends upon the existence of the Forest Reserve as it acts as a reservoir for the hunted species.

Discussion

The extraction of NTFPs takes place outside the licensing scheme and is therefore considered illegal. The local population understands the official management rules for forest reserves in Kenya and, therefore, tends to be secretive in revealing information on the use of forest produce without proper licences. Few households are willing to give accurate information on extraction of NTFPs in forest reserves.

It has been shown that the forestry sector may be under-valued by excluding the value of NTFPs. Such under-valuation ultimately influences national decision-making concerning forestry development. There is a need to enhance forest activities that have minimal adverse effects on forests. For example, the promotion of honey gathering in forest-adjacent com-

Table 1. Estimation of the value of wild meat taken from the Arabuko-Sokoke Forest Reserve

Household Category*	Activity	Value (US \$ /yr)
Regular	Hunting	10,600
	Trapping	2,800
Sub-total		13,400
Occasional	Hunting	2,600
	Trapping	10,400
Sub-total		13,000
Grand Total		26,400

* 'regular' refers to households who catch game as a regular part of household activities. 'occasional' refers to household who occasionally trap game.

Source: Mogaka, 1992

munities can boost national honey production and serve as an appropriate source of income for the local population while continuing as part of the local subsistence economy.

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ASSESSING THE PATTERNS OF USE OF FOREST RESOURCES BY LOCAL COMMUNITIES: FIELD EXPERIENCE IN AND AROUND BWINDI (IMPENETRABLE) NATIONAL PARK IN SOUTHWESTERN UGANDA

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Summary

Bwindi (Impenetrable) National Park, in the southwest of Uganda, is surrounded by communities who have had traditional access to the products of the forest. When the Park was gazetted in 1991, this access was denied. The CARE Development Through Conservation Project and Uganda National Parks have embarked on a multiple use programme where pilot communities are allowed to remove non-timberforest products from the Park. The communities have been fully involved in the identification of forest resources, monitoring the impact of utilisation and preparation of harvesting schedules.

Introduction

Bwindi (Impenetrable) National Park (BINP), lying in southwestern Uganda, is an important area for both Afrotropical and Albertine Rift fauna and flora. The forest covers 300 km² and is found over an altitude range of 1190—2607 m; the dense undergrowth of BINP gives it the name 'impenetrable forest'.

The Park, an 'island' in a heavily cultivated area with 400 persons/km². The surrounding communities are largely peasants who depend on subsistence agriculture and to some extent on forest resources. Table 1 shows the uses of some principle trees and shrubs used by the communities.

The Bwindi (Impenetrable) Forest Reserve was established in 1934 and its status changed to a national park in 1991. Prior to its gazettelement as a park, the local community had legal access to forest resources by obtaining permits from the Forest Department. On gazettelement as a National Park, access to all forest products was denied.

Table 1. Uses of principle trees and shrubs requested by communities in the area surrounding BINP

Botanical Name	Local Name (Rukiga)	Uses
INDIGENOUS		
<i>Faurea saligna</i>	Omurengyere	Be, Fw, T
<i>Podocarpus</i> sp.	Omusenene	A, Fw, Sh, T
<i>Prunus africana</i>	Omumba	M, Sh, T
<i>Strombosia scheffleri</i>	Omuhika	Bp, Fw, T
<i>Polyscias fulva</i>	Omungo	A, Ca, Be, Sf
<i>Hagenia abyssinica</i>	Omujeesi	Fw, T
<i>Maesopsis eminii</i>	Omuguruka	Bp, Fw, T
<i>Erythrina abyssinica</i>	Ekiiko	Be, C, Fw, H, Sr
<i>Ficus natalensis</i>	Ekitooma	Bp, C, F, Fw, S, T, W
<i>Rhytigynia kigeziensis</i>	Nyakibazi	M
<i>Olinia usambarensis</i>	Omubaba	Y, S, Be
EXOTIC		
<i>Sesbania sesban</i>	Omunyganyegye	Sf, Sr, M, Sh, Bp, W
Bamboo	Omugano	Ty, Be, M, A
<i>Cupressus lusitanica</i>	Karwenda	H, Fw, T, Bp, A
<i>Eucalyptus</i> spp.	Entunsi	Fw, M, F, Sh, Bp, W

KEY:

Aesthetics	A	Fuelwood	Fw	Soil erosion	
Beekeeping	Be	Hedge	H	control	Sr
Building Poles	Bp	Medicines	M	Timber	T
Culture	C	Stakes	S	Tray/baskets	Ty
Carving	Ca	Soil fertility	Sf	Wind break	w
Fodder	F	Shade	Sh	Walking stick	Y

In 1992, Uganda National Parks (UNP), supported by CARE Development Through Conservation Project (DTC), embarked on a multiple use programme for the communities of the 21 parishes adjacent to the Park. Under this programme, extraction of minor non-timber forest products (NTFPs) by three pilot communities was permitted in exchange for them assisting UNP with its conservation efforts. Specialised resource use such as beekeeping and the collection of medicinal herbs was allowed. Figure 1 shows the project area and its physical relationship to BINP and the neighbouring parishes.

Patterns of use of forest resources

An essential part of the programme has been the assessment of existing patterns of NTFP use. This was carried out with full cooperation of the forest adjacent community.

Identification of resources and resource areas needed by the local community

Institutions, such as the Institute of Tropical Forest Conservation (ITFC) and UNP, scientists, researchers and local resource users were involved in the identification of resources and collection areas needed by the local community. Such resources and areas were identified by the researcher walking through the forest with members of the community, forest inventory research and community consultations.

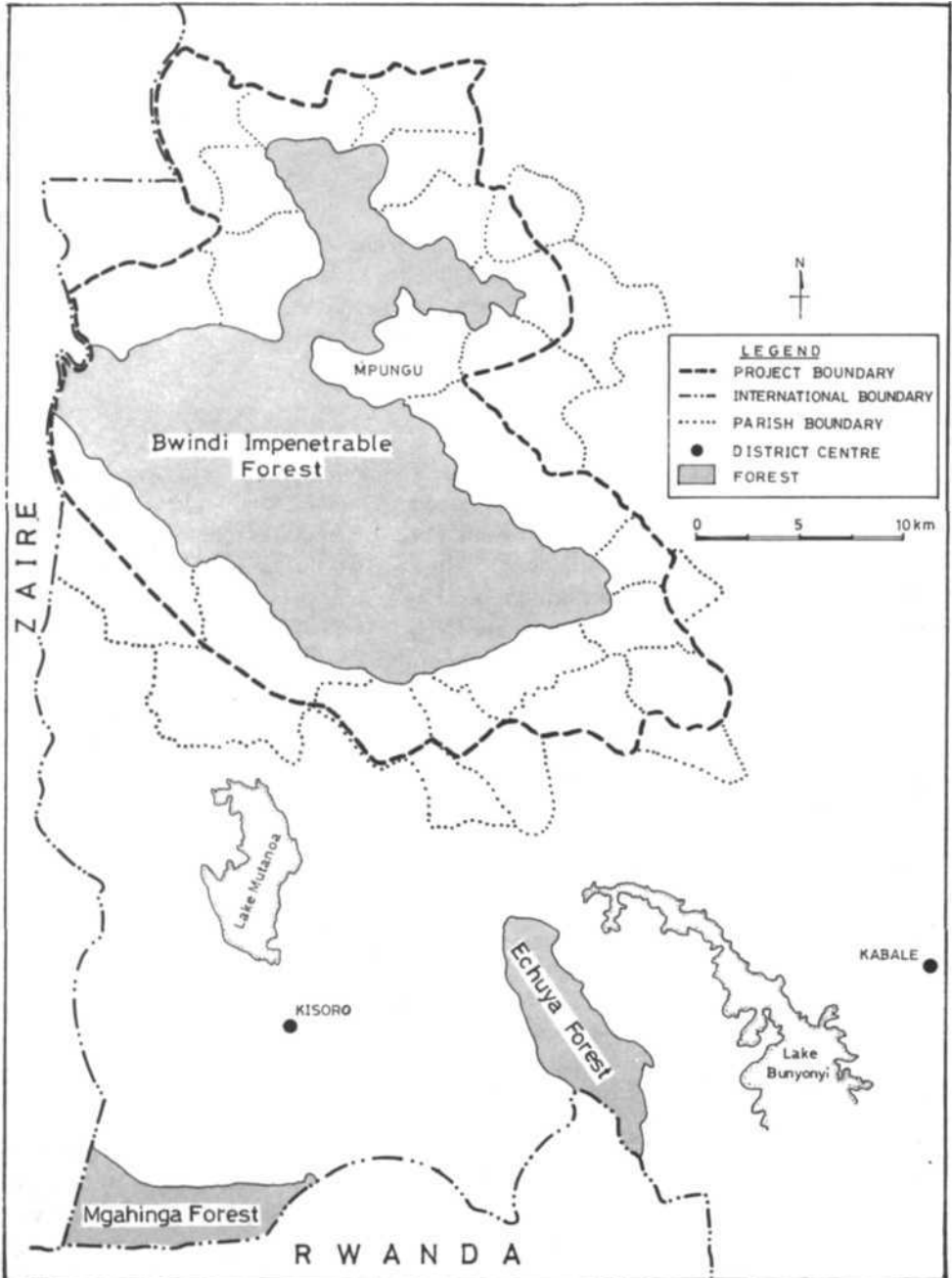


Figure 1. Map showing the boundary of the DTC project with respect to the BINP and adjacent parishes

Maps of forest resources are produced from information so gathered and a proposal that 20% of the forest be designated for multiple use was submitted. A herbarium was set up at ITFC where students and researchers could identify forest plants. Two ethnobotanical gardens have been established. Visitors, both local and foreign, can view species that are commonly used by local communities.

The impact of utilisation on target species

The three pilot parishes have removed medicinal plants and weaving material from the BINP and 3,500 beehives have been hung in the Park. Sample plots were set up in the forest and expert NTFP users were selected to harvest key species from these plots. The monitoring of the impacts of NTFP utilisation has involved UNP, local communities, resource users and DTC.

On-farm production of NTFPs

Consultations between the DTC project, the local community, ITFC and UNP were used to assess whether forest products could be produced on the farm to relieve pressure on the forest. Seeds of several important plants were collected from the forest and indigenous seedlings raised and distributed to farmers. Two nurseries of indigenous trees were set up to satisfy the high demand for seedlings. Bamboo is used for house construction and weaving but the bamboo stand in BINP is too small for sustained harvesting of bamboo culms. To reduce bamboo collection from BINP, farmers were allowed to collect bamboo rhizomes from the Park for on-farm planting.

Traditional collection of honey is dangerous to the forest (fires destroy the trees) and kills entire bee colonies. To encourage the adoption of modern techniques in beekeeping, one training of trainers workshop in honey bee management was carried out.

Negotiations with the community and capacity building for local institutions

Multiple-use areas in the forest were demarcated and maps made of resource and multiple-use areas. As a result of consultation with the community, a detailed assessment of key species, parts used and quantities to be harvested was carried out. A harvesting calendar was created to show the availability of resources and harvesting frequency. The community selected legal resource users and compiled a list of these people.

Before procedures and mechanisms for resource use could be written, the relevant village structures and institutions were identified and all park regulations were translated into the local language 'Rukiga'. In Mpungu Parish, a Forest Society of five committee members was formed. A Memorandum of Understanding between the Forest Society and UNP was drawn up and signed; this represented the first step towards a joint forest management agreement between the two entities. Identity cards for legal resource users were produced. The people in Mpungu are now harvesting some NTFPs according to the regulations set down by the Forest Society.

The monitoring of forest resources is carried out by the Forest Society, UNP, DTC, and ITFC. Resource users report their collections to the Forest Society Committee who have been trained in simple record keeping. Table 2 shows the amounts allowed to be extracted for selected medicinal species. Community Conservation Rangers from the

Table 2. Medicinal species, parts and quantities allowed to be extracted from Mpungu Parish annually

Family	Species	Local name	Part used	Life form	Annual allowance per person	No. of users
RUBIACEAE	<i>Rytigynia kigeziensis</i>	Nyakibazi	Outer bark	Shrub	1 palm size	14
EUPHORBIACEAE	<i>Croton macrostachyus</i>	Omurangara	Bark/Leaf	Tree	1/2 palm size	5
EUPHORBIACEAE	<i>Neobotonia macrocalyx</i>	Omwinya/ Ekyanya	Bark/Leaf	Tree	12 handful of leaves	44
PIPERACEAE	<i>Piper guineense</i>	Rukokota	Root	Creeper	12 palm size of bark	7
RHAMNACEAE	<i>Gouania longispicata</i>	Omufurura	Leaf	Creeper	60 finger lengths	7
LAURACEAE	<i>Ocotea usambarensis</i>	Omwaha	Outer bark	Tree	12 handfuls	7
MARATTIACEAE	<i>Marattia fraxinea</i>	Omutambagire	Leaf	Fern	12 palm size	4
CELASTRACEAE	<i>Maytenus acuminata</i>	Omulembwe	Leaf	Tree	120 leaflets	4
MYRICACEAE	<i>Myrica salicifolia</i>	Omujeje	Bark	Tree	1 handful	2
MORACEAE	<i>Myrianthus holstii</i>	Omwifa	Fruit	Tree	12 palm sizes of bark	1
GUTTIFERAE	<i>Symphonia globulifera</i>	Omusisi	Outer bark	Tree	12 fruits	1
ROSACEAE	<i>Primus africana</i>	Omumba	Outer bark	Tree	12 palm sizes of bark	4
RHAMNACEAE	<i>Maesopsis emini</i>	Omuguruka	Outer bark	Tree	12 palm sizes of bark	2
CYATHEACEAE	<i>Cyathea manniana</i>	EkiGUNJU	Bark/Leaf	Tree fern	12 palm sizes	2
THEACEAE	<i>Ficallha laurifolia</i>	OmuVumaga	Bark	Tree	6 handfuls of leaves	1
MYRTACEAE	<i>Syzygium guineense</i>	OmuGote	Bark/Leaf	Tree	6 palm sizes of bark	2
RUTACEAE	<i>Fagara macrophylla</i>	OmuShaga	Bark	Tree	12 palm sizes of bark	2
					12 handfuls of leaves	2
					12 palm sizes of bark	1

community have been trained and three are currently employed by UNP. Information on the success of the collection strategies comes from post-graduate students who amass baseline data in the multiple-use areas

Conclusion

The DTC project hopes to collect more information as the multiple-use activities increase in Mpungu Parish and the other two pilot parishes. If the pilot programme in the three parishes is successful, then it may be extended to all the parishes neighbouring BINP.

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ECONOMIC VALUE AND ROLE OF NON-TIMBER FOREST PRODUCTS IN THE LONG-TERM MANAGEMENT OF FOREST RESOURCES IN THE CÔTE D'IVOIRE

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Summary

The lack of reliable data makes it difficult to assess the real economic impact of non-timberforest products on a national level in C  te d'Ivoire. The economic importance of certain non-timberforest products, of which volume and export value can be found in the statistics of customs departments or at the few factories, is analysed. The value of these products is compared to the value of wood over a period of 30 years. Finally, the study describes the attitudes of governmental authorities, research and development institutes and peasants to long-term development of forest resources based on non-timberforest products.

Introduction

NTFPs are increasingly presented as an alternative means to preserve and use tropical forests with the aim of assisting local populations to directly benefit from the long-term conservation of the forest resource (Pearce, 1989). Non-timber forest products (NTFPs) are defined in this paper as any biological material other than building timber and industrial wood from the forest (De Beer and McDermott, 1989). This definition includes plant products, such as fruit, seeds, leaves, resin, cane and charcoal, as well as products of animal origin.

Cote d'Ivoire, because of its diverse flora and fauna, has a large variety of NTFPs (Adjanooun and AkeAssi, 1979; Bouquet and Debray, 1979; Gnesio Tehe, 1980; Bognon, 1988; Gauthier-Begin, 1992). Its cultural diversity (more than 60 ethnic groups) and the state of its road network (more than 5,000 km of tarmacked road) are assets that enable the promotion of NTFP use. It is very difficult to assess the real economic impact of NTFPs on the Gross National Product of the country. Indeed, trade in these products is still dependent on the informal sector. Only collections of NTFPs destined for export

from the forest plantations (cashew nut), natural groves resulting from an agro-system where farmers save certain species (cola nut, shea nut) from slash and burn, or secondary forests (arils of *Thaumatococcus daniellii*) are listed in customs statistics. For products used at national level, little information is found, as indicated in the listing of permits for exploitation of NTFPs in Table 1.

Table 1. The number of permits for NTFPs in Côte d'Ivoire at 26-11-91

Products	Number of permits		
	1989	1990	1991
Charcoal	249	231	244
Firewood	45	45	53
Rattan cane	NA	NA	21
Toothpicks	NA	NA	41
<i>Thaumatococcus</i> leaves	NA	NA	14
Art objects	NA	NA	12
Winnowing baskets	NA	NA	11
Mortars	NA	NA	9
Baskets	NA	NA	7
Brooms	NA	NA	5
Bowls	NA	NA	4
Bamboo	NA	NA	3
Poles	NA	NA	3
Sedge leaves	NA	NA	2
Incense (resin)	NA	NA	2
Bahia leaves	NA	NA	1
Palm ribs	NA	NA	1
Pepper	NA	NA	2
Tom-toms	NA	NA	1
Poles	NA	NA	1

NA = not available

Source: Secondary Forest Products Service,
Ministry of Agriculture and Animal Resources, Côte d'Ivoire

In the following paragraphs, the extraction and export of some NTFPs from Cote d'Ivoire is discussed.

Production of *Thaumatococcus daniellii* arils

Thaumatococcus daniellii of the *Marantaceae* family is a plant of the secondary forest of western Africa. It is known all over western Africa for the numerous local uses of its leaves, fruit, seeds, leafstalks and rhizomes (Falconer, 1990). *T. daniellii* produces a red berry with three capsules, the white arils of which are used to make a natural, low calorie sweetener, which is a substitute for sugar. In 1970, an extraction process for aril proteins to make Talin (the commercial name for the sweetener) was developed in Britain. Talin has a low calorific value with a sweetening power 5,000 times that of sugar (Stephens, 1983). Talin proteins are presently used in beverages, foods and Pharmaceuticals and by diabetics.

From 1984 to 1991, the total production of arils in Cote d'Ivoire increased from 10,250 to 25,600 kg (Table 2). At an estimated average price for frozen arils of CFA Francs 4,000/kg, this production earns between CFA Francs 40 and 100 million annually (US\$160,000 to US\$400,000) in exports to the UK.

Table 2. Volume and estimated value of Cote d'Ivoire's *Thaumatococcus daniellii* arils between 1984 and 1991

Year	Volume (kg)	Estimated value (CFA Francs '000,000)
1984-85	10,250	41
1985-86	7,500	30
1986-87	15,000	60
1987-88	15,750	63
1988-89	13,000	52
1989-90	15,714	63
1990-91	25,600	102

Source: Sembly Company, Abidjan, Côte d'Ivoire

In the Cote d'Ivoire, there are three aril production units, of modest size (less than 20 employees), situated in the south and west of the country. The first unit was founded in Lakota in 1983 and is supplied with fruit from the Lakota, Divo, Ganoa and Sasandra Districts. The second unit was set up in Montewo (Agboville) in 1988. It gets its fruit from the Agboville, Adzope and Anyama Districts. The last unit is in the west of the country (Bangolo) and was opened in 1991 and covers the Bangolo, Man and Guiglo Districts. A feasibility study on a fourth production unit in the southwest (San-Pedro) is being carried out.

Women buy the whole fruit, then separate the arils from the seeds in special rooms in the production units. The arils are sold to the production unit, where they are prepared and frozen as quickly as possible. Quick freezing is essential in order to prevent heat destroying the aril proteins. The number of women cutting and selling arils is steadily increasing, indicating the importance of the aril market to women.

Economic value of cola, shea almond and cashew

Export of *Cola nitida* nuts

Cola nitida (Sterculiaceae) is a species found in the dense, humid forests of western Africa. Cola nuts are highly valued by the people of the northern savanna (northern Benin, Côte d'Ivoire, Burkina Faso and Mali) because they are rich in caffeine and are used as stimulants. Nuts are also used in the pharmaceutical industry and were once an ingredient in making Coca-Cola. In Côte d'Ivoire, cola nut is gathered mainly from secondary forests. Gathering takes places twice a year from September to December (big gathering) and from May to July (small gathering).

The cola nut has been exported to countries of the northern savanna for many years and more recently to Europe and the USA. The production of cola is dependent on climatic variations, which affect fruit bearing. Since 1960, Côte d'Ivoire's exports of cola nuts have yielded an average of 400,000 tons/year with an annual value of CFA Francs 1,700 million (US\$6,800,000) (Tables 3 & 4).

Table 3. Value of Exports of Cola, Shea and Cashew nuts from Côte d'Ivoire between 1960 and 1990

Year	Cola nut (in CFA Francs X 1,000,000)	Shea nut	Cashew nut
1960	1,738	1	-
1960	1,699	4	-
1962	1,581	12	-
1963	1,533	70	-
1964	1,485	11	-
1965	1,485	53	-
1966	1,620	3	-
1967	1,620	14	-
1968	2,430	24	-
1969	2,750	36	-
1970	2,339	108	-
1971	2,300	NA	-
1972	965	NA	-
1973	1,121	NA	-
1974	1,576	70	-
1975	1,144	197	-
1976	900	204	-
1977	852	51	22
1978	1,078	200	65
1979	852	155	70
1980	798	157	25
1981	2,487	236	57
1982	3,225	134	87
1983	2,289	1,303	135
1984	1,811	503	188
1985	1,944	8,944	4,999
1986	2,233	505	1,171
1987	1,998	669	1,247
1988	1,739	223	387
1989	1,283	232	1,466
1990	1,819	1,097	1,093

Source: Customs statistics

NA = not available

Table 4. Value of Exports of Cola, Shea and Cashew nuts from Côte d'Ivoire between 1960 to 1990

Year	Cola nut (tons)	Shea nut (tons)	Cashew nut (tons)
1960	NA	75	-
1961	NA	202	-
1962	NA	NA	-
1963	NA	817	-
1964	NA	5,258	-
1965	NA	796	-
1966	NA	3,418	-
1967	NA	150	-
1968	NA	872	-
1969	NA	577	-
1970	NA	994	-
1971	NA	3,543	-
1972	32,616	NA	-
1973	40,911	NA	-
1974	54,464	1,066	-
1975	54,562	2,981	-
1976	36,996	1,568	-
1977	38,677	1,064	35
1978	47,557	4,636	111
1979	34,450	3,165	121
1980	38,312	4,738	34
1981	41,447	4,294	541
1982	53,445	2,428	720
1983	38,039	20,333	1,537
1984	30,127	7,663	1,450
1985	32,053	55,061	5,449
1986	37,044	5,374	4,218
1987	33,037	12,418	1,845
1988	29,354	4,679	1,980
1989	22,656	3,440	8,492
1990	31,111	13,852	6,325

Source: Customs statistics

NA = not available

Export of shea almonds (*Vitellaria paradoxa*, Sapotaceae)

Shea is a species of the Guinean and Sudanese savannas. A fatty substance is extracted from these almonds; shea butter is used in foods, cosmetics and medicine. In the Côte d'Ivoire, the value of shea almonds exports has risen sharply. It increased a hundredfold between 1960 and 1990, and earns an average of CFA Francs 550 million/year (US\$2.2 million). The average annual volume of exports is more than 5,000 tons (Table 4).

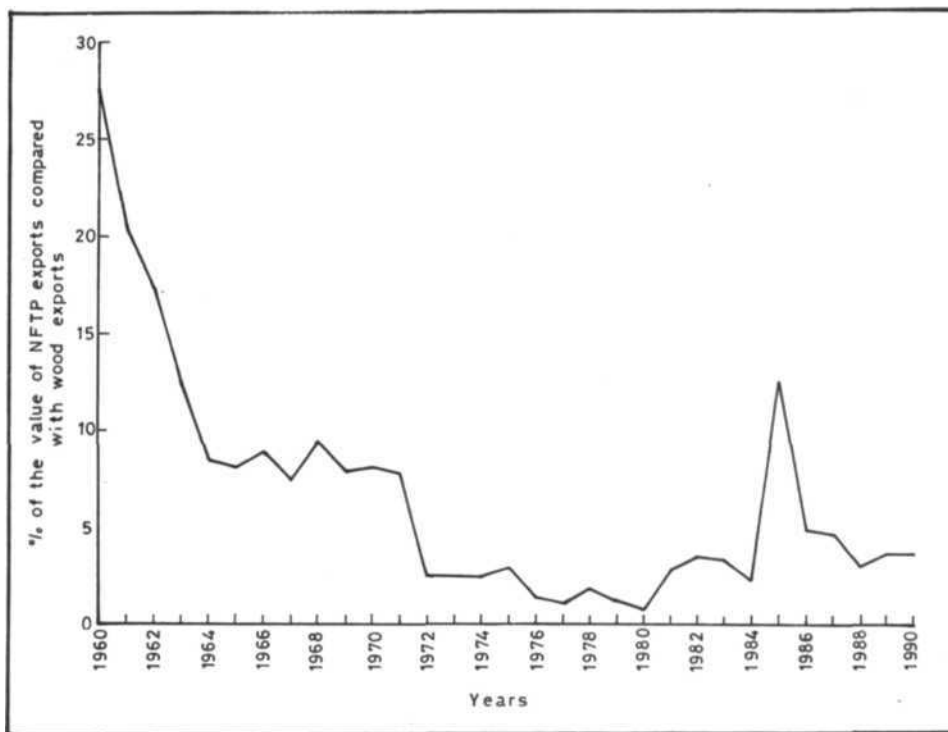


Figure 1. Evolution of Côte d'Ivoire's export values of NTFPs from 1960 to 1990

Exports of cashew nuts (*Anacardium occidentale*, Anacardiaceae)

Cashew nuts are used for baking or served as a delicacy with aperitives. They were introduced to Côte d'Ivoire in the 1960s and production started in 1970. From 1977 to 1990, more than 2,000 tons of cashew nuts were exported annually (Table 4) the value of which averaged CFA Francs 460 million/year (US\$1.8 million).

Value, conservation and long-term management of NTFPs in the Côte d'Ivoire

The role of NTFPs in conservation and long-lasting use of forest resources can be appraised by:

- development and conservation policies based on these products, initiated by the government and research or development institutes;
- endogenous initiatives by local populations (especially peasants) to preserve these resources.

Government policies on NTFPs

An analysis of the value of NTFPs exports over a 30 year period (from independence to 1990) shows a steady decrease in the value of the NTFPs as a percentage of the value of timber (Figure 1). This is because the value of timber exports has increased while the

value of NTFP exports has remained relatively static. The reasons for this are numerous. The rapid deforestation taking place in west Africa and the lack of development plans for these products are crucial reasons. Indeed, wood, coffee and cocoa have for long been the pillars of Côte d'Ivoire's national economy. Wood is the forest product that has benefitted the most from government policies on resource management. The setting up of SODEFOR (a forest development society created in 1966) and a development project for the natural forests of Yapo, Mopri, Irobo and Tene led by the CTFT (Centre Technique Forestier Tropical) in Côte d'Ivoire illustrate the state's intention for correct, long-term management of timber resources.

Since 1988, a growing interest in NTFPs has developed and will be incorporated into the long-term management plans of several forests. Such projects include:

- the rehabilitation programme for classified forests in the east;
- the autonomous project for the conservation of the Taï National Park PACPNT (Projet Autonome pour la Conservation du Parc National de Tai);
- the project 'wild fruit-trees'.

This interest is not due to the economic value of NTFPs, which has been constantly decreasing and they, therefore, remain secondary compared to timber in the mind of governing bodies. Interest stems from the fact that through NTFP utilisation, local populations can participate in long-term development projects for forest resources.

Peasants' initiatives based on NTFPs

In the context of the rapid degradation of resources taking place in the Cote d'Ivoire, peasants adopt the two following approaches to better manage forest resources:

1. The reinforcement of traditional rights to forest resources, or
2. domestication.

Reinforcement of traditional rights to forest resources

Shea parks in the north of Côte d'Ivoire, such as those in the Sudanese-Sahelian zone (Seignebos, 1982) have been preserved thanks to reinforced community or hereditary land rights on this land. Cola orchards of the forest zone, with mainly naturally grown cola trees, are the private property of families or individuals.

Wild fruit trees scattered on agricultural land are appropriated. Each member of the rural community knows this and nobody may gather the fruit of these trees without the owner's permission. The felling of such trees by another peasant, to whom the plot of land has been allocated for agriculture, is often the cause of conflicts in the Tai Region (personal observation). In the zones where *Thaumatococcus daniellii* is planted, every family tries to increase its control on its forest plot in order to guaranty that it benefits from the products of the plant.

Domestication

A survey carried out in the Taï Region in 1990 (Bonnéhin, 1991) has shown that more than half of the families questioned had already planted at least one indigenous tree for its fruit. The reason for the plantings was that resources were becoming rare due to intensive use of the forest and the increase of agricultural activities.

Conclusion

This study has shown that NTFPs may be considered as minor in terms of their export value in comparison to timber products. However, they are a key element in conservation policies at both the level of government projects and peasant initiative. At the peasant level, the initiatives taken (the reinforcement of the traditional law) are not always initiatives for a long-term management of resources. Nevertheless, they are a prerequisite for the implementation of long-term management plans and are also necessary to encourage domestication strategies.

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THE USE OF NON-TIMBER FOREST PRODUCTS IN BENIN

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Summary

In Benin, forest cover is 41,000 ha, 3,490,000 ha and 11,000,000 ha for closed, open and secondary forests respectively. Local communities make extensive use of the forests. Medicinal plants from the forests are increasing in popularity as modern medicine becomes too expensive for the poorer sector of the population. Materials are gathered from the forests for wicker work and basketry. Bushes and creepers are cut from secondary forests for hut building, fish shelters and fodder for animals. For direct human consumption, honey, snails and fruits are collected. The collection of forest products diversifies the income of the local communities.

Introduction

The world's forests cover about 3,800 million ha or 30% of the total surface of the earth. Tropical forest cover is about 53% in America, 32% in Africa and 36% in Asia of total land area.

In tropical Africa, countries in the central zone (Gabon, Cameroun, Zaire) have the highest percentage of forest cover. Zaire's forests represent 25.3% of the total area of African tropical forests. Countries in the Sahelian zone and some mountainous countries of eastern and southern Africa have the least forest cover. Mixed forest and savanna surrounds the vast zone of dense and humid forest of central and western Africa. Tropical Africa has 685 million ha of woodland (36% of the land area), 443 million ha of bushland, 178 million ha of secondary forests and 156,475,000 ha of closed forest. Shifting cultivation is the main cause of deforestation of the open and closed forests.

Industrial wood or building timber can be extracted from 60% of closed forests in tropical Africa, however, only 20% of productive forests are managed. Tropical Africa exports about 30% by volume of its major industrial wood products. The use of important forest reserves in tropical Africa can be diversified away from timber by using non-timber forest products (NTFPs).

Forest reserves in Benin and their potential use

Benin and Togo form a corridor between two large forested areas, Nigeria to the east and Ghana to the west. Benin has 41,000 ha of closed forest, 3,490,000 ha of open forest and 11,000,000 ha of secondary forest. These forest formations contain many resources with a variety of uses and the extraction of these resources benefits local communities.

Forests

Benin is not very rich in closed forests but has important areas of open forest. The few existing areas of closed forest are situated in the southeast, northwest and in the south (latitude 7° north) of the country. These forests were rich in species used in the building industry but such species are now scarce because of intensive exploitation. Red and white wood species are extracted.

Medicinal plants

Forests are 'traditional pharmacies' which contain natural, medicinal products but, unfortunately, these are only known to traditional healers. Not so long ago, they were harassed and treated as quacks as public and religious authorities tried in vain to abolish these practices in favour of western medicine. However, physiological problems linked to western medicine and the low purchasing power of local communities have instigated the re-introduction of traditional medicine.

Many plant families in Benin provide ingredients for traditional treatments. Roots, stems, leaves, flowers, tubers and rhizomes are used. Medicinal plants are found in market stalls in every large centre of Benin. The most common families are Acanthaceae, Annonaceae, Asteraceae, Asclepiadaceae, Cucurbitaceae, Lamiaceae, Malphigiaceae, Malvaceae, Menispermaceae, Verbenaceae and Zingiberaceae. Women generally sell medicinal plants in the markets.

Both men and women gathered medicinal plants in the countryside, which are then forwarded to urban zones by bicycle, vehicle or by dugout. Roots, stalks and bark are gathered by men while leaves are usually gathered by women.

When roots, rhizomes, tubers or bulbs are removed, the survival of the plants may be threatened. This may lead to local extinctions if no measures are taken to safeguard certain groups of plants. When *Carissa edulis*, *Baissea zygodioides* stems are gathered, the plant can reshoot. This is not always the case and *Raphiostyis beninienses*, for instance, cannot reshoot after harvesting. Unregulated gathering of medicinal plants by these methods can damage the environment. Leaf gathering by women is not yet a danger to the forest.

The gathering of medicinal plants is a secondary activity for men as their main task is to work in the fields. But it is an important, additional contribution to the income of rural communities.

Trade in medicinal plants is very important. Women trade in medicinal plants as their sole occupation. Their stalls earn enough to satisfy their daily needs. This trade competes with and complements that in western pharmaceutical products.

Extraction of essential oils is a new activity that is reinforcing traditional medicine. Some healers use essential oils in their cures. Many plant families can be used for extraction of essential oils, such as Myrtaceae, Rutaceae, Verbenaceae and Phytolaccaceae.

Wickerwork and basketwork

Swamp forests in the valley of the Oueme River in the south of Benin provide cane palms (*Eremosphata macrocarpa*, *Acnistrophyllum* sp.) which are used to make furniture. This is carried out by a group of men who have set up a cooperative and their livelihood depends solely on this activity. A seven piece living room set costs CFAFrancs 70,000. These workers do not find sufficient mature cane in the swamp forests and are obliged to import raw material from Ghana and Nigeria.

Certain semi-deciduous forests in the south of Benin provide *Hypolodelphys vilacea* (Marantaceae), used for wickerwork baskets and grain stores. Today this raw material is rare but the need for baskets in local markets is steadily increasing. This type of activity provides peasants with extra income in addition to agriculture.

Acadjas

In southern Benin, 'acadjas' can be seen on the waters of the Port-Novo lagoon and Lake Ahene. 'Acadjas' are bundles of bushes and branches that are placed on the water surface and fish use them for shelter and egg laying. The fish are easy to catch because they remain close to the 'acadjas'.

Plant gatherers cut bushes in the surrounding forest and make bundles of 20—25 kg from stalks and leaves. The bundles are sold to the traditional inhabitants of the lagoon or lake and to some urban dwellers who use stretches of water they buy from the traditional land owners.

Peasants have cut most of the bushes of the secondary forest. In inland Benin, between the coast and 7° north, it is no longer easy to cut bushes. Nowadays, leaves of oil palm (*Elaeis guineensis*) and bamboo (*Bambusa vulgaris*) are used because of the lack of bushes. While this activity provides the peasants with additional income, it has led to the scarcity of trees in this zone. Forest succession is seriously impaired and some species may disappear if strong measures are not taken to regulate the use of the forest.

Hut building

In the same area of southern Benin, creepers are cut for building huts on piles in the water and in the river valley. In addition, creepers are used for making fishing implements and fish traps where they are plaited between two poles to make a dam that lets water pass and traps fish. *Montandra guineensis* (Apocynaceae) is the main plant species used. Peasants gather creepers and tie them in bundles of 20—30 kg for sale to fishermen.

Fodder plants

In Cotonou, the selling of ovine or caprine animals from Zongo has lately developed as a subsistence activity. These animals require fodder while they are penned awaiting sale. *Chrysobalanus icaco* var *orbicularis*, *Panicum maximum* and *Digitaria horizontalis* are regularly gathered for fodder.

Chrysobalanus icaco var *orbicularis* is a creeping shrub which is found from Krake to Cotonou and has been excessively exploited. It is cut to a stump and the bundles are sold to the animal keepers. As this plant has become scarce, grasses such as *Panicum maximum* and *Digitaria horizontalis* are now used. Plant gatherers travel as far as 80 km to collect fodder plants for sale. *C. icaco* var *orbicularis* has almost disappeared from the coast in less than 10 years, which is unfortunate because it has a fruit that is highly valued by the population.

Edible fruit

The fruits of *Chrysophyllum albidum* (Sapotaceae) and *Dialium guineense* (Cesalpiniaceae) are popular and are traded in Benin.

Chrysophyllum albidum, present in the forests of southern Benin, is increasingly planted in fields and concessions in rural areas. Women buy the fruit in the countryside for CFA Francs 5—10 a 50 kg basket. They then sell the baskets of fruit in the urban markets for CFA Francs 8—15.

The fruits of *Dialium guineense* ripen from February to March. Women gather them in the secondary forests and fallows and sell them in the markets at CFA Francs 150/kg. Gathering has no negative impact on the vegetation.

The fan palm (*Borassus aethiopum*) bears fruit which is traded in the region. The fresh fruit is sold in 100 kg bags and women boil the fruit for resale.

The 'nere' or *Parkia africana* is a tree of the Guinean and Sudanese savannas. It can be found in the region stretching from Ghana to Eastern Africa. *P. africana* is a protected species and spared when forests are cleared as the trees belong to well-defined, local groups. The pods contain a yellowish, sweet, pulp used for making flour. The yellow flour is sold in buckets by women in the market and the seeds are sold in 100 kg bags. The annual flour production in Benin is about 1,500 tons. Trade in *P. africana* seeds takes place on a vast part of the Benin. Minor conflicts are reported when some individuals gather the *P. africana* pods from trees that do not belong to them. Work is carried out by families. Seeds are resold to women in urban centres to be processed into a type of mustard, a product which is highly appreciated in African cooking. Mustard is sold for CFA Francs 50 for 10 gm.

The shea almond (*Vitellaria paradoxa*) is a tree found in the Sudanese savannas. Shea commercial activities are concentrated in the Northern part of Benin. Shea is a protected species and is spared when forests are cleared. Women gather fallen fruit in the fields or around the villages. In regions far from inhabited places the fruit is generally not gathered for trade. The average yield for dried almonds is 5.2—8 kg/tree. Dried almonds and butter are the two commercialized products of the shea tree.

Dried almonds are packed in 100 kg bags and sent to Cotonou by road or rail. Shea butter is produced from the almonds. The majority of shea butter is used locally or in urban centres for cooking and ointments. The remainder and the dried nuts are exported. Women and children in the production zone gather the fruit for sale. The gathering of the nuts appears to have no marked negative impact on the environment.

Fauna

Snails

Three snails are collected for human consumption in Benin: *Achatina achatina*, *Achatina marginalis*, and *Limicaularis* sp. The first two are frequently eaten in Benin and the trade is widespread in Togo, Benin and Nigeria. Women and children gather them and deliver them to sellers in urban centres.

In the long run, snail gathering from the wild will affect the snail populations and the market will no longer be satisfied. Thus snail breeding is increasing in popularity in Benin to satisfy the market and protect the wild populations.

Bees

Wild bee hives are found in holes in trees or rocks. Peasants use fire to collect the honey at night to avoid bee-stings. This method is harmful to the bees, adversely affects the quality of the honey and is dangerous to the environment. Entire colonies are destroyed when the honey is collected; devastating fires often result from the fires and peasants fell living trees for honey.

Modern beekeeping improves bee husbandry, increases the income of the bee keeper and the honey produced is of good quality. Honey is a valuable product which gives a substantial income to peasants.

Discussion

Africa has important multiple use potential for its forest reserves. If each country explores its forest resources, raw material will be found for use in food products, medicine, tourism and decoration objects.

Development could be fostered by creating small, local enterprises set in rural areas. The National University of Benin is carrying out experiments to extract essential oils from certain aromatic plants for use in medicine, soap, biscuits and perfumes. The experiment could lead to small extraction units being set up in rural areas for peasants to produce these oils and sell them. In this way, local communities can diversify their activities.

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MANAGEMENT OF FOREST RESERVES AND FORESTED NATIONAL PARKS IN KENYA: A ROLE FOR THE USE OF NON-TIMBER FOREST PRODUCTS

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Summary

Kenya's forest cover is small, only 2.9% of the total land area. Yet the forests are under increasing pressure for their services and products by the people of Kenya. There is need to diversify the use of forests in order to meet the increasing demands of the population and the multi-purpose use of forest will need to be carefully managed. Non-timber forest products in Kenya, which must be managed sustainably, include fuelwood, wood for handicrafts, medicinal plants, bamboo, sap extracts, minerals, animal products, honey and biodiversity.

Introduction

Kenya's forests show varied vegetation patterns including closed canopy forests, bushlands, riparian forests, mangroves, open woodland, and savanna. A most important habitat for wildlife is provided by Kenya's forest reserves, forested national parks and reserves.

Forests are among Kenya's most important assets due to their roles in the conservation of biodiversity, water and soil; as a source of forest products for the people of Kenya; and as a revenue earner for individuals, communities, the private sector and the nation. Pressures on these forests have increased over the last few decades to insupportable levels. Diversified, multi-purpose use is required to manage and conserve them sustainably.

The largest forests are located in Kenya's moist highlands, which are significant catchment areas and both densely populated and intensively cultivated. In the dry zone, important forests occur as scattered islands; in the coastal region, the important and over-utilised mangrove forests are found. Nearby communities are highly dependent on the forests for various services and products.

All traditionally non-commercial products of wood, non-wood vegetative products, non-vegetative products and the various ecological and aesthetic services derived from forests are considered to be non-timber forest products (NTFPs) in this paper.

Management of forests

Key issues and problems

The forest resource-base in Kenya is small and covers 2.9% of the country. Forest ecosystems face a variety of problems including: squatters, uncontrolled grazing, unsustainable felling for charcoal, fuelwood and timber, and excision of land. Forest-wildlife-human conflicts have arisen as wildlife living in the forests often damage forest plantations and crops.

When planning multi-purpose use of the forest, the following key issues should be taken into account:

- A policy on wildlife utilisation should be developed.
- Once the forest policy has been fully revised (it is now in progress), the Forest Act should be amended to support it.
- In regulating forest-based activities, licensing must be based on sustainable-yield estimates and be supervised stringently.
- In order to reduce pressure on protected areas, there is an urgent need to enhance production of timber and other products outside these areas. This could be in the form of plantations, woodlots or agroforestry.
- Resource-users should participate in forest management for effective conservation.
- Institutions involved in forest management must be strengthened and broadened.

Zoning

The Forest Department (FD) and Kenya Wildlife Service (KWS) are implementing a Memorandum of Understanding for the joint management of over 31 selected forest ecosystems. By pooling their resources, FD and KWS are enhancing the conservation and management of forests. Management plans are being revised to allow for multiple use zoning. Regulation of activities in forests and parks is through the licensing system, where applicants have their requests evaluated and, if acceptable, licenses are issued for specific activities (e.g. lodges, sawmills).

Potential of non-timber forest products

Past utilisation of forest resources has emphasised conventional wood-based products and neglected NTFPs. However, NTFP use must be properly managed to ensure conservation of the forest. For example, in the South West Mau Forest, *Podocarpus latifolius* is used as a waterproof covering for bee hives. Near Nyangores, part of the Mau Complex Forests, 30% of all *P. latifolius* are dead or dying because of this activity. Long-term hunting and trapping on the boundaries of Transmara Forest have eliminated several larger antelopes and duikers.

By exploiting the existing potential of NTFPs as import substitutes, Kenya may save large amounts of foreign exchange while creating employment. There is also a need to review policies to increase the direct benefits to communities from forest resources.

This will in turn promote the participation of communities in the conservation of the meager forest and wildlife resources.

Potential exists in Kenya for exploitation of the following NTFPs:

Oils

Rosin Kenya Co. Ltd is licensed to tap pines to produce resin and turpentine. This company is the sole supplier of resin to the pulp and paper industry in Kenya, while turpentine is used by the pharmaceutical industry. The capacity of the company is 1,500 t/year but currently it is under-utilised. The existing pine resources have an estimated capacity of 16,000 t/yr for the production of oleoresin.

The potential for exploiting other oils, such as eucalyptus leaf oil, citronella grass oil, is largely unexplored.

Conventional oil seeds have an average oil content of 30%. The following species have seeds with an oil content of over 30% and could be utilised in industrial processing in food, resins and paint: *Balanites aegyptiaca*, *Simmondsia chinensis*, *Melia azederach* and *Azadirachta indica*. These species grow extensively in the semi-arid and arid areas in Kenya.

Some *Acacia* species (e.g. *Acacia Senegal*) produce gum that has commercial use. Over 40 species of *Commiphora* and two species of *Boswellia* produce gum resins in amounts that could support commercial production. Exploitation of this could raise living standards in the arid areas by creating alternative sources of income to pastoralism.

Medicine

Mankind has used plants in treating diseases since time immemorial. Unfortunately, most of this knowledge has been used locally without regard for the potential that it holds for modern medicine. In Kenya, the isolation and characterisation of biologically active compounds is being carried out at the Kenya Medical Research Institute. At the Kenya Forestry Research Institute over 800 species of medicinal herbs have been documented.

Non-timber forest products and their current utilisation in Kenya

Forests and forested reserves provide a wide range of both non-timber vegetative and non-vegetative products and user services, with varying values between communities. The use to which a forest-derived product or a service is put is determined by the community's socio-cultural and economic values and practices. The diversity of NTFPs has traditionally given the adjacent communities food, medicines, artifacts, enjoyment, working tools and security instruments. The use of most of these products involves their removal and hence depletion of the forest stock, whereas the use of forest for rituals and recreation may not involve any depletion of the resource.

Traditional and modern extractivism

With changing traditional lifestyles and economic demands, extractivism may lose its equilibrium with the forest due to new extraction methods and practices and increases in the quantity of product extracted. The factor of greatest impact is trade, which signifies a shift from subsistence extraction to a quasi-commercial situation. Under subsistence

collection of NTFPs, individual quantities are smaller, extraction less frequent and extraction practices less destructive and more conservation oriented than in the commercial situation.

Studies by KIFCON (1994) classify direct users of forests into three user groups: local households, large-scale commercial enterprises, and visitors for leisure and education. The form of forest use and needs varies considerably amongst these groups and they thus have different impacts.

Local households and communities

Local households and communities use forests primarily for subsistence needs and, to a lesser extent, some income-generating activities.

Their needs include:

- wood for fuel, construction, carving, hives, mortars and pestles, instruments and tools;
- grass for grazing, thatching, fodder;
- medicinal products from roots, leaves, bark, fruits, seeds and stems;
- animal products such as meat; skin and hair for clothing, straps and ornaments; and horns and teeth for ornaments;
- foods including honey, and termites;
- building materials include sand, clay and stones;
- clay which is used for pottery, some stones are carved, and metals are used to make implements, weapons and metallic ornaments.

Forests have not only socio-economic values for forest dwellers and adjacent communities but also strong ritualistic and religious associations. They are involved in ceremonies for rain making, birth, burial, circumcision and worship.

Large commercial users

Commercial users are enterprises or individuals licensed to extract products such as timber, resin, tanning or gum products, rocks, minerals, water, fauna and flora. These extractive operations are licensed in most cases.

Leisure and educational visitors

Tourists and educational and research visitors mostly observe the biodiversity and scenic beauty of the landscape and sites of special interest. These activities are non-extractive but may lead to adverse effects such as degradation or pollution of the environment.

Sustainable use of non-timber forest products in Kenya

The demand for NTFPs has been increasing in all forested reserves as a result of increased populations and the need to increase incomes. The continued ability of the forested reserves to provide these products sustainably needs to be re-evaluated. Considering that these extractive activities mainly occur in the informal sector, they are mostly unrecorded and very little information is available on exploitation. Similarly, information on resource availability is scant for most reserves.

The current situation and recommended actions for sustainable use of major NTFPs follows:

Fuelwood

The majority of households in Kenya, as in many developing countries, is dependent on wood for their energy requirements. Wood collections from forests and rangelands are enormous, estimated at over 95% of the approximately 20 million m³ annual fuelwood consumption. Fuelwood demands pose real threats to the natural forest, national parks and reserves.

Action: There is a need to promote on-farm tree planting for household energy supply.

Wood carvings, domestic implements and tools

Wood carving, domestic implements and other household items are made from specific trees. Wood carvers in Kenya prefer 'muhugu' (*Brachylaena huillensis*), while 'mutati' (*Polyscias kikuyuensis*) is preferred for bee hives. Currently, the lucrative trade in wood carving has been detrimental to 'muhugu' stands; the case is even more extreme for Ebony 'mpingo' (*Dalbergia melanoxylon*) which is now almost extinct in Kenya.

Action: There is the need to identify the specific trees preferred in order to formulate strategies to preserve the trees in natural forests and to propagate them on the farm.

Medicinal plants

Different communities and herbal medicinal specialists within the communities use different trees, shrubs and herbs as medicines. Herbalists, using an extensive range of plants, prepare medicines for specific diseases of both humans and livestock. Neem or 'muarubaini' is claimed to cure forty diseases and is in high demand. Within Kikuyu land (near Mount Kenya), an alcoholic drink called 'miti' is made with extracts of bark, roots and stem of a number of trees and shrubs and mixed with honey. There is thriving trade for 'miti', which has increased demand for particular raw materials. The dried fruit of 'muratina' (*Kigelia aethiopum*) is fermented with honey and sugarcane to make the traditional Kikuyu beer 'muratina'. This tree is now scarce as 'muratina' is sold commercially.

Extraction of medicinal materials can be extremely destructive, especially where bark and roots are required. Indiscriminate extraction of 'muri' (*Prunus africana*) bark for export has resulting in the death of many trees.

Action: Medicinal trees in high demand could be established in farm woodlots, or agroforestry models, for local and export use.

Bamboo

Bamboo has many uses in both forest-adjacent communities and beyond. It is popular for fencing, basketry and making household items. Commercially, it is used in horticulture and in the manufacture of furniture and tooth picks. Some communities eat bamboo shoots. As bamboo forests occur in critical water catchment areas, bamboo harvesting from forests should only be carried out with special permission.

Action: Promote bamboo planting on farms and community lands.

Resin, gum and other sap extracts

Forests trees and shrubs provide a variety of sap extracts for both subsistence and commercial use. The sap is used in preparation of foods, alcohol, beverages, dyes, medicines, preservatives and adhesives. Commercialised extraction includes tannin, oleoresin and gum tapping. Rosin Kenya (Ltd) extracts resin from pines and East African Tannin Extract Company extracts tannin from Black Wattle (*Acacia mearnsii*). Gum arabic is extracted from *Acacia* spp. in the drier parts of the country for trade. Some palm species are tapped for home and commercial production of alcoholic drinks, particularly at the coast.

Action: With increasing commercialisation of sap extraction for different products, there is a need to closely monitor and study the extraction technologies employed so that destructive techniques are discouraged. There is also a need to evaluate and formulate strategies to meet the needs for commercial sap extractions, to reduce pressure on the environmentally fragile forest reserves. Plantations of gum producing trees could be established on farms and community lands.

Minerals

A wide range of minerals, such as building stones, sand, metals, laterite and clay, are extracted from forests. In many cases these activities are not licensed. The major threat to the forest ecosystem occurs when uncontrolled mining activities destroy the vegetation and topography without subsequent rehabilitation.

Action: There is a need for comprehensive management plans and monitoring of extraction.

Hunting

Commercial hunting is banned in Kenya. Although subsistence hunting is illegal, it is carried out by forest dwellers, such as the Dorobo, and some forest-adjacent communities. Poaching is a threat, especially to rare and endangered species, whether for subsistence or commercial use.

Action: If meat requirements for forest-adjacent communities and forest dwellers can be met through livestock rearing programmes, the threat from hunting can be minimised.

Honey collection

Honey collection is common among forest-adjacent communities for both subsistence and trade. Honey collectors, while generally non-destructive, increase the risk of fire in the forest when smoking the hives.

Action: Modern bee keeping programmes, both on-farm and in the forest, can contribute to forest conservation

Biodiversity

Some plants and animals with specific cultural, scientific or commercial value are collected. These include butterflies, birds, reptiles, wildflowers and herbs, which may be exported or used locally. Uncontrolled collection may be detrimental to the biodiversity of the forested reserves. In many cases, these activities are unlicensed and unknown to forest and park managers, which makes monitoring difficult.

Action: Comprehensive surveys should facilitate control and monitoring of in-forest activities.

A strategy to improve the sustainable use of NTFPs

For the sustainable exploitation of NTFPs, the following will require immediate attention:

- evaluation of the potential for sustainable production and utilisation of NTFPs for commercial exploitation;
- evaluation of harvesting and handling techniques to make recommendations for increasing yields;
- investigation of resource assessment and intensive ethnobotanical surveys of potential species;
- socio-economic assessment of local communities in relation to existing management systems.

The role for NTFPs in the economy can be summarised as follows:

- enhanced living standards for rural communities, including pastoralists;
- broadened scope in forest and wildlife conservation, thereby safeguarding and expanding the tourism industry;
- saving of foreign exchange by import substitution;
- creation of employment;
- integration of cultural knowledge and traditions with development;
- improving the health of the populace;
- rehabilitating arid and semi-arid areas;
- increasing national food security.

Conclusion

Licensing has not been effective in monitoring the extent and effect of NTFP extraction activities in Kenya's forests and parks. This is primarily because most of these activities are carried out in the informal sector, and most of the extractors are from forest-adjacent communities and, therefore, may visit the reserves unnoticed.

There is a need for comprehensive surveys and studies to ascertain the extent of the resources and the impact of extraction on the reserves, to facilitate formulation of strategies for monitoring, and to develop long-term, sustainable programmes. Where some useful and commonly used plants are threatened, programmes for their cultivation should be considered to reduce pressure on the existing forest and park reserves.

Finally, the use of NTFPs is expected to raise the living standards of the people, particularly the rural communities, and widen their commercial base. This will make an important contribution to the national economy.

III CASE STUDIES: LATIN AMERICA

EXTRACTIVE RESERVES IN BRAZIL: SEARCHING FOR SUSTAINABLE DEVELOPMENT WITH SOCIAL JUSTICE

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Summary

The 'extractive reserve' is an excellent example of a new model of development that integrates, economically and socially, marginalised families with the environment. In these reserves, extractivists earn their living from non-timber forest products while concurrently conserving forest biodiversity. The principles of this model have been developed by working closely with traditional communities.

Introduction

Recent changes in Brazil's production base has had serious social, economical and political consequences. These include deforestation, land conflicts and a lack of economic alternatives to enable indigenous people to continue to live on their native land. In the forest, conflicts have increased between landowners, lumbermen and miners and the traditional occupants of the forest. Thousands of families, who once co-existed with the natural environment, have been forced to migrate to a life of misery in the urban slums. Yet the traditional occupants guarantee the conservation of forests and their biodiversity by exploiting them sustainably.

Extractive communities live by exploiting the non-timber products of the forests such as rubber, nuts, fruits and flowers. The importance of the Brazilian extractivists has been recognised since 1970 when settlers and rubber tappers of the Amazon region began organising themselves, through trade unions or rural syndicates, to defend their rights and their way of life. In 1985, the National Council of Rubber Tappers (NCRT) was founded. As a result of pressure from the NCRT, and national and international organisations interested in conserving the forests, the Government of Brazil recognised the right of people to continue to exploit the forests without destroying them. These activities culminated in the establishment of the extractive reserves (ERs), which guarantee the extractivist communities the right to continue to live and work in their traditional areas.

A law was enacted in 1989 to establish protected areas, including ERs and areas of social and ecological interest. Between 1990 and 1992, Brazil created nine ERs, covering a total of 2,000,000 ha and supporting 28,000 inhabitants. Extractive products include rubber, Brazil nuts, palm nuts, medicinal plants, resins, fibres, aromatic essences, fruits, flowers, oysters and fish. The first reserves were in the Amazon region and were designated primarily for sustainable utilisation by rubber tappers. Since then a marine ER has been established for the use of fish and molluscs, and a savannah ER has been proposed for the sustainable use of savannah products such as fruits, medicinal and handcraft plants.



Figure 1. Existing and proposed ERs in Brazil.

The National Center for the Sustainable Development of Traditional Populations

The Federal Government, through the Brazilian Institute of Environment, created the National Center for the Sustainable Development of Traditional Populations (CNPT) in 1992 to liaise with the extractivists and establish, implement and develop the ERs. The CNPT is managed by the National Consultative Council, which is composed of 14 members, one representative from each national association of traditional communities and a representative from each of the nine ERs.

The CNPT is considered to be an important example of co-management between government and society. Its major aim is to support the planning and implementation of projects demanded by traditional populations, either through their representative entities or through governmental organisations. In this way the CNPT assists traditional communities to find paths for development. By participating in the management of the environment and thus their livelihood, the communities improve their social and political organisational skills. This in turn reduces their exploitation by commercial agents.

Criteria for creation of extractive reserves

The National Consultive Council of the CNPT established political and technical criteria to prioritise the creation of Extractive Reserves.

Priority is given to potential ERs that can satisfy the following criteria:

Political

- ERs that can extend the concept to areas of the country outside the Amazon region;
- areas where traditional communities have a low environmental impact on existing natural, renewable resources;
- areas where there is collaboration between the state governments and associations of traditional communities in the basic studies used to plan the ER.

Technical

- Rich and valuable biodiversity of the ecosystems, i.e. species that have productive potential and are capable of sustained management;
- important and representative cultural heritage of the populations, including natural resource management practices;
- status of land tenure, related to future regularisation of land tenure;
- the technological level and future prospects of resource use.

After reviewing and analysing this information, CNPT provides a technical recommendation as to whether or not the extractive reserve should be established.

Establishment of extractive reserves

The Brazilian Institute of Environment, through the National Center of Sustainable Development for Traditional Populations (CNPT), is the organ responsible for the legal processes involved in establishing ERs. Before a proposal to establish a reserve can be considered, the traditional occupants must form an association. The final step in this

process is the preparation of the Extractive Reserve Concession Contract between the Brazilian Institute of Environment and the Association of the Reserve, based on detailed surveys of the social and economical conditions of the inhabitants of the proposed ER. Included in the contract is a Utilisation Plan, proposed by the community and approved by the Brazilian Institute of Environment, which outlines the rules and norms that will guarantee the sustainable use of the natural resources of the ER.

Once the contract is completed, the inhabitants of the ER receive, gratis, legal rights to the use of their traditional land. This guarantees the permanence of the communities and avoids conflicts with land-leasers (those who rent farmland from city-based landowners). Participative management of these areas, involving the Government of Brazil, associations of inhabitants, NGOs and other social institutions, is an essential part of the ER system.

The creation of protected areas maintains biodiversity, germplasm for research and retains climatic equilibrium. Because the inhabitants of the ER are the protectors of their environment, this reduces the cost of environmental protection to the Government.

Development activities carried out in extractive reserves

Programmes introduced to the ER aim to increase the income and quality of life of traditional communities and, therefore, prevent the migration of rural people to the cities.

Technical programmes

Technical programmes are directed towards increasing the efficiency of production and improved marketing of traditional NTFPs. Such measures include:

1. Increasing production, improving quality and reducing waste of traditional products. An important activity has been the distribution of kits for the production of rubber plate, which has improved the commercial value of rubber compared with the traditional product. This technology is simple, time saving and can be carried out at the household level.
2. Adding value to the product by local processing. By processing Brazil nuts at the local level, the villager earns a higher price for the product.
3. Establishing new economic activities such as agriculture, raising domestic and wild animals, fishing and bee keeping. The environmental costs of permanent agriculture are reduced by using existing forest clearings.
4. Commercialising forest products by developing markets for traditional and new forest products. A pilot project has been developed for the commercialisation of 'açaí pulp.

Social Programmes

Social programmes aim to improve the quality of life of traditional communities. Such programmes include:

- training rubber tappers as Inspector-Collaborators to work in the ERs;
- implementing a community irrigation system to improve domestic food supply;
- community mobilisation and education, such as teacher training based on the culture of local communities;

- increasing numbers of and training for community health agents to establish a basic health system;
- environmental education;
- organising the supply of consumer goods through the community warehouses to eliminate usurious middlemen.

The economic values of extractivism

Extractivism, by using non-timber products and conserving the forests, has less negative environmental impacts on the environment than other land uses, such as forest clearing for cattle farms. Comparing the poor economic performance of farming with the extractivist practices of traditional populations, it can be concluded that the extractivist economies are competitive and can support large communities.

Between 1975 and 1985 there was an increase in the total export of extractivist products, the types of products exported, and the prices gained for these products. Three products: (Brazil nuts, palms and 'carnauba'¹) accounted for more than 80% of the total value of extractive products in 1985.

Extractive households use a wide range of forest products. All the products (rubber \$430, Brazil nuts \$300, domestic animals \$140, hunting and fishing \$360, agriculture \$880, wild fruits, flowers, firewood etc. \$400) realise an annual income for each family of around US\$2,510. This represents a superior income compared to those who receive a minimum salary in the city and have to cope with high living costs.

Conclusion

Through the Extractive Reserves system, local populations continue to live on their native land, conserving biodiversity whilst earning a living. The communities demonstrate that ERs are a viable option for development. The income gained from extractive activities, improves the quality of life of the traditional communities. Thus local people have become self-sufficient.

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¹ Carnaúba' is a wax extracted from palm leaves for use in the cosmetics industry.

POTENTIAL PRODUCTIVE USE OF THE TROPICAL FORESTS OF GUATEMALA AS A STRATEGY FOR ITS CONSERVATION

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Summary

The Integrated Development Plan of Peten, Guatemala guarantees the sustainable use of timber and non-timber forest products and maintains the biodiversity of Petén's tropical forests. Approved activities include the collection of palm foliage, latex and allspice berries. The harvesting of these products is carried out in such a way that minimal disturbance of the forest ecology takes place.

Introduction

The Republic of Guatemala is located in Central America, between 14 —18° north and 88—92° east, with an approximate area of 109,000 km² and a population of nine million inhabitants. A central mountain range system is flanked by coastal plains, limestone hills and lowlands. In the latter is one of the most significant remnants of tropical forest in Central America. These forests are in the Department of Peten, in a northern zone of the Republic bordered by Mexico to the north and west and Belize to the east.

Guatemala's forests have been extensively exploited. By 1950, the only intact forests were in this northern region. Today, only 2,600,000 ha still remain of the original 3,600,000 ha (AHT/APESA 1992a).

Recognising the importance of conservation of the natural and cultural resources in the region, in 1990 Guatemala created the Mayan Biosphere Reserve of 2.1 million hectares. At the same time, with the financial and technical assistance of the German Government, a regional plan for the Department of Peten was initiated. The plan, developed over a two year period, determined the need for conservation of the important areas in the southern part of Peten.

As stewards of the land, the planning team of the Integrated Development Plan of Peten has the responsibility to secure the quality of life of present and future generations. The Plan provides a development strategy that guarantees the sustainable use of timber and non-timber forest products (NTFPs) in Peten and maintains the biodiversity of the tropical forests.

Potential sustainable uses of tropical forests

Part of the development strategy is to promote the sustainable use of NTFPs if utilisation has no detrimental effects on the forests or the specific resource that is harvested. Three particular traditional uses of the forest that show promising potential for sustainable use are the harvesting of palm leaves, the collection of latex and the collection of allspice berries.

Harvesting and exportation of palm foliage

Fresh palm foliage is of significant commercial importance to Guatemala. The following species are highly valued in developed countries for their foliage: 'Xate hembra' (*Chamaedorea elegans*), 'Xate macho o jade' (*Chamaedorea oblongata*), 'Cambray' (*Chamaedorea erumpens*), 'Tepejilote' (*Chamaedorea tepejilote*), 'Cola de pez' (*Caryota mitis*).

Guatemala and Mexico are the major exporters of 'xate', mostly to the United States, Germany and Holland (in order of importance). According to the data from the Vegetable Quarantine Department of the Ministry of Agriculture and Cattle Raising, Guatemala exported over US\$400,000 worth of green foliage during 1991.

In a study of two species of palm, *Chamaedorea elegans* and *C. oblongata*, it was estimated that there are over 490,000 ha in Peten that have an average of 1,225 plants/ha of either species. With two harvests a year, approximately 3.7 million leaves could be harvested annually (AHT/APESA 1992b).

Palm foliage can be exploited sustainably because harvesting is carried out throughout the year and, as only the leaf is harvested, the plant continues producing. Foliage collection is an alternate economic activity for a large number of rural inhabitants.

Harvesting and export of 'chicle'

'Chicle', the white latex of the 'Chicozapote' tree (*Manilkara* spp.), is the base for making chewing gum. Harvesting for export dates from the beginning of this century. For many years it was exported primarily to the United States but today Japan is the major destination of 'chicle'. During the 1980s, Guatemala exported between 564,000 and 1,123,950 Quetzales (currency with a value between US\$1.00 and US\$0.20 during that period) annually.

The latex is extracted by means of incisions in the bark between the base of the tree to the first fork of the stem. For latex extraction, the tree must have a minimum of 40 cm diameter at breast height and requires a recovery period of at least three years before it can be harvested again. Harvesting is only carried out during the rainy season when the latex is flowing. 'Chicle' harvesting is compatible with the conservation of Guatemala's natural resources as it has no negative effects on other elements of the forest, and only temporarily affects the tree itself.

Harvesting and export of allspice

Allspice, known locally as 'pimienta gorda', is the dried fruit of a small tree (*Pimento dioica*) that is found in the understorey of the tropical forest. The mature berries are either dried naturally or artificially and used as a condiment or as a flavouring and curing agent in processed meats and bakery products. Oil extracted from the leaves and nuts

is used in fruit-based products and in perfumes (Purseglove *et al.*, 1980). Locally, the leaves and seeds are used to make medicinal teas. The ancient Mayas used allspice to embalm the bodies of important persons.

Guatemala, Mexico, Belize, Honduras and Jamaica are the most important producers in the world. The United States has imported allspice from Guatemala since 1954, but it wasn't until 1959 that commercial harvesting began (Reining *et al.*, 1991). Between 1988 and 1989, the production increased from 373,000 kg to 500,000 kg, currently representing over 12.5% of world exports of allspice and a value of US\$875,000. The international market offers interesting possibilities, especially exports to Germany, Holland and other countries from Eastern Europe.

Allspice harvesting is not destructive to forest biodiversity as it can be carried out in a sustainable way without harming other species.

Other non-timber forest products

There are other NTFPs in the Petén's tropical forest that are of importance for industry and crafts, such as the vines and rattan that are used for making baskets and wicker furniture (*Philodendron* sp. and *Desmoncus* sp.). There are also many plants with ornamental potential value (*Beucornea* sp., 'izote pony') and medicinal qualities.

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USE OF NON-TIMBER FOREST PRODUCTS FOR RURAL SUSTAINABLE DEVELOPMENT IN CENTRAL AMERICA: THE EXPERIENCE OF THE OLAFO PROJECT

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Summary

The Olafo Project is based on the wise use of natural resources by indigenous communities, with the dual aims of improving community incomes and conserving natural ecosystems. Examples include ornamental and medicinal plant production in Costa Rica, Green Iguana farming in Nicaragua and the integration of timber and non-timber forest product exploitation in Guatemala. While the Olafo Project is still at an early stage of development, preliminary budgets indicate the potential viability of the concepts.

Introduction

The Conservation for Sustainable Development in Central America Project (called Olafo) was established in 1989 by the Tropical Agricultural Training and Research Center (CATIE), Costa Rica. CATIE is a regional center, which was established in 1942 by member countries (the six Central American nations plus Mexico, Venezuela and Dominican Republic). The centre carries out research, training and postgraduate education in tropical agriculture and natural resources management.

The Olafo Project was established to field-test a model of rural sustainable development, based on the wise use of native natural resources (mostly forests) by local communities. It is expected that the activities promoted by the project will simultaneously improve the income of local families and conserve natural ecosystems and biodiversity.

The following elements are the basis of the Olafo Project approach:

1. Use of indigenous resources. One of the main concepts of the project is biodiversity conservation through use, which requires a focus on indigenous resources.
2. Integrated approach. Every relevant aspect related to production must be considered including biological research, community organisation, marketing, economic feasibility

and legal framework. This makes Project activities very complex and costly. A piecemeal approach is less expensive but may not improve conditions for rural communities or give them more sustainable lives.

3. Different levels of complexity. It is necessary to identify and to differentiate goals and activities for the different levels of activity in the field. For instance, information is needed at the species level (growth, ecological requirements and reproduction of a particular plant); the ecosystem level (how the plant grows in relation with other plants, its distribution, its ability to compete, associated species, how it reacts to changes in light etc.); and the landscape level (problems of erosion, deforestation, conversion to agriculture).

4. Community participation. Project experience has confirmed the need for community participation and support of community groups, without the creation of dependence.

Olafo Project areas and activities

The Olafo Project is active in tropical rain forests (Costa Rica, Honduras, Panama), mangrove forests (Nicaragua) and sub-tropical forests (Guatemala) (Figure 1). Project areas represent different ethnic and social conditions; in Panama and Costa Rica the project works with native communities, while in the other areas the target group is mostly migrants of European ancestry (locally called 'latinos'). In Costa Rica the land and its resources are owned by the peasants, while in Panama the land is communally titled. In the other areas, communities extract resources from reserves and other national lands.

The Project has a multi-disciplinary team in each of these areas, which includes a forester, an agronomist, a social scientist, and an economist or biologist depending on the area.

Project activities are carried out in three stages. Stage I includes general fact-finding activities in each region, and ethnobotanical surveys to identify native resources used or known by local inhabitants. In Stage II, the selection of communities to be involved and resources to be exploited takes place. Stage III involves ecological and agronomic research to establish appropriate management practices, followed by the design and implementation of the project itself. Community development activities are carried out simultaneously, as well as organisational support for local groups interested in productive activities based on the resources already identified.

The Olafo Projects are currently at Stage III. First production cycles have been completed, allowing for preliminary analysis, as well as for ecological monitoring.

Since 1989, the Project researched and tested several activities. Some of them were successful, others not. Activities included:

- Ornamental plant (*Zamia skinneri* and *Reinhardtia gracilis*) production in Costa Rica.
- Medicinal plant (*Smilax* spp.) production in Costa Rica and Panama.
- Ornamental plant (*Chamaedorea elegans* and *C. oblongata*) production in Guatemala.
- Latex (*Manilkara zapota*, 'Chicle') production in Guatemala.
- 'Bayal' (*Desmoncus* sp. a vine similar to rattan) production in Peten, Guatemala.
- Palm heart extraction in /Panamá.

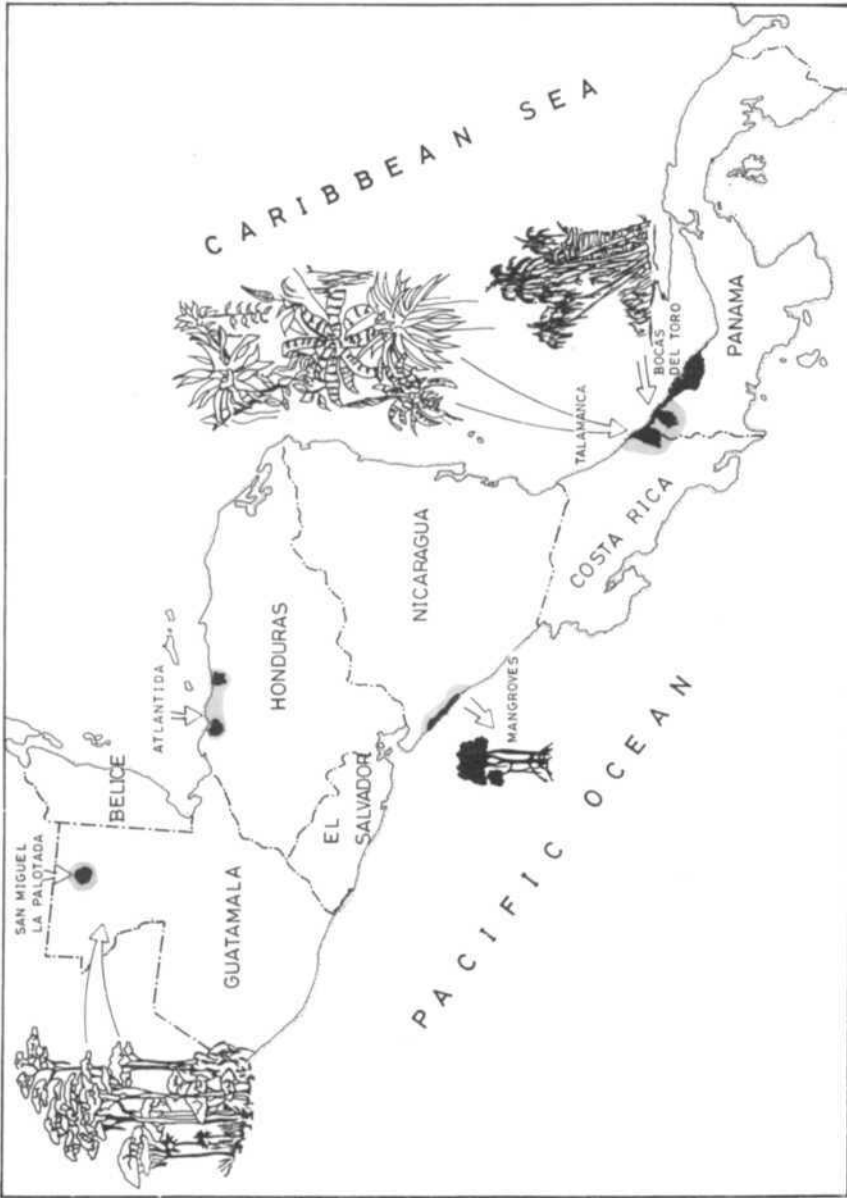


Figure 1. Olafo Project areas in Central America

- *Quassia amara* (medicinal- and insecticidal plant) production in Costa Rica.
- Green Iguana (*Iguana iguana*) fanning in Nicaragua.
- Fiber handicrafts (*Carludovica palmata*, *Heteropsis* sp. and *Philodendron* sp.) in native communities in Costa Rica and Panama.
- Wood and rattan (*Desmoncus* spp.) handicrafts in 'latino' communities in Guatemala and Nicaragua.
- Integration of timber and non-timber forest product (NTFP) management in Guatemala and Costa Rica.

Four of the more advanced activities of the Project are discussed in this paper.

Ornamental plant production in Costa Rica

Background

Two ornamental plants occurring in the Talamanca area of Costa Rica, *Zamia skinneri* (Zamiaceae) and *Reinhardtia gracilis* (Arecaceae), were chosen by the project for their market potential, despite the fact that their growing rate is slow (3—5 years for market plants). *Z. skinneri* seeds were collected for propagation, while *R. gracilis* is propagated vegetatively from the 2—3 plantlets that are produced annually.

Production Scheme

As 'latino' peasants of the area own their farms and work on an individual basis, production was organised around three features: individual forest plots, a common nursery, and common marketing. The average farm in the area covers 50 ha; at least 50% is natural forest, usually lightly logged, while the remainder is pasture. Most of the peasants are cattlemen keeping 30—40 animals each.

Peasants began by enriching the forests on their farms with both species. Plant material was collected from patches in their own forests or by taking plants from forests destined for intensive logging. Having enriched their forests, half the plant production was retained to continue the enrichment and the other half was sent to the nursery.

Plants are grown-on in the nursery. Once they are ready for market, the plants will be sold by the nursery to exporters.

Organisation

The nursery is run by a group of peasants organised in a legally established association (14 members), with their own administration and accounting and after receiving proper training. They buy seeds and plantlets for on-growing and sale. The nursery group borrowed money from a revolving fund, established by the project, to buy nursery equipment. The nursery is a marketing enterprise, managed by all participants as a non-profit exercise to maximise benefit for the farm.

Preliminary financial analysis

The production process has not yet completed its first cycle. Work at the forest level started three years ago and is well advanced, with participating peasants establishing 400—500 mother plants of each species. The nursery was completed early this year. Preliminary budgets for an individual farm is shown in Table 1 and for the nursery in Table 2.

Table 1. Preliminary annual budget for the individual farms selling *Zamia skinneri* and *Reinhardtia gracilis* to the nursery

Item	Value (US\$)
INCOME ^a	140
VARIABLE COSTS (nil)	-
GROSS MARGIN	140
NET MARGIN (no fixed costs)	140
Daily return to labour (8 days/yr)	18
Average daily cost of labour	5

^a1kg of *Z. skinneri* seeds @ US\$40
400 plantlets of *R. gracilis* @ US\$0.25 each

Table 2. Preliminary annual budget for the nursery dealing in *Zamia skinneri* and *Reinhardtia gracilis*

Item	Value(US\$)
INCOME ^a	6,250
VARIABLE COSTS (purchase plants and seeds, operating costs)	2,085
GROSS MARGIN	4,165
FIXED COSTS (depreciation and loan repayment)	1,800
NET MARGIN	2,565
Daily return to labour (400 days/year)	6
Average daily cost of labour	5

^a 2,500 plants of *R. gracilis*/yr @ US\$1 each
3,000 bulbs of *Z. skinneri*/yr @ US\$1.25 each

***Quassia amara* production in Costa Rica**

Background

Quassia amara (Simaroubaceae) is a native of the neotropical, lowland, humid forests and is used for medicinal purposes with additional potential as a natural insecticide. Small trees (5–6 m high) of *Q. amara* grow both in the forest understory and in the cleared areas. Trees flower and fruit annually. Their seeds have good viability, but they must be planted within a month of collection because they lose vitality quickly.

While most parts of the tree contain the active principles (quasinoids), users prefer to make an aqueous extraction of the quasinoids from the wood. It was decided to focus research on extraction from woody growth use of quasinoids as natural insecticides.

Simultaneously, other national institutions carried out toxicological studies, identified insect pests that could be controlled with the product and developed laboratory techniques to measure active principles.

Production scheme

The project chose the native community (30 families) living in the Kekoldi Indian Reserve in Talamanca, Costa Rica, to start working with *Q. amara*. Ecological studies were carried out on the wild population, as well as research on reproduction and regrowth rate after harvesting trunks and branches. The average density of *Q. amara* in Kekoldi is 130 plants/ha, an average of 2.5 kg wood/plant is obtained in each cut, with the trees cut once every 30 months.

A local biochemical company was identified to carry out the extraction and marketing of quasinoids. The company bought *Q. amara* wood at US\$0.25/kg to make preliminary market tests, promising to buy 500 kg a month for one year. The company will attempt to introduce *Q. amara* formulations into the USA market for natural insecticides.

Forest inventories and growth studies, carried out at the first stage, were used to design an extraction cycle to allow time for regrowth.

Organisational scheme

The organisation of this project was very simple because the rights of native families to use the resources of the Reserve were clearly established. Every month, different families harvest the wood from their land according to the agreed management plan. At this first exploratory stage, four families are providing the amount of wood required by the industry. The Reserve Association established a *Q. amara* nursery in 1993 that produced 5,000 plants to enrich the forest and to introduce this species into their agroforestry systems with cocoa (*Theobroma cacao*) and other species. There is ample potential to expand this production using wild populations in nearby forests.

Preliminary financial analysis

Based on the first extractions, a preliminary budget was completed for an annual period, based on the present extraction level of 500 kg of wood per month (Table 3).

Table 3. Preliminary annual budget for *Quassia amara* extraction

Item	Value (US\$)
INCOME ^a	1,500
VARIABLE COSTS (transport)	420
GROSS MARGIN	1,080
NET INCOME (no fixed costs)	1,080
Daily return to labour (180 days/year)	6
Average daily cost of labour	5

^a6,000 kg of wood @ US\$0.25/kg

If additional demand is generated at current prices, it is estimated that a family would use 1 ha of forest per month. As 30 months are required for forest recovery, each family must have access to 30 ha of forest, which is acceptable for the Kekoldi Reserve. An annual family income of US\$540 could be earned from harvesting *Q. amara*. This is roughly equivalent to a half of their present annual income. An additional aspect to consider is that the present prices pay for labour only, while the resource is taken at almost no charge. This factor must be considered when establishing a more equitable price for the product.

Farming Green Iguanas in Nicaragua

Background

Project activities in Nicaragua are focused on the western coastal mangrove forests. The main activity in the area is fuelwood extraction from mangrove forests. Other non-traditional activities are carried out to improve income and alleviate pressure on mangrove resources; one of these activities is Green Iguana (*Iguana iguana*) farming. Green Iguanas are hunted in Nicaragua for their meat and leather and there is also a demand for small animals as pets in some developed countries. Farming of Green Iguanas has been carried out in Central America for the past decade and techniques have been developed for egg incubation, designs of cages and food sources.

Production scheme

There are wild populations of Green Iguana in the mangrove areas and there is a limited market for small iguanas (as pets in Europe and North America.) In 1993, the project selected two families in the Colonia Alemania Federal of Nicaragua to test the feasibility of introducing iguana farming to the area.

Appropriate growing facilities were built by the pilot farmers and 24 female iguanas were captured by each family as the basic stock. Eggs laid were incubated and they hatched after two months; the young were ready for sale at three months of age. Seventy five small iguanas were sold for US\$2/each to a local firm for export as pets. Iguanas are fed on fruits and leaves from local trees. The experience gained, coupled with a higher demand, led to expansion and the stock was enlarged to 160 females in 1994. There is provision to return at least 320 animals to the wild at one year of age to replace those taken.

Organisational scheme

The experience of 1993 was very limited and was carried out at the family level. Each family received support from the project to establish small facilities but they tended the animals and sold them without assistance.

Preliminary financial analysis

Being the first experience of this kind for peasants there were problems: of the 24 females captured, 13 of them laid a total of 350 eggs from which 300 iguanas hatched; over 30% of the females died; 50% of the young iguanas escaped; 75 young were sold and 30 were kept for future breeding.

A preliminary budget by family, assuming that the management problems of 1993 are solved, is shown in Table 4. The feasibility of this project will be influenced by the export market as many other families are starting to grow Green Iguanas for sale as pets. Other possibilities include the production of larger animals for human consumption and/or leather.

Table 4. Preliminary annual budget for farming Green Iguanas

Item	Value (US\$)
INCOME ^a	2,252
VARIABLE COSTS (operating costs including food)	220
GROSS MARGIN	2,032
FIXED COSTS (depreciation, loan repayment)	849
NET INCOME	1,183
Daily return to labour (182 days/yr)	7
Average daily cost of labour	2

^aAssumptions used in the Table are: 50 mature females with a mortality of 10%, 23 iguanas hatched per female, loss of young 2%, 1,126 iguanas sold at US\$2 each.

A combination of timber and non-timber products extraction in Guatemala

Background

The simultaneous utilisation of timber and NTFPs seems logical. The long periods between successive timber extractions could be used for the extraction of NTFPs to generate income. Moreover, several non-timber species will benefit from the patches opened by the extraction of large trees.

This attractive conceptual framework is hampered by the fact that very little is known about ecology, physiology and production of NTFPs. To address this situation, the project established permanent plots in the forest to identify both timber and NTFPs and to be able to monitor the succession of NTFP populations after logging.

In Peten, Guatemala, the Olafo Project is working with a group of landless peasant communities (39 families) to diversify management of the forest. These communities inhabit the multiple-use area of the Maya Biosphere Reserve, and, with the support of the Project, they gained the rights to use 5,000 ha of forest for diversified management (extraction of both timber and NTFPs). The main NTFPs are: rattan (*Desmoncus* spp., 'bayal'), palm foliage (*Chamaedorea elegans*, *C.oblongata*, 'xate') and a tree whose latex was used for chewing gum and is currently used for adhesives (*Manilkara zapota*, 'chicle').

The community felt that the key action to ensure sustained extraction was to link timber extraction with local processing. Thus no timber will be sold as logs; it must be processed in some way. In this way, the amount of timber extracted is not limited by the capacity to cut, but by the community's capacity to process the timber from raw material to products. The use of timber for handicrafts, furniture, etc. was encouraged.

Production scheme

The production scheme is guided by a management plan. The area to be logged is delimited and the trees marked. Before logging, NTFPs are extracted. Logging begins in the dry season, marked trees are cut and transported to the (San Miguel) village for processing during the rainy season.

The extraction of 101 trees in 1994 from the first 40 ha will take 11 people two months, and processing the logs to planks will take 11 people another three months. As peasants also need time to tend their crops, three groups of 11 persons will rotate weekly. Furniture building is a full-time job for another three persons who were trained in 1993. Another seven people will focus their activities on NTFP extraction and production of handicrafts to be sold to tourists.

With a forest rotation of 60 years and by doubling the extractive area, full-time jobs will be provided for every person in these communities. Increasing local processing will incorporate more people. It is also expected that new information about NTFP behaviour after logging will improve management and allow new users. Moreover, the project is currently working with 3 — 4 NTFP species while ethnobotanical studies have found more than 100 such species in these forests.

Organisational scheme

The people participating in these activities are organised in a legally established group, the 'Asociacion de San Miguel' (San Miguel Association), which gives them the legal status to operate, to buy and sell goods and to have access to credit.

Preliminary financial analysis

A preliminary budget was prepared for the first 40 ha block to be worked in 1994. The results are shown in Table 5.

These preliminary figures require some comments:

1. The income generated by NTFPs seems low in comparison with timber income. However, the local people use collection of NTFPs to fill gaps in the labour cycle. NTFPs will be harvested in the intervening years while the area is fallow and income may increase as the number of species used increases.
2. The analysis of the overall cycle is complicated because of the lack of data about NTFP density in the 5,000 ha and the growth rate of timber and NTFP species after logging. Other issues also complicate the analysis such as changes in the timber market due to the exhaustion of *Swietenia* and *Cedrela* by over-logging.
3. Proper analysis of the economic potential of NTFPs under this management will not be possible before the study of the reaction of NTFP species to logging.
4. Makers of handicrafts make approximately US\$200/month from their activities.

Table 5. Annual budget for diversified extraction of 40 ha of forest

Item	Value (US\$)
INCOME (first year)	
Timber ^a	41,000
NTFP ^b	<u>400</u>
TOTAL INCOME	41,400
VARIABLE COSTS (first year)	
Timber (Inventory, demarcation, logging, equipment rental, planking, transport, silviculture)	22,500
NTFP	<u>NIL</u>
TOTAL	22,500
GROSS MARGINS	
Timber	18,500
NTFP	<u>400</u>
TOTAL GROSS MARGIN	18,900
FIXED COSTS	
Timber (depreciation, loan repayment)	3,900
NTFP	<u>NIL</u>
TOTAL FIXED COSTS	3,900
NET INCOME	
Timber	14,600
NTFP	<u>400</u>
TOTAL NET INCOME	15,000
Daily return to labour	
(a) Timber (512 days/yr)	29
(b) NTFP (170 days/yr)	2
Overall return	22
Average daily cost of labour	4

^aClass I species (*Swietenia*, *Cedrela*), Class II species

^b*Chamaedorea* spp., *Desmoncus* spp.

Potentials and constraints of the Olafo approach

The potential and constraints of the project approach discussed above are summarised as follows:

Potential

The approach used by Olafo Projects appears suitable for:

- producing real changes in the wellbeing of rural communities and empowering them to control their lives and income generation;
- integrating experiences from several fields in a single framework of analysis and actions;
- completing the process that converts locally used species into marketable products that can support new productive processes and generate additional income.

Constraints

Olafo Projects have the following constraints:

- they are valid only in areas with natural ecosystems that can support use these areas are becoming smaller and harder to find;
- they are complex and require strong coordination, the supervision of a truly multidisciplinary team, and time;
- they are expensive, as professional staff in several fields are needed for long periods of time. On the other hand, why should the promotion of sustainable rural development be cheap?

Conclusion

It is clear that the Project has not yet achieved its objectives, but the experiences gathered in all these activities during five years has left valuable lessons. Most are specific to places and activities, others are more general. It is expected that the projects will motivate others to follow this process, or to criticise it, or to enrich it with other experiences. Any of these reactions will contribute to sustainable development for our own benefit and for the generations to come.

NON-TIMBER FOREST PRODUCTS IN LATIN AMERICA: AN OVERVIEW

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Summary

Non-timber forest products are today being viewed as legitimate sources of livelihood for local communities. By forming associations, extractivists have achieved some success in having their rights to exploit forested areas recognised and enshrined in legislation and/or receiving increased prices paid for products. The development of legal systems of non-timber forest product use has not been without problems. Communities should be involved in decision-making on the management of the forest resource.

Introduction

For many years, conventional forestry considered that timber was the main if not the only product that could be obtained from tropical forests. The preoccupation with short-term benefits by logging companies frequently resulted in bad management techniques that, coupled with the vulnerability of tropical forest ecosystems, caused significant damage to primary forests. In many cases, forest concessions and timber exploitation have been carried out against the interests and the will of forest-dwelling people, causing serious social conflicts.

An understanding of the importance of non-timber forest products (NTFPs) has gradually developed amongst some forest managers and conservationists, yet the people using those resources have always understood their importance. Some forest-dependent communities have been successful in organising themselves to protect their livelihood. The most notable case in Latin America is that of the Brazilian rubber tappers, whose activities have led to the creation of extractive reserves for rubber exploitation by local communities (Allegretti, 1989). Several international organisations such as FAO, the World Bank, the International Tropical Timber Organisation, the World Wide Fund for Nature, Conservation International and Cultural Survival have developed projects to explore the potential of and support for the activities of people who depend on NTFPs. The conservation community was slow to embrace this philosophy as some sectors were more concerned about the possible impact of extracting NTFPs on tropical forest biodiversity than about the positive effects of maintaining forest cover and consolidating an alliance with forest-dwelling people.

In October 1992, a workshop on NTFPs, jointly organised by the Forest Conservation Programme of IUCN and the General Directorate for the Environment of the Commission of the European Union, took place in the Amacayacu National Park of the Colombian Amazon. Twenty-nine experts from ten Latin American countries and several international organisations met to discuss their experiences and to make joint proposals (Ruiz Perez et al., 1993); this paper draws on the activities of this meeting.

A Framework for the Use of Non-Timber Forest Products

The use of NTFPs has been considered as 'primitive' by the dominant culture. The advance of modern agriculture, and other development activities, has adversely affected many forests and the people who depend on them. Alarming deforestation, and the failure of conventional forestry techniques to efficiently exploit timber from tropical forests, necessitated a change in attitudes towards NTFPs. Interest turned towards the people who depend on forests and it was realised that sustainable use of the resources is essential to give a social value to forests and thus to conserve them.

That which was formerly considered to be marginal and backward is now gaining ground as an alternative to or a complement to timber exploitation. Case studies to illustrate the potential of NTFPs have been carried out in the three main tropical areas of the world (see de Beer and McDermott (1989) for South East Asia; Falconer (1990) for humid West Africa; Nepstad and Schwartzman (1992) for Latin America). In all cases, the use of NTFPs is combined to some extent with different forms of agricultural activities. The main reasons for using forest products are a diversification of diet, reduction of risks and to earn a supplementary income (Falconer and Arnold, 1989).

A combination of NTFP use and agriculture is proposed for extractive communities. This would take place along a gradient between primary forest and intensive agriculture and would buffer the household economies of the communities. The presence of agriculture will not necessarily degrade the forest because the differences between domesticated and wild plants or between natural and managed forests is not clear cut in Latin America (Dufour, 1990). In fact, a significant part of what is considered natural forest in the Amazonian region has had a clear human influence. From this perspective, extractive activities can be considered as intermediaries between biodiversity and biotechnology.

NTFPs are usually extracted from areas where a form of public property (common or state-owned lands) predominates. Traditional cultures have developed complex systems to regulate access to these resources, which take into account individual rights, quantities and reasons for harvesting. These traditional norms can be considered as proto-management plans. External market systems have frequently interfered with traditional management systems, with serious impacts on the resources being used.

Overview of the situation in Latin America

Numerous examples of NTFP use in tropical forests can be found in most countries of Latin America. Two basic approaches for NTFP use can be identified: the indigenous (descendants of American inhabitants before the arrival of Europeans, i.e. Native American Indians), and the 'Campesino' (peasants recently or long ago settled and culturally mixed) (Vickers, 1984; Redford and Robinson, 1987; Dufour, 1990).

The hunting and gathering activities of the indigenous communities are more centred on home consumption, with sale of products playing a secondary role. These communities obtain a large variety of products and, given the limited means of production and access to market, exert little pressure on the resources. However, the use of some animals, such as primates, ungulates and large birds, may cause significant local effects.

The 'Campesino' have a stronger market orientation and use a smaller number of products than indigenous communities. Market signals, through high demand and prices, may lead to pressure on the resources and the risk of over-exploitation. In this case, regulatory measures are considered urgent.

Unfortunately, the effects of extracting NTFPs on the biodiversity and functioning of tropical ecosystems is not well known. Contradictory evidence may have arisen from differences in human culture, the taxonomic groups studied, and size of the study area as well as the distance of the study area from a large market (Bodmer et al., 1988; Vickers, 1991; Prance, 1992; Redford, 1992). However, it seems that the use of NTFPs allows for a high degree of biodiversity conservation, in particular when compared with other alternatives common to the region, such as conversion of forests to low-productivity pasture.

The legal development of NTFP use in Latin America has centered on aspects of property and resource management, both in the indigenous and 'Campesino' situations. Most countries of the region have recognised some indigenous rights, having signed Convention 169 of the International Labour Organisation. Different types of indigenous territories have been established, although the situation is far from ideal (Brackelaire, 1992; Davis and Wali, 1993; Grenand and Grenand, 1993). Abuses, pressures to integrate into the dominant society and sporadic violence can still be found in indigenous communities. Moreover, many indigenous people's land claims have not yet been satisfied.

For non-indigenous communities, legal developments came much later; Brazil being the pioneer through the organisation of extractive communities and the subsequent creation of extractive reserves. Similar forms of land allocation exist in several countries such as the Communal Reserves in Peru, the Special use Reserves in Colombia, and Biosphere Reserves in Guatemala, Costa Rica and Venezuela. The common problems that occur in these reserves are summarized below:

- The use of the decree as a legal instrument is insecure. It is vulnerable to political changes, since it can be over-ruled by the government without consulting Parliament.
- Conflicts occur between nature protection laws and extractive activities.
- Difficulties are experienced with land delimitation
- Approval procedures take a long time and communities become frustrated.
- Difficulties in preparing and implementing management plans are common.

The institutional situation is also variable, with a clear distinction between those institutions dealing with indigenous territories and those normal associated with conventional nature conservation. An important element in the success of institutions is the participation of the local communities. Their empowerment, in the form of their ability to control resource exploitation, can be found in most countries usually, though not exclusively, linked to indigenous territories.

Some economic measures to support extractive activities have been taken, such as the decrees to maintain prices and promote consumption of nationally produced rubber in Brazil and the Chewing Gum Law ('Ley del Chicle') in Guatemala to distribute the benefits from the exploitation of the gum (between collectors, traders and managing institutions). Marketing is normally the weakest point of extractive economies, due to the frequent concentration of benefits by intermediaries, and to weak and scattered markets and infrastructures. The case of Brazil nuts (*Bertholletia excelsa*) illustrates the situation well. The producers of Brazil nuts only receive 3% of the price that consumers pay for the product in New York (Ryan, 1991). This situation is not uncommon. Thus, the producers of allspice (*Pimenta dioica*) and 'xate' (*Chamaedorea spp.*) in Peten (Guatemala) receive 31% and 13% respectively of the retail price¹, despite the fact that no processing of the product takes place before sale (CATIE, 1992). It is worth comparing this with the situation of the chewing gum producers in the same region, organised under producer associations and protected by the 'Ley del Chicle', who receive 42% of the retail price.

In order to improve the situation, there have been some national initiatives, like the 'Cooperativa agro-extractivista de Xapuri' in Acre (Brazil) or the Centre for Marketing of Indigenous Products (CEPAI) in Venezuela. International initiatives have also developed, like the ones undertaken by Cultural Survival, Conservation International, OXFAM and Magazines du Monde. They try to link local producers with foreign consumers through product promotion and reduction of transaction costs. Coupled with local processing and value adding, they are meant to help the development of local communities. Although they have been sometimes criticised on the grounds of political naivety and diversion from the real issue (Dove, 1993; Corry, 1993), they have frequently offered clear support to local communities in the Neotropics.

Conclusion and Recommendations

The Amacayacu workshop produced 72 guidelines and recommendations, which are summarized as follows:

1. The need for more research, particularly in the areas of:
 - knowledge of extractivist communities,
 - ecological studies to determine optimal harvesting levels,
 - analysis of economic and legal policies to promote sustainable use of biodiversity, and
 - design of new conservation areas that combine in a mosaic approach total protection with multiple-use forests.
2. NTFPs should be clearly recognised as a legitimate use of forests, with accompanying measures that guarantee the right of use.
3. Planning and local regulations should preferably be established by the communities, so that the regulations are compatible with local cultures and languages. The role of government agencies could be to guarantee the matching of local interests and rules with general norms and to help the enforcement of both.
4. Different legal instruments related to forest management at a national level should be harmonised. Good general laws that can be adapted to the local situation are

recommended. Both laws and institutions should be flexible enough to adapt to changing conditions.

5. A real participation of the communities at all levels of decision making is required. This implies a clear recognition of the rights of local associations and the development of suitable mechanisms to influence government decisions. Efforts should be made to incorporate user groups, such as women, that have traditionally been isolated.

6. In multiple-use forests, small representative areas should be kept under total protection as biodiversity reservoirs.

7. To allow for forest recovery, resting periods should be prescribed and monitored. Certain extraction techniques, such as hunting with guns and the netting of birds and fish, should be controlled.

8. Some management, enrichment and semi-domestication can improve the harvest, thus improving efficiency and reducing environmental pressures.

9. To maintain extractivism as viable economic activity, it is recommended to:
seek new sources of income by diversifying extractive activities
domesticate local plant species for agroforestry
improve the subsistence agriculture associated to the use of NTFPs.

10. Priority should be given to improving present technologies, developing new ones and adding value at the local level. Special attention should be given to quality controls and product conservation techniques.

11. The social and environmental services of NTFPs should be recognised. Direct (prices, credits, technical assistance) and indirect (education, social services and infrastructure, taxation measures) values should be developed to remunerate these services.

12. A closer contact between producers and consumers is desirable. National and international non-profit organisations can help to promote these contracts. Price agreements between producers and processing plants and a better seasonal and spatial distribution of the product are recommended.

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¹ In the case of 'xate', losses of 50% of the leaves are frequent and should be considered when making comparisons.

IV COUNTRY OVERVIEWS

In the following section, country-specific information is provided about forest cover, deforestation, forest management and non-timber forest products. Maps of forest reserves are included wherever possible. The information is based on several sources:

- The data on forest cover and deforestation are taken from: FAO. 1995. Forest resources assessment 1990—global synthesis. *FAO Forestry Paper* 124. Rome: FAO.
- Information about forest management is taken from: Sayer, J.A., Harcourt, C.S. and Collins, N.M. 1992. *The conservation atlas of tropical forests—Africa*. Basingstoke: Macmillan and IUCN.
- Additional information was derived from country-specific references, presentations and information provided by the workshop participants. These sources are mentioned in the bibliography at the end of each country overview.
- Maps were drawn by the World Conservation Monitoring Centre, Cambridge, UK.

BENIN

Introduction

Forest cover: 49,610 km², approximately 45% of the total land area. Figure 1 shows the current status of Benin's forests.

Benin's forests are mainly relict fragments; the largest being the Lama Forest in the south-west covering which covers 50 km². While the biodiversity of the forest remnants is important at the national level, fragmentation of the forest resource has reduced its importance at the regional or international level. The exception to this is the elephant population in the W du Benin National Park which is one of the largest in West Africa. Many animal forest species are rare and/or their populations are declining. In Pendjari National Park, antelopes comprise the largest group of fauna and their numbers are increasing.

Annual deforestation rate: estimated to be 650 km² between 1980 and 1990.

The chief causes of deforestation are fire, encroachment for agriculture and grazing, and excessive logging for illegal export of timber products.

Many of the forest remnants occur in savanna areas where previously high densities of disease vectors resulted in low human population density. The control of these vectors, and a resultant increase in human activity, has exposed the remnants to deforestation.

Management institutions, legislation and policy

Several government departments are responsible for the management of classified forests and protected areas. These include the Directorate of Forests and Natural Resources, the Ministry of Tourism and Hotelries, the Ministry of Rural Development, the Ministry of the Environment, Habitats and Town Planning and the Ministry of National Education.

Legislation enacted in September 1987 regulates the use of wild pasture, hunting and nature conservation in general. In 1995, classified forest reserves covered 21,893 km² and national parks and fauna reserves covered 16,374 km². Management plans for forest reserves provide for controlled logging and regulated use of other forest resources by local people.

Key non-timber forest products

A large proportion of forest products are used at the village level and are therefore unrecorded. Palms provide materials for household utensils, roofs, baskets, crop drying racks, storage bins and fish traps. Palm oil is produced primarily for household use. Mushrooms

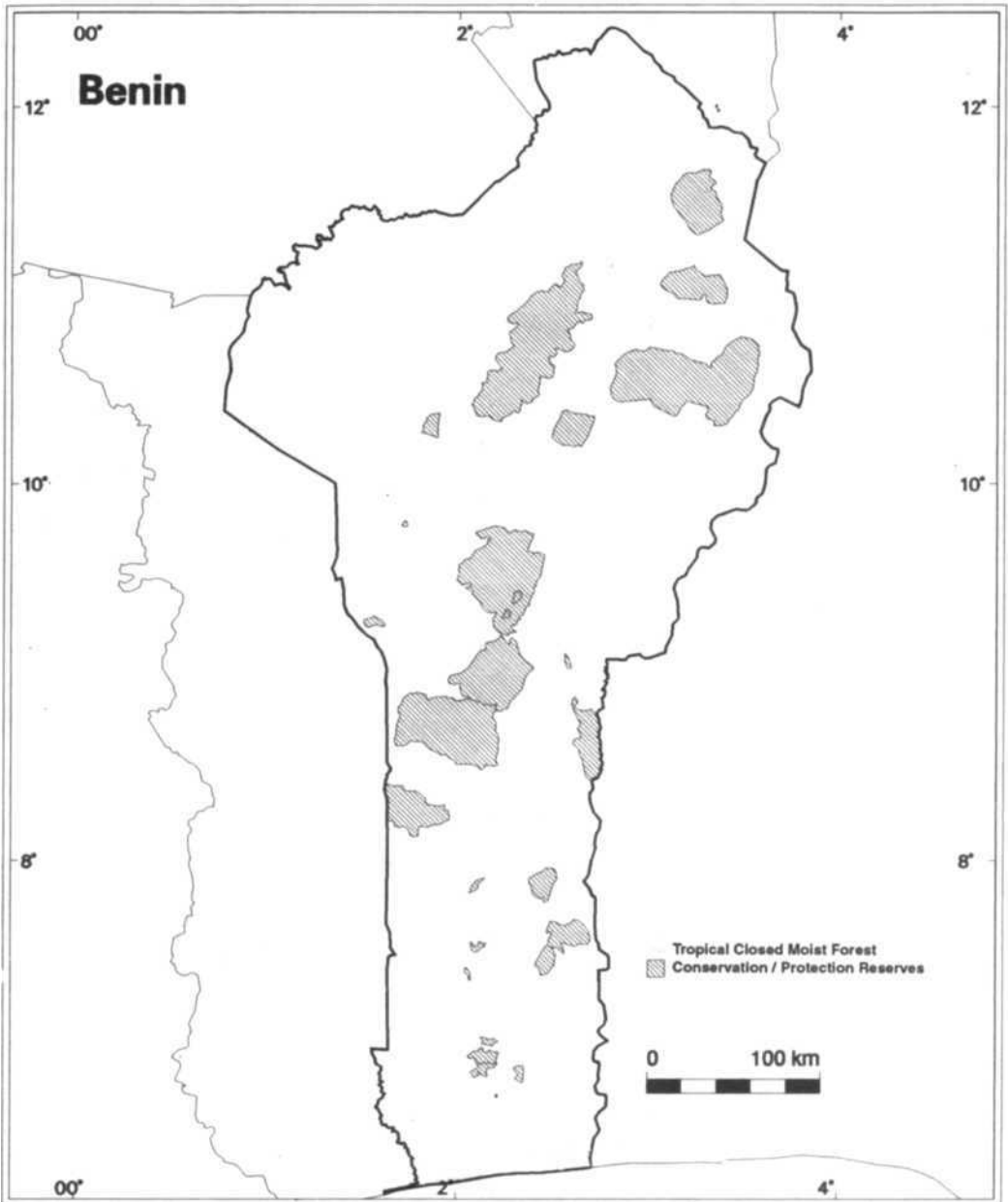


Figure 1. Forests of Benin

and vegetables are collected and it is estimated that 10% of vegetables marketed are gathered from the wild. Bark from certain forest trees is added to palm wine for flavouring and to speed up the fermentation process.

Bush meat is preferred over domestic meat and is commonly sold in markets. The grasscutter (*Thryonomys swinderianus*) is the most favoured species although other cane rats are also eaten.

Special initiatives

Three on-going programmes address the issue of non-timber forest product development. *Projet de Gestion des Ressources Naturelles pour les Fdrets Naturelles* focuses on the management of natural forests while *Projet Bois defeu pour les plantations domaniales et Rurales* and *Office National du Bois pour les plantations domaniales* focus on the management of private forest plantations.

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BOTSWANA

Introduction

Forest cover: 142,620 km² or approximately 25% of the total land area. Botswana's forested areas are shown in Figure 1.

Open, savanna woodland is the most widespread habitat.

Annual deforestation rate: estimated at 770 km² between 1980 and 1990.

The chief causes of deforestation include drought, over-grazing, shifting agriculture and excessive felling of trees.

Management institutions, policy and legislation

The Division of Forestry is responsible for the management of forest reserves and implements the Forestry Act of 1976, which is currently under review. The Department of Wildlife and National Parks is responsible for the management of national parks, game reserves and wildlife management areas. Protected areas and forest reserves cover 17% of the country's total land area.

Since 1993, the government has been pursuing a policy to encourage local communities to utilise and manage their natural resources on a sustainable basis. A few wildlife management areas have been demarcated and handed over to communities that have been sensitised on the benefits of sound management practices.

Key non-timber forest products

Plant products include foods (leaves and fruits), traditional medicines, thatch grass, dyes, gums, resins, leaves and fibres for handcrafts. Ornamental plants are also collected.

Wild animals are hunted for meat and to obtain trophies. In the wildlife management areas that are managed by local communities, safari companies may purchase the exclusive right to game hunting and pay a fee for every animal shot. Mopane worms (caterpillars of *Gonimbrasia belina*) are collected, cooked, dried and sold. Approximately \$2—3,000,000 worth of worms are exported to South Africa annually.

All the traditional non-timber forest products (NTFPs) are harvested by women and children. Men dominate the exploitation of wild game, particularly the marketing of mopane worms and game products.

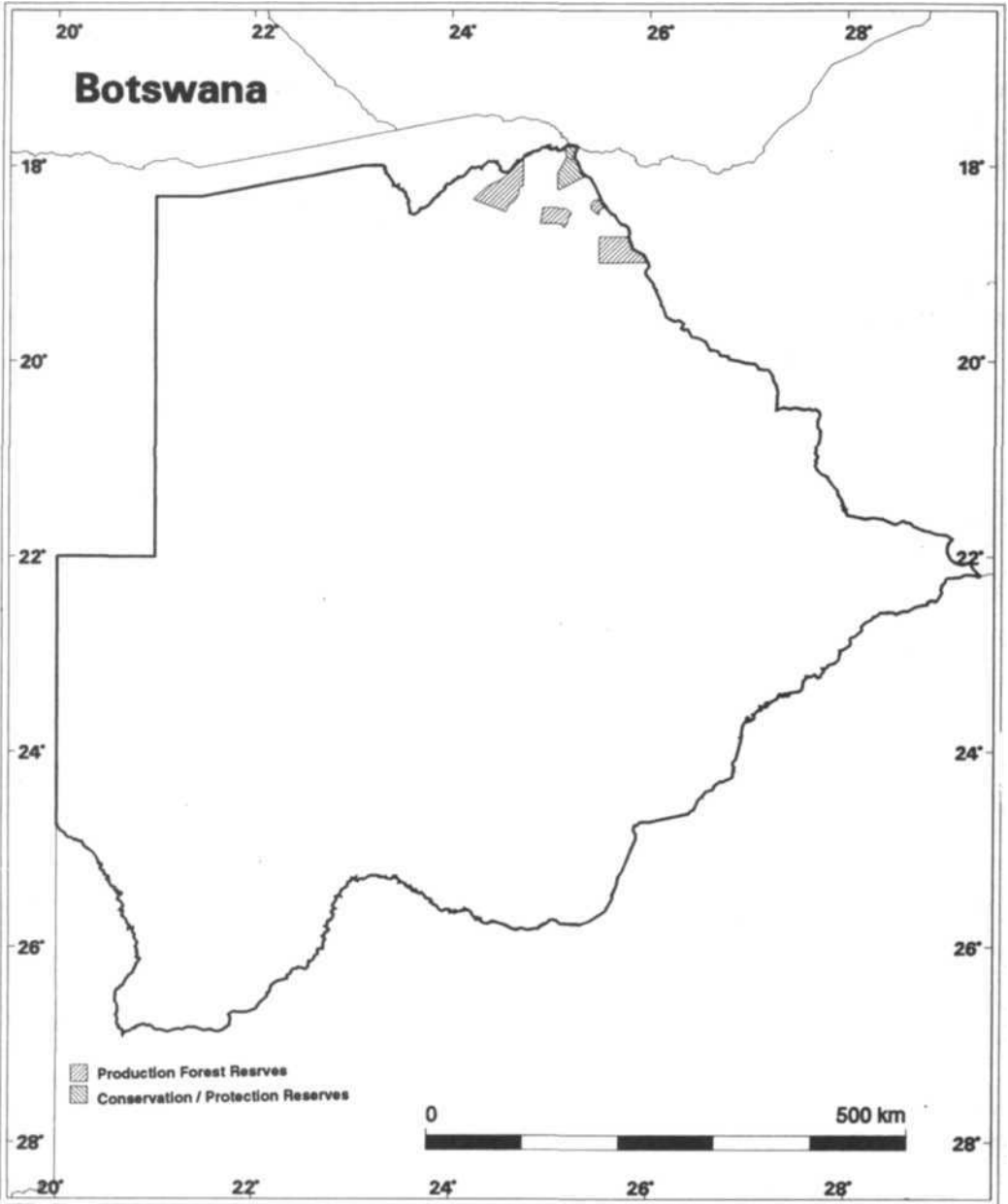


Figure 1. Forests of Botswana

Special initiatives

Currently, efforts are underway to encourage the domestication and genetic improvement of some indigenous species of fruit trees, food plants and one medicinal plant. Although the local people are aware of the increasing magnitude and impacts of environmental degradation, they have not been able to develop their own programme to reverse the trend. This problem is now being tackled on a pilot project basis through an NGO (Veld Products Research), using an innovative holistic approach which involves capitalising on the growing importance of NTFPs, most of which are not commercialised, and encouraging the communities to develop their own strategies to utilise and manage their natural resources on a sustainable basis.

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CAMEROUN

Introduction

Forest cover: 203,660 km²; approximately 44% of the total land area. Cameroun's forest cover is shown in Figure 1.

The forests of Cameroun are very diverse and comprise a major centre of endemism for both flora and fauna. The montane forests support 22 endemic species of birds and the lowland forests are of particular importance for the conservation of rare primates. By 1992, Cameroun was the world's largest exporter of tropical timber.

Annual deforestation rate: estimated at 1,220 km² between 1980 and 1990.

The chief causes of forest destruction and degradation are excessive logging, encroachment for agriculture and fire.

Management institutions, legislation and policy

The Forestry Directorate, within the Ministry of Environment and Forestry, is responsible for the formulation and implementation of forest policy, the preparation of regulations and the coordination of management plans. The Directorate applies forest legislation with respect to production and protection forests and the control of forest exploitation.

The National Office for Forest Development is responsible for forest inventories, the development of management plans, the promotion of wood and wood products, and management to promote the regeneration of forests on state land.

The Ministry of Tourism is responsible for the protection and management of national parks and other protected areas. There are 29 forest reserves, seven national parks and seven wildlife reserves. Despite the existence of well defined policy guidelines, management plans are lacking and execution of work depends on decisions made by local forest officers.

Forest management in Cameroun is chiefly concerned with addressing the following:

1. rapid deforestation and degradation in montane, coastal evergreen and semi-deciduous forests;
2. the degradation of water resources and soils as a result of deforestation, which leads to reduced land fertility and food security;
3. the need to increase revenue and foreign exchange earned through the timber industry;
4. the development of appropriate management plans to implement forest policy.

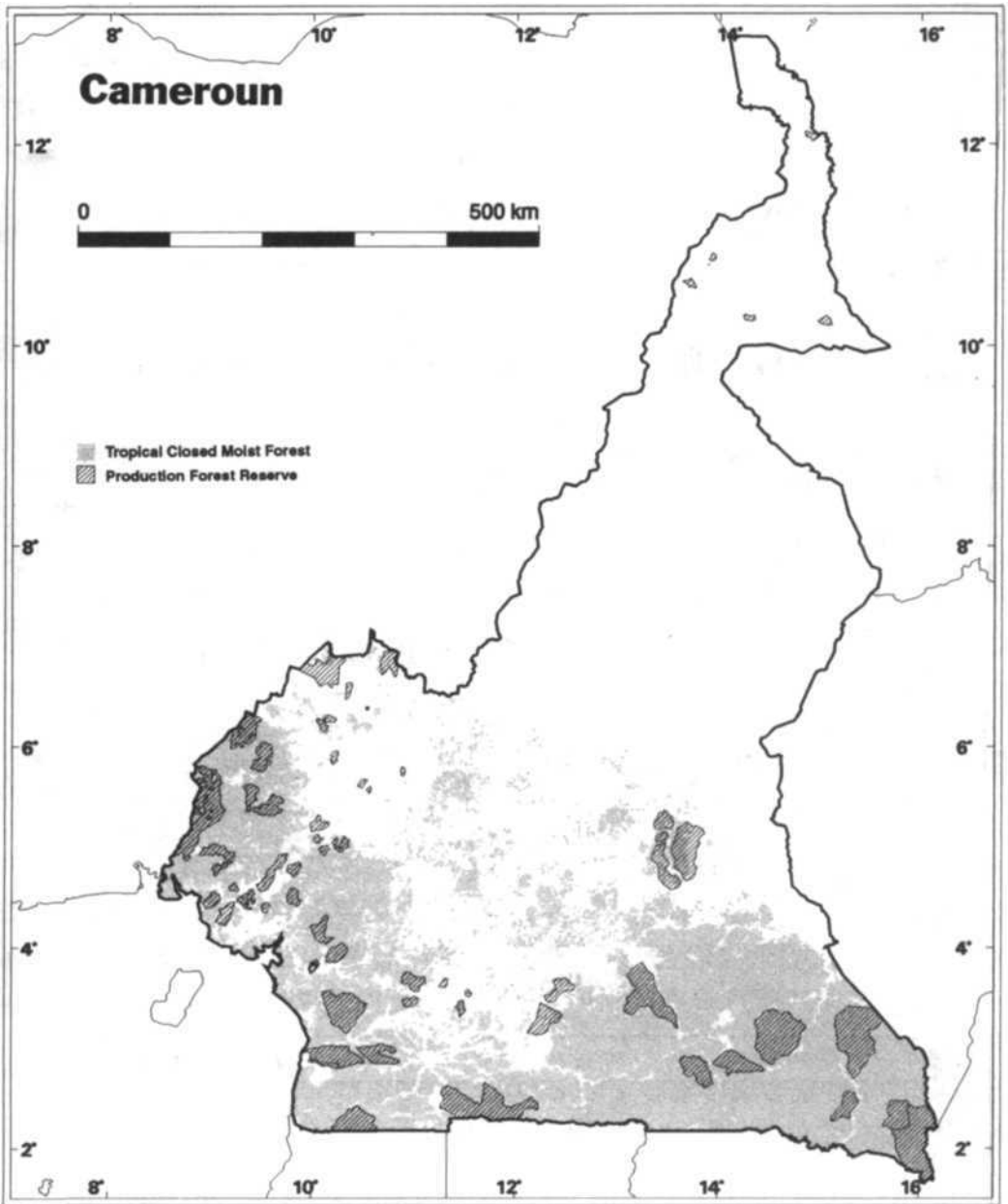


Figure 1. Forests of Cameroun

Forest policy provides for the identification and quantification of non-timber forest products (NTFPs) used by local communities and in industry. National policies also aim at genetic improvement and domestication of forest plant species and the improvement of processing and marketing methods. Multiple use management is being practised in some forest reserves. Some communities have been given certain rights and privileges for exploiting NTFPs in a bid to encourage multiple use and reduce conflicts in resource management.

Key non-timber forest products

The Raffia Palm (*Raphiafarinifera*) is the most versatile source of non-timber products. It is the source of edible fruits, palm wine, oil, leaves and fibres for packaging, fish nets, ropes, basketry and house construction. Raffia Palm wine earns the greatest income at the household level.

Other plants provide cane (rattan), fodder, fruits, chewing sticks and leaves (for food or packaging), or are used to make ornaments, dyes, gums, waxes, spices, condiments and medicines. Fungi are also an important source of food. Medicinal plants are the most common NTFPs collected from forest reserves and in 1984, vegetal material exported for the production of drugs amounted to 14.5% of projected forestry production.

In Cameroun, 9% of the meat consumed is from wild animals. Bush meat provides 70—80% of the animal protein consumed in the southern part of the country. Snails, caterpillars, ants and other insects are consumed regularly and in many areas domestic meat is only consumed on festive occasions. The prices for bush meat are higher than those of domestic meat and are increasing rapidly due to reduced availability. Hunting and trapping are therefore important activities and are usually conducted by men. Of the households in communities neighbouring Korup National Park, 61% are engaged in these activities which contribute between 20—30% of local income. In the Oku Mountain forest region, honey collection is an important, off-farm, income-generating activity.

Most NTFPs are consumed at household level, particularly in isolated villages. Where they are sold in local markets, prices are not standardised and there are no records of quantities traded or price structure. Fruits and leaves are usually collected by women, except where there is a high level of use or commercialisation. Rattan and raffia are mainly collected by men.

In western Cameroun, forest species are incorporated in live hedges and managed bush areas that are valued as reserves for food, fuel, timber, shade and other products. Most households in this region have at least one *Cola acuminata* tree since its fruit is consumed almost daily.

Under local traditions, individuals naturally inherit a right to forest resources and therefore harvesting or hunting rights are communal and universal.

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CONGO

Introduction

Forest cover: 199,020 km²; approximately 58% of total land area.

Congo is the most densely forested country in the Afrotropical realm and the forests represent a wide variety of associations and transition zones. All the forests contain a high level of species diversity, especially of primates. The total number of species is unknown but many rare species have been recorded.

The forests of Congo are also important as they are the traditional homes of the pygmies.

Annual deforestation rate: estimated at 320 km² between 1980 and 1990.

Causes of deforestation include shifting cultivation, encroachment for agriculture and over-exploitation for firewood collection, especially around urban areas.

Management institutions, legislation and policy

The ministry in charge of forestry is responsible for the administration of wildlife and conservation activities. The Fauna and Flora Service is responsible for the management of protected areas. There are four fauna reserves, three hunting reserves, two national parks and one biosphere reserve. All protected areas contain forests.

All forest land is state property and citizens enjoy constitutional rights to the use of this land. People have customary rights for subsistence hunting and collection of non-timber forest products (NTFPs); activities which currently do not adversely affect timber production.

Key non-timber forest products

Forests are important as a source of plant foods (e.g. fruit and roots) to supplement farm produce and are most commonly used in rural areas to enrich an otherwise protein and vitamin-poor diet. Forests are also a source of building materials and bush meat. Bush meat is the main source of protein for a large section of the population and therefore hunting provides a lucrative source of income. Illegal hunting for bush meat is widespread and occurs even in protected areas.

A wide variety of plants, mammals, reptiles and birds are collected or hunted and sold for the production of traditional medicines. Many of the forest tree species are considered sacred.

Special initiatives

The development of NTFPs is supported by the GEF-CONGO Programme and *Ecosysteme Forestier d'Afrique Centrale*.

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CÔTE D'IVOIRE

Introduction

Forest cover: 109,670 km²; approximately 34% of the total land area. Côte d'Ivoire's forested areas are shown in Figure 1.

A diverse range of forest and woodland types are present in Côte d'Ivoire, including the largest area of undisturbed lowland rainforest in West Africa. The country is therefore an important centre for plant and animal diversity and includes habitats for 90 endemic plant species and two endemic amphibians.

Annual deforestation rate: estimated at 1,150 km² between 1980 and 1990.

The chief causes of deforestation are over-exploitation for timber and fuelwood, particularly in savanna regions and forests situated near urban areas, and clearance for shifting cultivation and the establishment of cacao and coffee plantations.

Management institutions, legislation and policy

The Ministry of Water and Forests is responsible for the management of forested areas as stated in the revised Forest Acts of 1935 and 1965, which stipulate the legal requirements and procedures for the extraction of forest resources. SODEFOR (Societe de Developpement Forestiere) is in charge of forest management.

The 1988—2015 National Forestry Plan outlines a long-term strategy for forest resource protection and management and an immediate action plan for the rehabilitation of the forestry sector by 1995.

National parks and nature reserves cover 6% of the total land area. Other conservation areas are designated as botanical reserves and fauna and flora reserves. Most conservation areas contain forests.

Key non-timber forest products

The collection of non-timber forest products (NTFPs) is an important activity in the rural areas where approximately 55% of the population lives. The products include cola nuts, rattans, lianas, bark, *Thaumatococcus* leaves, palm products (including oil, wine, fruit, leaves, roots and petioles), wild fruits and other plant foods, snails, insects and mushrooms. Oil palms are not planted but are selectively protected and managed. The palm fronds are used in basketry and for roofing and the roots are used in medicinal treatments. Rattans, lianas and *Thaumatococcus* leaves are used to make baskets. Traditional cloth is made

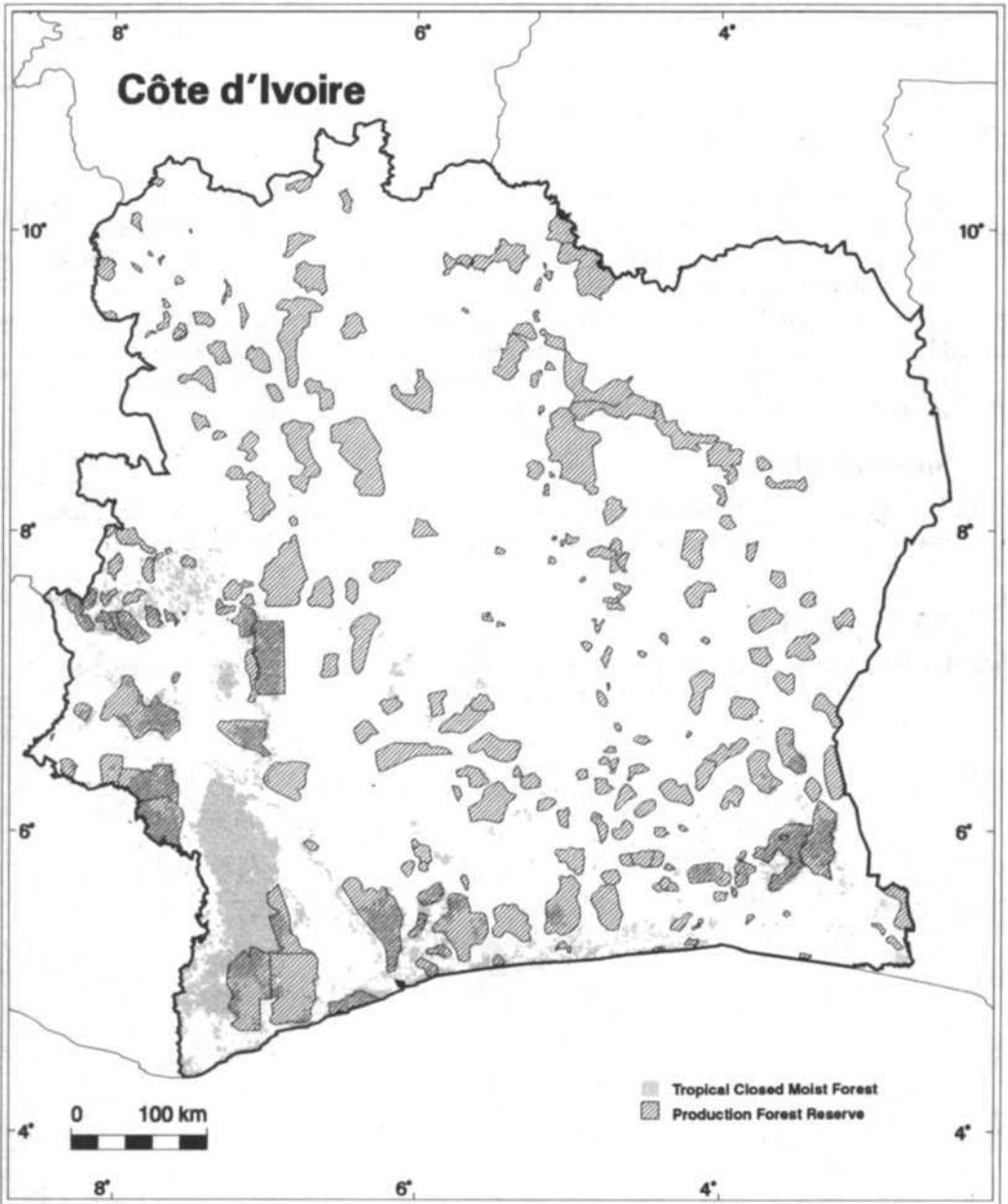


Figure 1. Forested areas of Côte d'Ivoire

from the bark of several forest tree species and dyed with extracts from forest plants. Women are usually more knowledgeable on forest plant medicines and the plants that are used regularly are often planted near their houses.

In general, the use of products from a tree over several years gives the user the rights to the land occupied by the tree.

Hunting was officially stopped in 1984. However, hunting is still an important activity and is conducted throughout the year in forested areas, especially where economic activities are not focused on cash crop production. Bush meat is very popular in both rural and urban areas and the production of bush meat is greater than that of total domestic meat production. It is estimated that the annual per capita consumption of bush meat is 11.3 kg in rural areas and 4.3 kg in urban areas. Favoured foods include forest duiker and other antelopes, monkeys, bush pigs, porcupines, squirrels, cane rats, insects and snails. Children often capture and consume birds and small rodents.

Special initiatives

A proposal has been made for the development of a scheme for the sustained yield management of the giant African snail (*Achatina* spp.), a popular food, in the areas adjacent to Tai National Park in the south-west.

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GABON

Introduction

Forest cover: 182,560 km², approximately 71% of the total land area. The forested areas of Gabon are shown in Figure 1.

The forests are of extremely high species diversity and 19% of the forest plant species are endemic.

Annual deforestation rate: estimated at 1,150 km² between 1980 and 1990.

The main cause of deforestation is clearance for agriculture but the rate of clearance is declining. It is expected that in due course the impacts of commercial hunting will pose a more serious threat to the forest biodiversity.

Management institutions, legislation and policy

The Ministry of Water and Forests oversees the management of forests and has three divisions concerned with forestry: Inventories, Exploitation and Re-afforestation. A fourth division, Wildlife and Hunting, is concerned with fauna management.

Forest management practices are defined by a law dating from 1982. Licences for selective logging in forest are awarded subject to certain conditions. For example, only citizens may log forests in the coastal zone.

Gabon's five protected areas cover 6.9% of the country's total land area. None of these reserves are legally protected from selective logging.

Non-timber forest products

In northeast Gabon, the fruits of *Pachylobus edulis* and *Persea gratissima* are used as substitutes for meat. The seeds of *Ceiba petandra* are exploited for their soft fibres. The Tsogho people use rattan to make a variety of household items including baskets, mats, food containers, furniture and kitchen utensils.

The forests are also important as sources of medicinal plants.

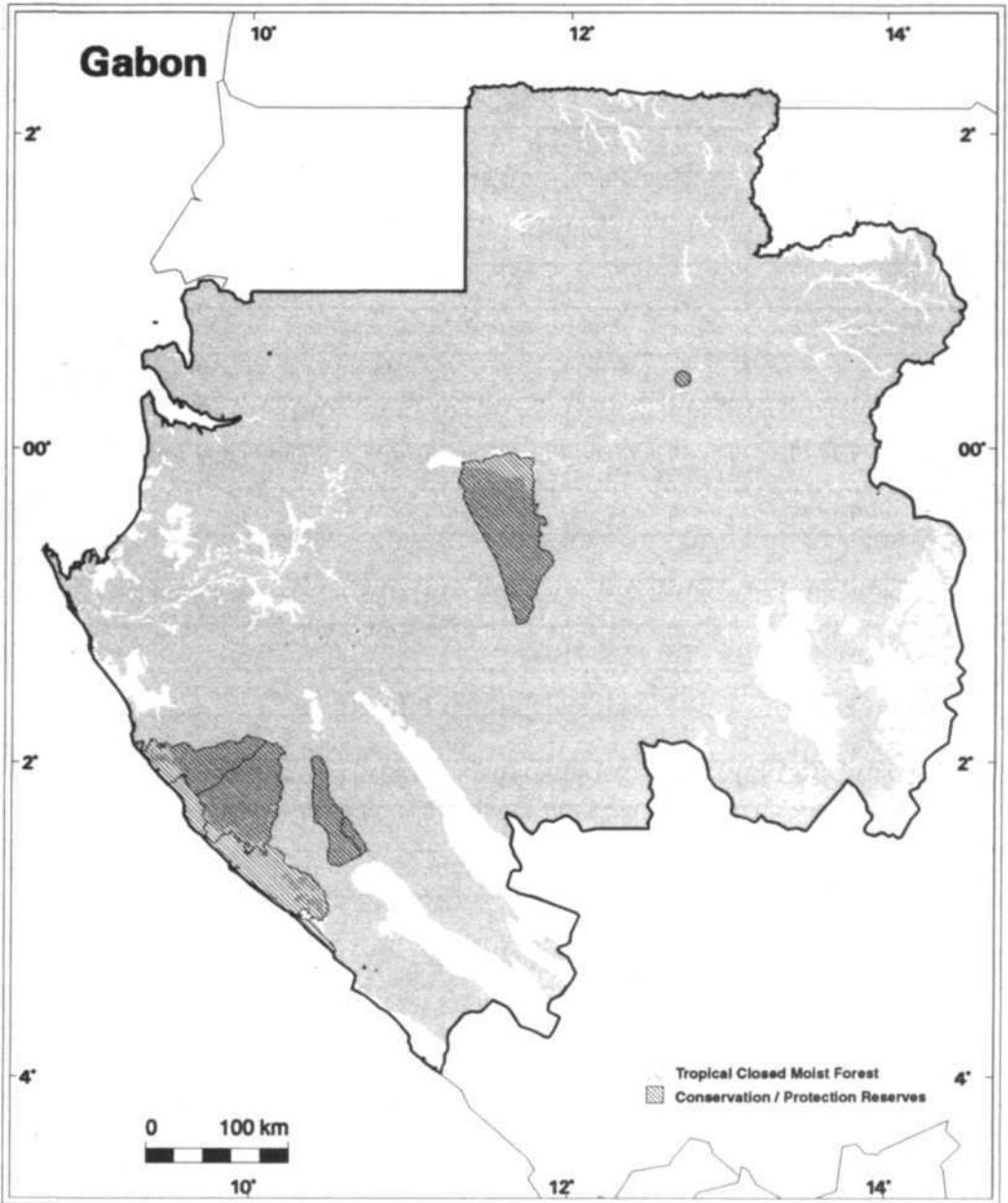


Figure 1. The forested areas of Gabon

GHANA

Introduction

Forest cover: 96,080 km², approximately 42% of the total land area. The forested areas of Ghana are shown in Figure 1.

The forests of Ghana are major habitats for wildlife. The majority of plant species found in the country occur in the forest zone, including 23 endemic species. The forest fauna includes diverse mammalian species, 200 of which are rare and endangered. Likewise, 200 out of a total of 721 bird species listed for the country have been recorded within forests.

Annual deforestation rate: estimated at 1,370 km² between 1980 and 1990.

The main causes of deforestation are fire, shifting cultivation, excessive logging and over-exploitation for fuelwood. Many forest remnants are threatened by further degradation due to their small size.

Management institutions, policy and legislation

The Forest Department is responsible for the management of forests as outlined in the Forest Ordinance. Government policy on wildlife conservation and protected area management is based on the Wild Animals Preservation Act No. 43 of 1961, Legislative Instrument 710 of 1971, the National Environmental Action Plan and the National Forest and Wildlife Policy of 1994.

The National Forest and Wildlife Policy aims to enhance the conservation of forests and wildlife through the sustainable development of forest-based industries and increased community participation in resource management.

There are approximately 280 forest reserves; 100 of which are managed exclusively for protection. Other protected areas include two national parks, a nature reserve, a game production reserve and a monkey sanctuary. Currently there are fifteen wildlife protection areas and proposals to establish other conservation areas are being considered.

The government retains the right to fell and sell all timber trees. Long-term concessions and short-term licences for logging may be obtained from the Forest Department. However, limited use for domestic purposes is allowed when trees occur on farmland.

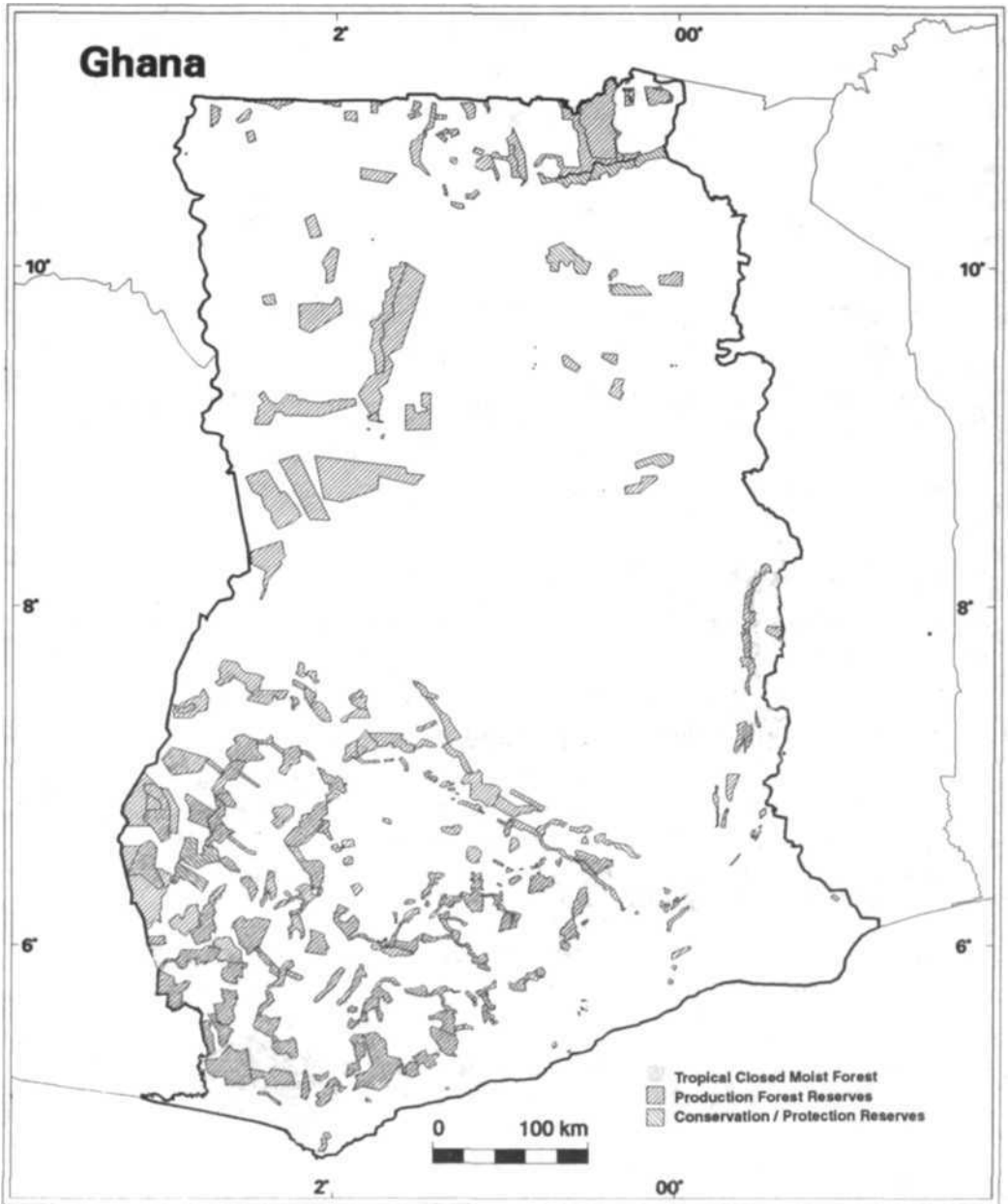


Figure 1. Forested areas of Ghana

Key non-timber forest products

Forest plant foods (e.g. leaves, roots, tubers and seeds) and mushrooms are mostly consumed as snacks, flavourings or condiments, particularly during seasonal food shortages. Sap from Raffia (*Raphia farinifera*) and Oil Palms (*Elaeis guineensis*) is distilled to produce an alcoholic beverage known as 'akpeteshie'. Many plants are exploited for their medicinal value (including those used for making chewing sticks) or to obtain fodder, dyes, resins, gums, packaging materials and materials for making houses, mats, mattresses, sponges, baskets and fish traps.

Leaves from members of the Marantaceae family are used for wrapping foodstuffs and are collected and marketed widely. Cloth coloured with natural dyes from the bark of forest trees is more expensive than conventional types and in some areas production has been commercialised.

Bush meat is an important non-timber product and 75% of the population consumes bush meat obtained from forests and fallow fields. Foods include game meat (e.g. duikers, cane rats (*Thryonomys* spp.), fish, caterpillars, termites and snails. Some species are hunted for live export.

Forest species that are valued as sources of food or medicine are usually protected in farms and fallow fields, primarily for household use. Forests are also important as habitats for sacred plants and animals and many include sacred groves.

'Akpeteshie' and bush meat are the most important products in terms of the number of people involved in their production. Recent studies show that in 1992 total household expenditure on these products within Ghana was valued at US\$63 million and US\$22 million respectively. In the same year, sales of palm wine, snails and honey were valued at US\$7 million, 4 million and 1.6 million respectively.

Hunting, basketry and mat-making are predominantly male occupations while women are usually involved in the collection of small animals and in the trade in bush meat. The majority of traders in non-timber forest products (NTFPs), such as wrapping leaves, chewing sticks, sponges and bush meat, are women. For chewing sticks, men dominate the wholesale trade and women the retail trade. The majority of those involved in the production and trade of NTFPs still rely on other economic activities for most of their income.

Special initiatives

In 1989/90 a pilot research study was conducted to examine the importance of NTFPs in two regions of southern Ghana based on data collected from households and local markets.

The on-going Sustainability of Economic Activities based on Non-Timber Forest Products Project is a three-year project to investigate the sustainability of small-scale production and trading activities based on NTFPs that contribute to household incomes.

The Collaborative Forest Management Unit of the Forest Department is currently studying various aspects of NTFP management with the aim of increasing community participation in forest resource management while improving production and sustainable use of NTFPs.

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KENYA

Introduction

Forest cover: 13,050 km²; approximately 2% of the total land area. Kenya's forested areas are shown in Figure 1.

Significant numbers and variety of wildlife occur in Kenya's forest reserves, forested national parks and reserves. Species diversity is greatest in the forests on the coastal and western plateaux and the Taita and Taveta Hills.

Annual deforestation rate: estimated at 54 km² between 1980 and 1990.

The chief causes of deforestation are encroachment for agriculture and settlement, uncontrolled grazing, excessive felling of trees for fuelwood and lumber, and excision of public forests for other purposes. Forest habitats are also threatened due to the high degree of fragmentation resulting from these activities.

Management institutions, legislation and policy

The Forest Department in the Ministry of Environment and Natural Resources is responsible for the management of state forests and reserves in accordance with the Forests Act Cap. 385 and the National Forest Policy, Sessional Paper No. 1 of 1968.

The Kenya Wildlife Service is responsible for the management of all protected areas, excluding the nature reserves within forest reserves and national monuments. The Forest Department and the Kenya Wildlife Service have developed a Memorandum of Understanding that provides for joint management, based on multiple-use zoning, of selected forest reserves with high biodiversity values.

County councils, in collaboration with the Kenya Wildlife Service, are responsible for the management of all National Reserves. The councils also manage ungazetted forests situated on their land. The National Museums of Kenya manages forests occurring within gazetted National Monuments, in particular the 'kaya' forests on the coast.

The National Forest Policy is currently under review and thereafter is expected to emphasise the need to promote wider participation in forest resource management and the conservation of a wider range of biological and ecological values. There is a need to promote the development of a strategy for the sustainable extraction, utilisation and marketing of non-timber forest products (NTFPs) based on the lines of the proposed.

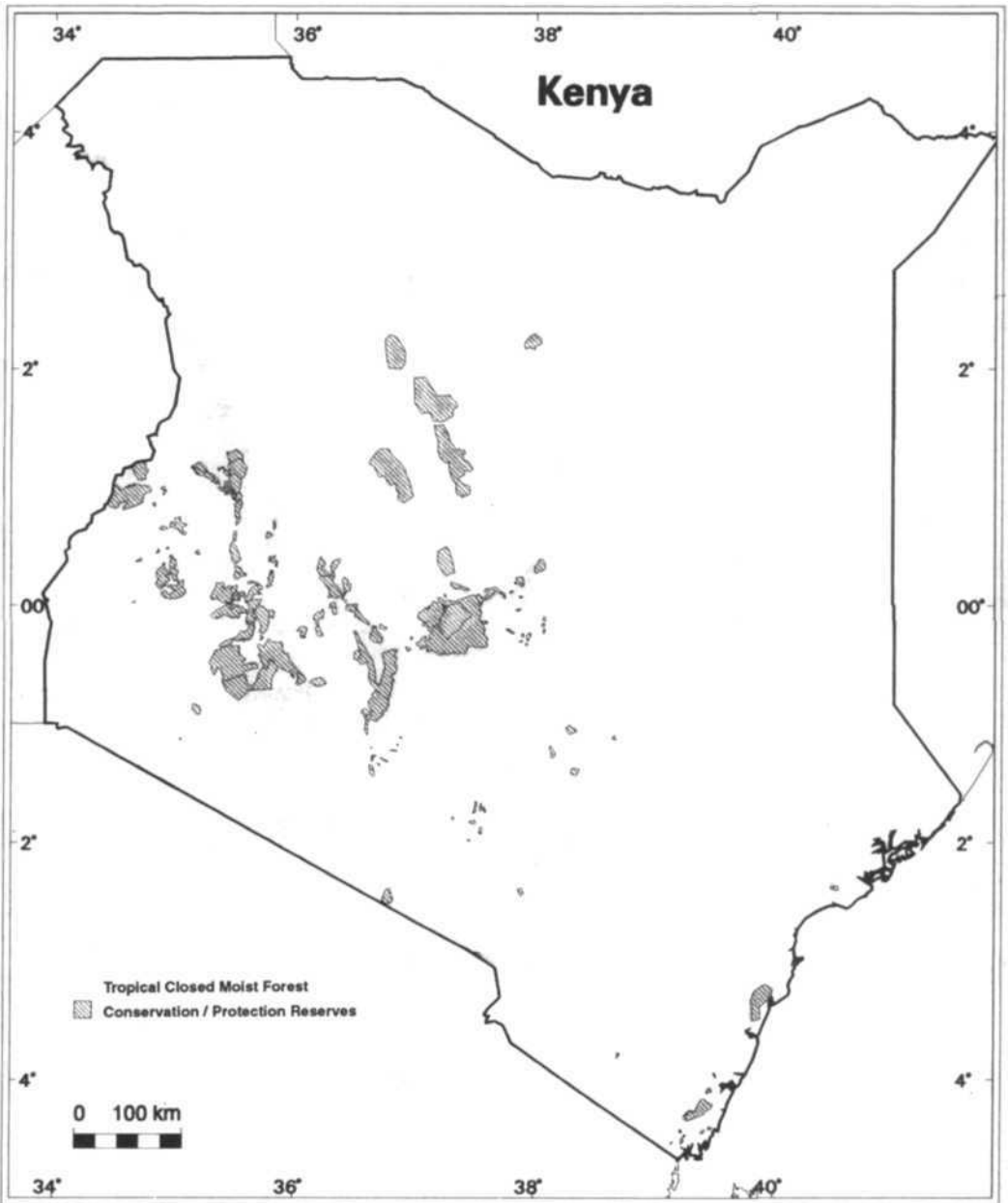


Figure 1. The forested areas of Kenya.

Key non-timber forest products

Limited public access to forest areas and a cultural shift towards domesticated and industrial sources of food and other consumer products has resulted in a decline in the consumption of non-timber forest products. These include the fruits, nuts, vegetables, small mammals and birds that are usually harvested and consumed at the subsistence level as dietary supplements. Honey may be collected for home consumption or sale in local markets.

Medicinal plants are still widely sought, usually by professional healers. Other important forest products include bamboo, lianas and other sources of fibre for construction, furniture, baskets and a wide variety of handcrafts. Several plant species yield extracts for the production of dyes, preservatives, adhesives and alcoholic beverages.

Forests are important as sources of thatch grass, fodder and dry season grazing areas and, in some cases, for the collection of sand, clay and other minerals.

At least 30 indigenous tree species contain useful amounts of tannin. However, commercial tannin production is based on *Acacia mearnsii*, an exotic plantation species. Close to 20,000 tonnes of *A. mearnsii* bark are processed every year.

One private company is involved in the production of resin from oleoresins. The oleoresin is tapped from exotic pines in plantations managed by the Forest Department. A royalty is paid to the Department for every tonne of oleoresin tapped.

Valuation of most non-timber forest products is difficult in the absence of a formal licensing and marketing structure, which would require effective monitoring and evaluation systems. However, recent studies indicate that they contribute at least 40% of the overall value of products from natural forests.

There are usually distinct, gender-related roles in the harvesting and marketing of NTFPs. These roles are primarily related to local cultures and traditions. For example, thatch material and fodder are usually collected by middle-aged to old women and men usually dominate activities like honey-gathering, harvesting of medicinal herbs and manufacture of tools. Young boys, especially when herding cattle, are usually the ones who collect wild fruits.

Special initiatives

The government and the NGO community are actively promoting the development of NTFPs in several programmes and projects. Examples of on-going and proposed projects include ethnobotanical studies on medicinal plants; the promotion of *Acacia Senegal* (for gum arabic production), *Moringa oleifera* and *M. stenopetala* (for water-purification, medicinal and other properties), *Pinus* spp. (for oleoresins), bamboos and rattans; the Kenya Woodfuel and Agroforestry Programme and the Ministry of Energy's fodder development programme.

Private enterprises have also invested in the development of NTFPs. The East African Tannin Extraction Co. Ltd. for tannin production; Kenya Nut Co. Ltd for macadamia nut production; Rosin Kenya Ltd. for rosin production; and numerous private enterprises for honey production.

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MALAWI

Introduction

Forest cover: 36,120 km²; approximately 38% of the total land area. The forested areas of Malawi are shown in Figure 1.

The miombo woodlands, evergreen and semi-evergreen forests of Malawi are habitats for several rare bird species and important refuges for many mammalian species. The forest fauna includes eight endemic species and sub-species of reptiles and three endemic butterfly species. The Mount Mulanje area is a particularly species-rich site and contains habitats for several endemic forest plant species.

Annual deforestation rate: estimated at 460 km² between 1980 and 1990.

The main threats to forests are dry season bush fires and clearing for agriculture. Many forest remnants are also threatened due to their small size.

Management institutions, policy and legislation

The Department of Forestry and Natural Resources is responsible for the management of the national forest estate. The Department of National Parks and Wildlife manages national parks and game reserves. These institutions collaborate to formulate and implement appropriate policies for natural resource management.

Of Malawi's total forest cover (4.5 million ha) 38% is in national parks, game reserves, forest reserves or woodlands on customary land. The majority of evergreen forests in these protected areas receive adequate protection.

Hunting is illegal in all protected areas. Permits can be obtained to hang bee hives in some protected areas. The communities living around Kasungu National Park and Dzalanyama Forest Reserve are allowed to collect caterpillars. During the rainy season, local residents are also permitted to collect mushrooms from most forest reserves.

A cattle ranch is located within the boundaries of Dzalanyama Forest Reserve. For a fee, residents of the neighbouring communities may also graze their cattle within the reserve.

Key non-timber forest products

Non-timber forest products (NTFPs) play a major role in social development but are not properly managed and there is little information on their quantity and value. Fruits, in-

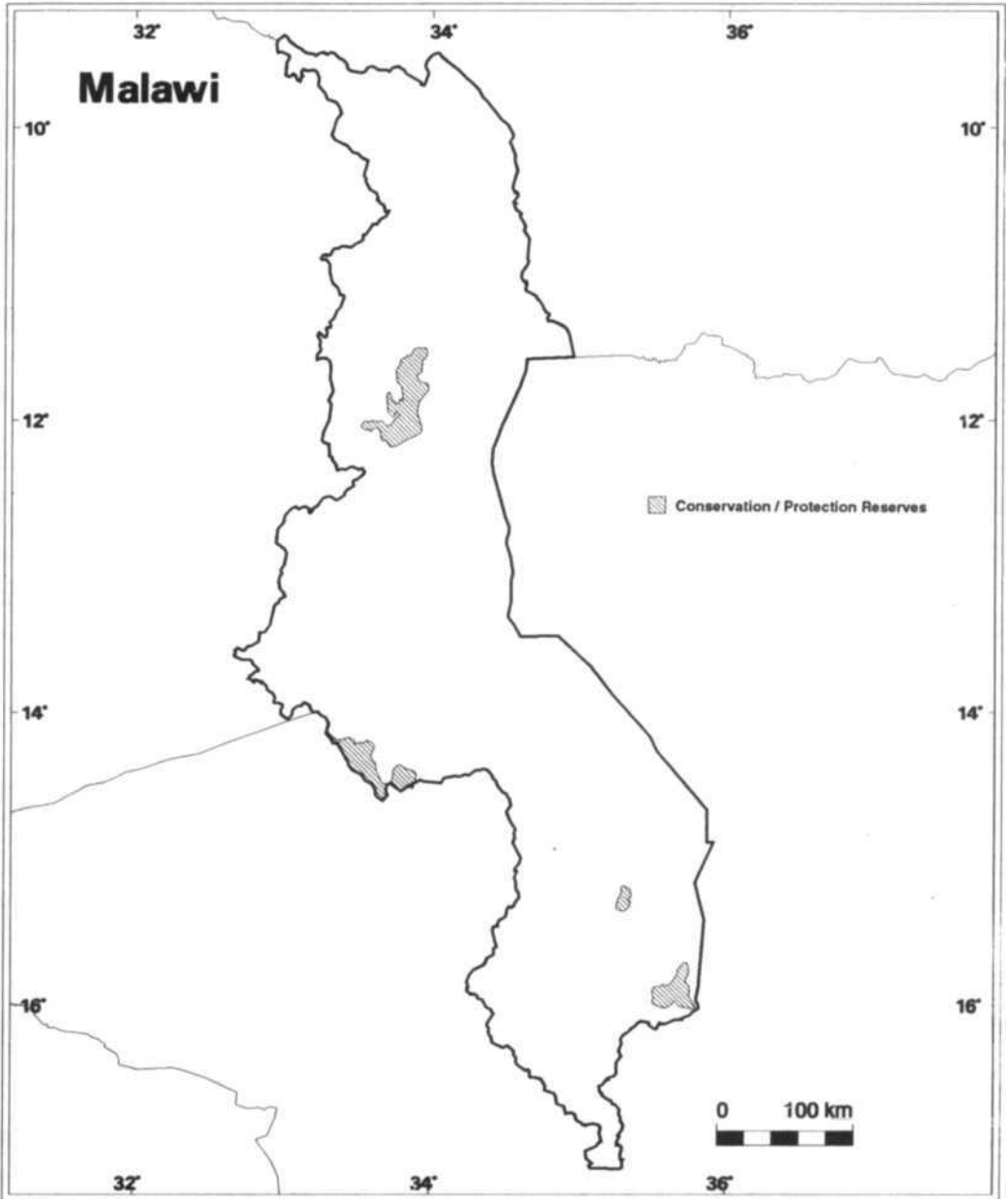


Figure 1. The forests of Malawi

sects, tubers, edible leaves, fibres and grass are collected exclusively for subsistence use. Mushrooms, medicinal plants, fodder, soil and honey are commercial products. There is a very well developed marketing system for honey.

Wild game is hunted for meat, hides and other products. In the northern and southern parts of the country, faunal forest foods (e.g. termites, caterpillars, game meat and honey) are eaten more abundantly than plant foods. Unfortunately, the demand for wild game often leads to illegal practices such as hunting in protected areas. Sport hunting is permitted outside protected areas; licences limit the number of duikers, warthogs and bush bucks that may be killed.

Men dominate activities such as hunting, trapping and the harvesting of honey, resins and plant fibres. The collection of caterpillars, mushrooms, tubers and leaves is primarily a female occupation.

Special initiatives

Ethnobotanical studies and chemical analyses of medicinal plants have been conducted by the University of Malawi since the 1980s. During the 1990s, several projects have been initiated to collect information on other NTFPs including fodder, edible caterpillars, mushrooms, indigenous vegetables and fruit trees. Research trials are underway at the Makoka Agricultural Research Station to study the performance of indigenous fruit trees and promote these species amongst local farmers. Similar trials are proposed for *Moringa oleifera*, which has potential for use in water purification, and *Stenulia quinqueloba*, the source of karaya gum.

More general studies are being conducted to investigate seasonal trends in the utilisation of miombo woodlands, bee-keeping and the marketing of NTFPs.

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MOÇAMBIQUE

Introduction

Forest cover: 173,570 km²; approximately 22% of the total land area. The forested areas in Moçambique are shown in Figure 1.

The flora of Moçambique is estimated at 5,500 species, 216 of which are endemic. The northern coastal area is particularly rich in endemic plant species. Although there is limited information on the country's fauna, a number of rare bird species have been identified.

Annual deforestation rate: 1,350 km² between 1980 and 1990.

The main threats to forests are encroachment for agriculture, over-exploitation and fire. The high levels of illegal hunting of large mammals in protected areas and the lack of effective management during the civil war have also led to the deterioration of forest habitats.

Management institutions, policy and legislation

The National Directorate of Forestry and Wildlife, in the Ministry of Agriculture, is responsible for the management of forests and protected areas. At provincial level, the Directorate is represented by the Provincial Forestry Services. Logging in forests is permitted for concession holders. The Department of Agriculture also issues cutting licences.

Protected areas include national parks, game reserves, hunting areas and forest reserves and cover approximately 11% of the total land area.

Controlled harvesting of non-timber forest products (NTFPs) is allowed in some protected areas. The government's Forestry Development Strategy Paper, published in 1991, outlines a framework for the development of the forestry sector, which aims to combine sustainable resource management with a wide range of socio-economic development objectives. The policy aims to increase community involvement in natural resource utilisation and management.

Key non-timber forest products

Non-timber forest products include wild fruits, medicinal plants, honey and wild animals. Forest fauna are important as sources of food, medicines, skins and other trophies. Bush meat is the chief source of animal protein for an estimated five million people in rural Moçambique. Wild animals are also an important asset in the tourism industry.

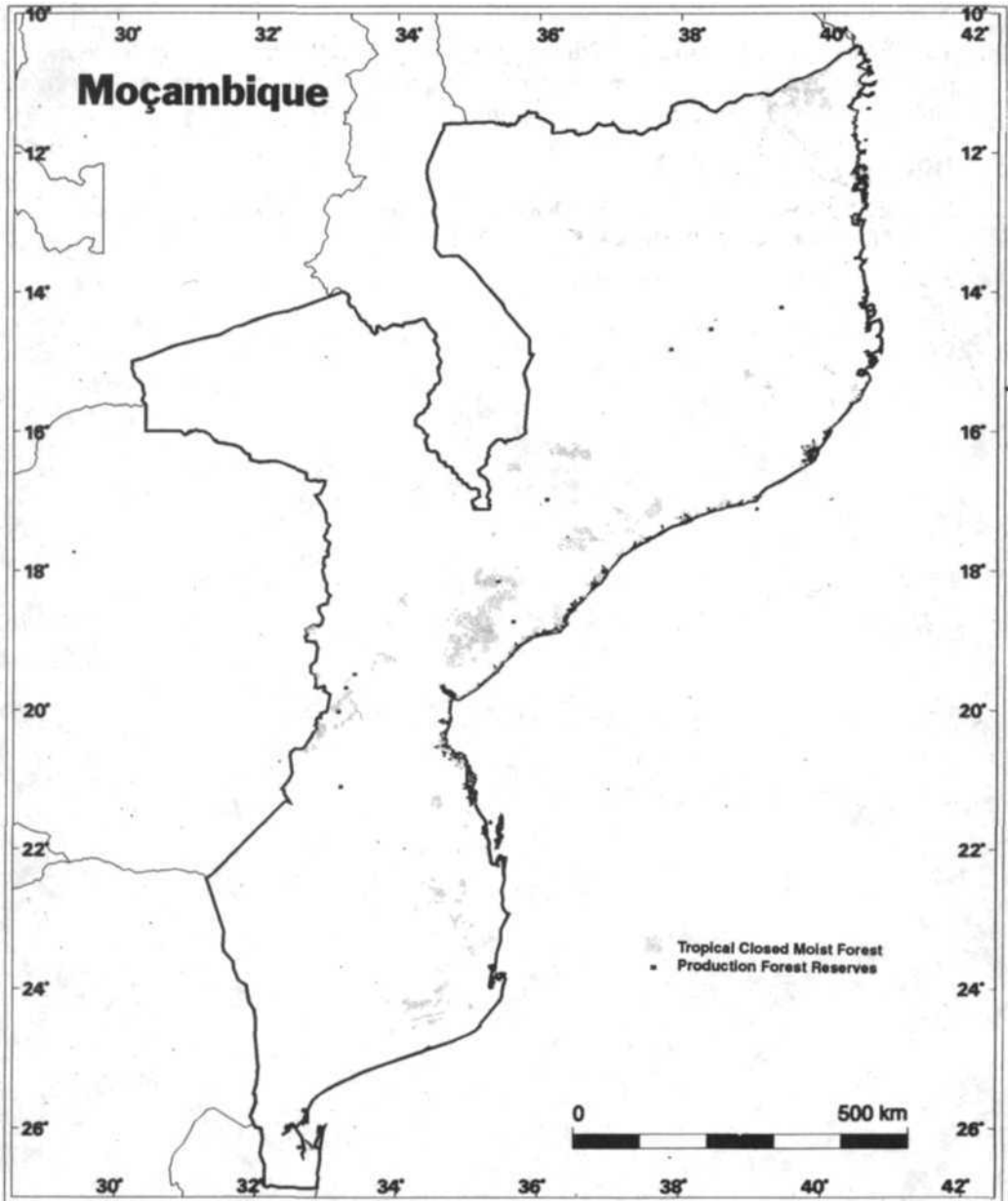


Figure 1. Moçambique's forested areas

All land belongs to the state and there are no legal restrictions for the exploitation of NTFPs outside protected areas.

Special initiatives

The Directorate of Forestry and Wildlife proposes to establish pilot projects in some provinces with the aim of creating appropriate institutions for the management and exploitation of natural resources by local communities.

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SOUTH AFRICA

Introduction

Forest cover: 29,576 km²; less than 1% of the total land area.

There are a variety of forest types in South Africa, including the widely distributed and highly fragmented mixed evergreen forests. These fragments comprise valuable habitats for the conservation of locally rare species.

Annual deforestation rate: not available.

Most of the forests are adequately conserved and deforestation rates are low. However, woodlands in the former homeland areas have been degraded due to over-exploitation for fuelwood and fodder, over-grazing and conversion for agriculture.

Management institutions, legislation and policy

The Department of Water Affairs and Forestry is responsible for the management of state forests that contain natural forest and the National Parks Board is responsible for the management of forests and woodlands in national parks. Each of the nine provinces has an Environmental Conservation Department which is responsible for forest and woodland management in mountain catchment areas and provincial nature reserves. The South African Forest Company Limited is responsible for the management of natural forest patches that occur on state land designated for plantation forestry.

There are a number of policies and laws applicable to forestry, the most important being the Forest Act (Act 122 of 1984). Other laws include the Management of State Forest Act (Act 128 of 1992), the Environment Conservation Act (Act 73 of 1989), the National Parks Act (Act 57 of 1976) and the Mountain Catchment Areas Act (Act 63 of 1970).

Several categories of protected areas exist in South Africa and they are administered by different management institutions. All forests and woodlands managed by the National Parks Board are strictly protected whereas those under the provincial Environmental Conservation Departments are managed more flexibly; some may be protected while others are utilised for non-timber forest products. No natural, public forests in South Africa are formally utilised on a commercial basis.

The national forest policy is currently under review and a policy discussion paper was published by the Department of Water Affairs and Forestry in July 1995.

Key non-timber forest products

The local people harvest forest foods (fruits, nuts, roots, spinach, fungi and honey) which are important dietary supplements; especially during periods of drought. The sap of the Ilala Palm (*Hyphaene natalensis*) and the Wild Date Palm (*Phoenix reclinata*) are tapped for wine production.

Forest plants are also sources of dyes, medicines and the poisons which are used to stun fish and applied to arrow tips. Oil from the seeds of *Ximenia americana* is used to soften leather and as a cosmetic. Tannin is extracted from the bark of *Acacia mearnsii* which is widely grown in plantations.

Other plants provide fibre and other materials for the production of cordage, baskets, mats, cloth and other handcraft. Climbers and the leaves, leaf petioles and bark of some species are used in house construction.

Epiphytic mosses and ferns are harvested and sold for use in the floral industry for packaging and in floral arrangements. The production and domestication of indigenous cut flowers has also developed into a prosperous industry.

Honey is obtained from forest bees and a variety of mammals, birds, reptiles and caterpillars are trapped or hunted for food. In most cases the meat is consumed within the household and the hides, skins, horns or bones sold to manufacturers of fashion accessories (bags, belts, etc.) and artifacts, or to commercial bone meal producers. Products from some animals (e.g. porcupine, hares and pangolin) are used to make traditional medicines.

Wild animals are also hunted for sport. Currently, commercialised trophy hunting is more widely practised than traditional, communal hunting. Rare birds, butterflies and moths are also trapped for sale to collectors.

Some forests have cultural significance as burial sites, e.g. Hlatikulu Forest for the DINGAAN people.

The production of handcrafts, traditional medicines, plant foods, epiphytic mosses and ferns are the most widely commercialised activities, though the true extent and value of these industries is unclear. Some sources indicate that there is a multi-million rand trade in traditional medicines and forest foods between urban and rural outlets. In the Southern Cape Province, the production of fern fronds for export is also considered to be a major source of income for private land owners.

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TANZANIA

Introduction

Forest cover: 337,090 km²; approximately 38% of the total land area. The forested areas of Tanzania are shown in Figure 1.

The forests of Tanzania are habitats for numerous rare and endemic plant and animal species. It has been estimated that up to 25% of the forest plant species are endemic. The forests on the eastern arc mountains are particularly rich in species and comprise a major centre of endemism for birds.

Annual deforestation rate: estimated at 4,300 km² 1980 and 1990.

The main threats to forest ecosystems are encroachment for agriculture, excessive logging and poor harvesting methods, illegal harvesting of timber, fire and the high degree of habitat fragmentation.

Management institutions, legislation and policy

The Tanzania National Parks Authority is responsible for the management of all protected areas except forest reserves. Protected areas include 11 national parks, 16 game reserves and one conservation area.

There is an extensive network of forest reserves. These are managed by the Forestry and Beekeeping Division of the Ministry of Tourism, Natural Resources and Environment, primarily for habitat protection in accordance with the Forest Ordinance Cap. 389 of 1957. Licences for the extraction of non-timber forest products (NTFPs) from the reserves for either subsistence or commercial use can be issued to communities and individuals.

The extraction of non-timber forest products from other public lands and forests is carried out within the framework of local government laws and bye-laws.

The national forest policy is currently under review and, among other issues, it will provide for greater community participation in management and utilisation of forest resources.

Key non-timber forest products

Forests are a source of edible plant products and fungi. Fruits of the more abundant and popular species (e.g. *Uapaca kirkiana* and *Myrianthus* sp.) are collected for sale in local markets.

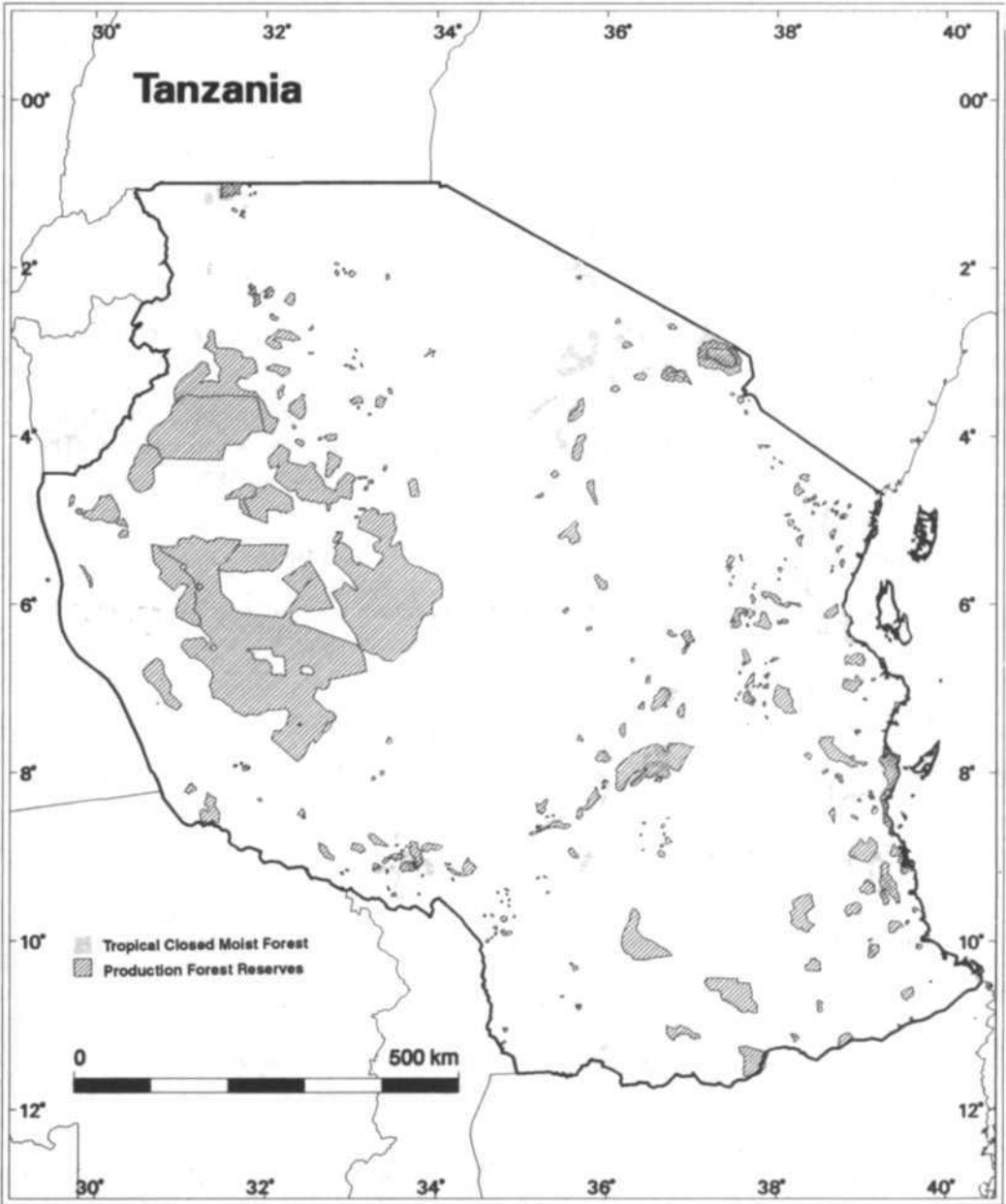


Figure 1. The forested areas of Tanzania.

Oil is extracted from the seeds of some tree species and used to make a wide variety of products including soap, cosmetics, candles and cooking oils. Tannin is extracted from the bark of *Parinari excelsa* and mangrove trees (*Bruguiera gymnorrhiza*, *Ceriops tagal*, *Rhizophora mucronata*) for use in the leather industry.

Bamboo and other plant fibres are widely used in construction and to make furniture and various handcrafts. For example, cork from the bark of *Erythrina excelsa* is used to make floats for fishing nets.

Honey and beeswax are collected for the production of foods and medicines and there is a well established system for the marketing of honey between rural and urban centres. Forest bees also have a significant role in the pollination of agricultural crops in the surrounding areas.

Forests and woodlands are important sources of fodder, browse and pasture, particularly during the dry season. Animals (e.g. hares, dik dik, bush pig, tree hyrax and birds) are also hunted and trapped for food. Hunting is a major activity for men and boys during those seasons when the agricultural workload is reduced.

Many of the forests are of cultural or spiritual significance to the local people.

In 1988 it was estimated that the trade in honey and beeswax (3.8% of the entire forest produce) contributed TSh 1,100 million to the economy, whereas the trade in non-timber plant products yielded TSh3,100 million.

Special initiatives

Studies have been conducted on the ecology and utilisation of the baobab *Adansonia digitata*. The Tanzania Forestry Research Institute will shortly commence several studies on NTFPs within 'miombo' woodlands. Likewise, NTFPs and their utilisation within rural communities will be the focus of several post-graduate research studies.

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UGANDA

Introduction

Forest cover: 63,660 km², approximately 32% of the total land area. Uganda's forest cover is shown in Figure 1.

Within Uganda there is great diversity of forest types and species diversity is highest in the western forests. The forest fauna includes the black-fronted duiker.

Annual deforestation rate: estimated at 650 km² between 1980 and 1990.

Causes of deforestation include encroachment for agriculture and over-exploitation for timber.

Management institutions, legislation and policy

The Forest Department is responsible for the management of forests as stated in the Forestry Act Cap. 346. The legislation focuses on the harvesting of timber products and administrative procedures to govern the management of NTFPs are largely undeveloped. Licences may be obtained to harvest wild coffee from Kibale National Park and bamboo from Mount Elgon National Park.

Uganda National Parks (UNP) is responsible for the management of all national parks, including forested National Parks, in line with the National Parks Act. UNP is currently enacting a policy to facilitate multiple use of natural resources within protected areas and promote community participation in resource management. As a result, some communities around Bwindi (Impenetrable) National Park and Mount Elgon National Park are allowed access to non-timber forest products (NTFPs).

Key non-timber forest products

Forest foods include leaves, roots and fruits of various plant species and mushrooms. These are usually collected by women and children. Medicinal plants are widely used for treatment of both humans and livestock and they are usually collected by specialist practitioners.

Forests are important sources of thatch grass. Bamboo (from the montane forests), rattan, palms leaves and stems provide material for making baskets, beehives, fish nets, furniture, mats, ropes and other handcrafts. Occasionally, palm midribs are used to construct houses. Bamboo shoots are eaten on Mount Elgon.

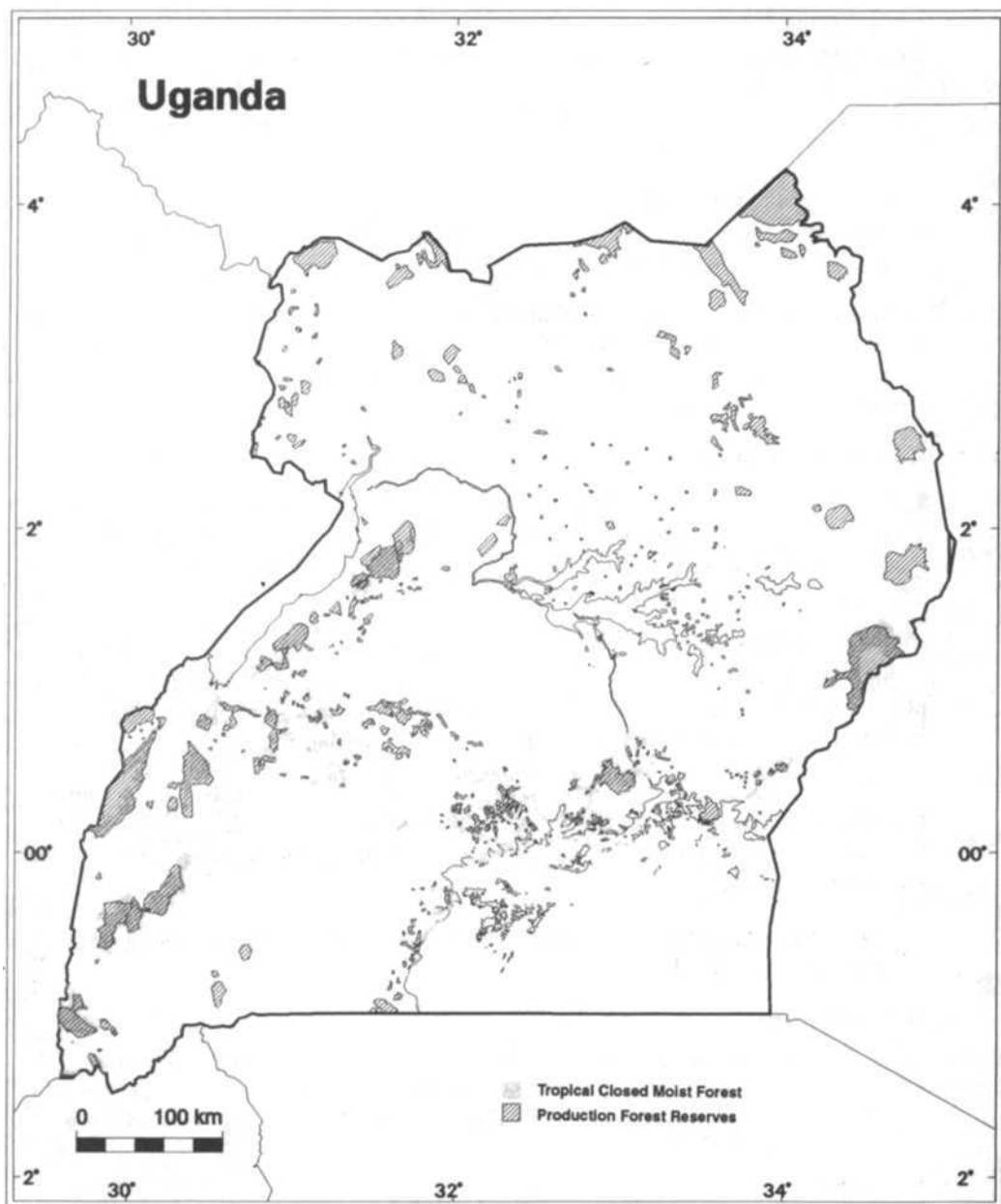


Figure 1. Forested areas of Uganda

Palm oil (from *Elaeis guineensis*) is used to make soap and other products by the communities around Kibale and Semuliki National Parks.

Several species of mammals (e.g. porcupine, squirrel, mongoose and wild pig) and birds are trapped or hunted for food. However, in the forests of Mount Elgon hunting is no longer considered to be a viable activity due to the decreasing numbers of wild animals. The forest animals, especially birds are also important for ecotourism. Beekeeping is another forest-based activity usually conducted by men.

In Karamoja, herdsman collect gum from *Acacia Senegal*. Some of the gum is eaten by the herdsman and the rest is sold to the Forestry Department. By general agreement, each herdsman collects approximately 200 grams of gum per tree every season.

It has been estimated that NTFPs contribute at least US\$1 million to the economy of the communities around Mount Elgon forest. In this area, most forest products are consumed at the household level and dependence on forest resources is not significantly related to household income.

Special initiatives

The current trend towards the promotion of community participation in the management of conservation areas has resulted in the publication of several reports that include information on NTFP utilisation within different regions of the country; particularly on wild foods and medicinal plants.

Through the Development through Conservation Project, CARE is supporting Uganda National Parks to plan and implement a multiple use programme for Bwindi Impenetrable National Park. The project aims to assess patterns of use involving information-gathering, negotiation and local institution capacity-building.

On Mount Elgon, a study was carried out on the use of the forest by the local communities. This assessment, assisted by IUCN, was a first step in establishing pilot collaborative management arrangements between the managing authorities of the park and the local communities.

Several, on-going, post-graduate research studies are investigating the ecology, harvesting and utilisation of NTFPs.

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ZAIRE

Introduction

Forest cover: 1,133,170 km², approximately 50% of the total land area.

There is a very high diversity of forest communities and species within Zaire. There is also a high level of local endemism in many groups of flora and fauna and the highest specific diversity of primates in Africa.

Annual deforestation rate: estimated at 7,290 km² between 1980 and 1990.

The moist forests are extremely sensitive to disturbance. The main causes of deforestation are fire, shifting cultivation, overgrazing and over-exploitation for fuelwood.

Management institutions, policy and legislation

The IZCN (Institute Zairoire pour la Conservation de la Nature) in the Ministry of Environment and Nature Conservation is responsible for the management of forests. Government policy aims to give total protection to 12—15% of the national territory and maintain natural forest cover or forest plantations on 35% of the total land area. Currently the protected area system includes national parks, nature reserves, hunting reserves, a game reserve and a flora reserve.

Key non-timber forest products

For most of the population, non-timber products are of greater significance than wood. Products include honey, plant fibres, foods and medicines.

The Okapi (*Okapia johnstoni*) is protected as a cultural resource. Other animals, e.g. bats, caterpillars, snails and small game, are widely exploited for food. Bush meat comprises most of the meat consumed in both rural and urban areas and there is a thriving market economy for wild animal foods in the areas neighbouring Ituri Forest.

In general, bush meat is cheaper than domestic meat and can be purchased in smaller quantities, which suits the needs of the urban poor. Hunting and collecting follow seasonal trends depending on the abundance of the wild animals and the demand for labour in agriculture.

Although trade in ivory is illegal, poaching continues and ivory is a major non-timber export product.

Special initiatives

In the Ituri Forest, management is geared towards the conservation of the Okapi; a species whose entire range is within Zaire. Local communities participate in the management of this species and its habitat; ensuring sustainability of the conservation measures.

ZIMBABWE

Introduction

Forest cover: 89,810 km², approximately 23% of the total land area. Forested areas of Zaire are shown in Figure 1.

The forests of Zimbabwe contain few endemic or endangered plant species. The moister forests are rich in butterflies and also the habitat for two endemic bird species, two endemic amphibians, and two rare species of small mammal; Arend's Golden Mole (*Chlorotalpa arendsi*) and the Selinda Rat (*Aethomys selindensis*).

Annual deforestation rate: estimated at 600 km² per annum between 1980 and 1990.

Agricultural expansion in low and mid-altitude areas (below 1500 m) is the main threat to natural forest cover.

Management institutions, policy and legislation

The Forestry Commission is responsible for the management of all forests that are not situated on private land. The Department of Natural Resources enforces the Natural Resources Act.

The Department of National Parks and Wildlife Management is responsible for all aspects of wildlife and protected area management. There are over ten categories of protected areas for the conservation of flora, fauna and representative habitats and these cover 47,792 km² (approximately 12% of the total land area).

The policies and activities of these management institutions are guided by and enforced through the Natural Resources Act, the Communal Land Forest Product Act and the Parks and Wildlife Act. The Parks and Wildlife Act reflects the government's policy of sustainable management of wildlife populations on communal land through community participation.

Key non-timber forest products

Forest plants provide food (leaves, fruits, nuts, roots and tubers), medicinal extracts, toxins, dyes and fibres. Many of the fruits are collected for sale in local markets and sometimes ('masowe' *Ziziphus mauritania*) in urban areas. *Parinari curatellifolia* fruits are processed into sweet cakes. Juice or wine is prepared from the fruits of *Sclerocarya birrea*. In some areas, up to 25% of the meals of poor households during the dry season contain a wild fruit component.

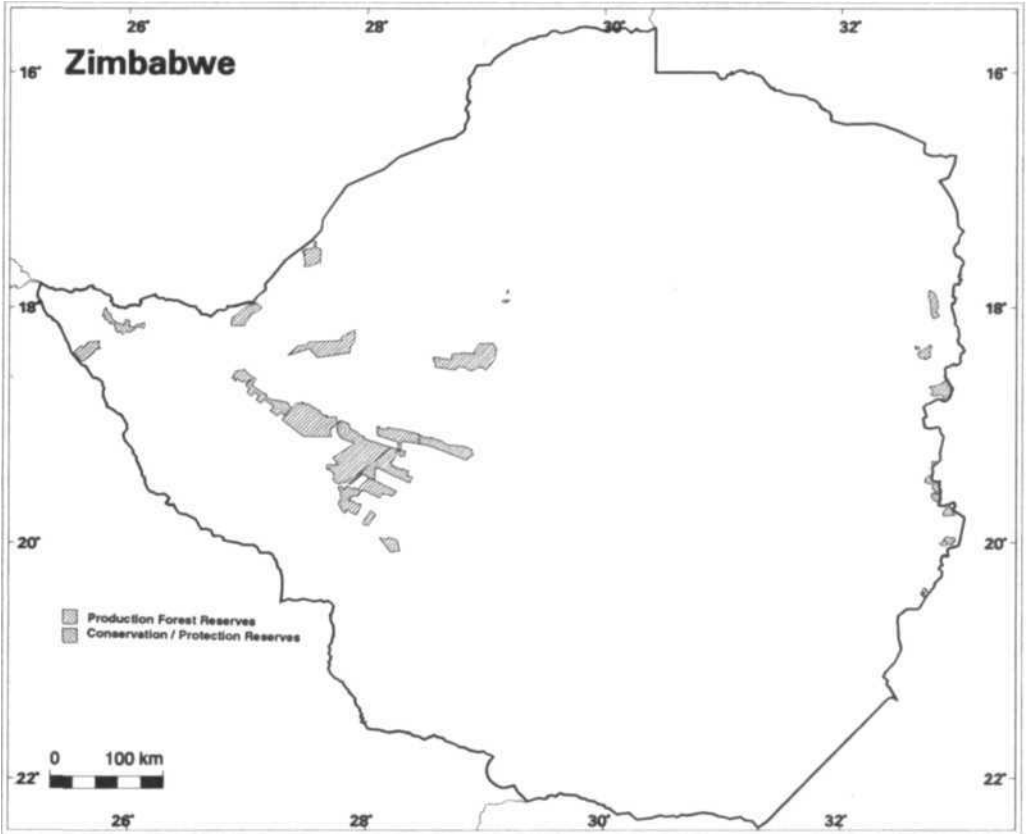


Figure 1. Forested areas of Zimbabwe

Forests are also important as sources of thatch grass which can be purchased from the Forestry Commission. Pine plantations are a source of resins tapped from *Pinus caribbae*, *P. radiata* and *P. elliotii*. Plantation forests are also an important source for honey and mushrooms.

Honey and insects (e.g. termites and caterpillars) are collected and eaten by almost all households in rural areas, though seasonally and in small amounts.

Special initiatives

The Communal Areas Management Programme for Indigenous Resources (CAMPFIRE) was initiated in 1982 to establish and support appropriate institutions under which natural resources can be managed and exploited by local communities for their direct benefit. CAMPFIRE has developed into a strong collaborative effort between government departments and non-governmental organisations and by mid-1994 it had been initiated in 23 out of 57 districts.

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IUCN - The World Conservation Union

Founded in 1948, The World Conservation Union brings together States, government agencies and a diverse range of non-governmental organisations in a unique world partnership: over 800 members in all, spread across some 129 countries.

As a Union, IUCN seeks to influence, encourage and assist societies throughout the world to conserve the integrity and diversity of nature and to ensure that any use of natural resources is equitable and ecologically sustainable. A central secretariat coordinates the IUCN Programme and serves the Union membership, representing their views on the world stage and providing them with the strategies, services, scientific knowledge and technical support they need to achieve their goals. Through its six commissions, IUCN draws together over 6000 expert volunteers in project teams and action groups, focusing in particular on species and biodiversity conservation and the management of habitats and natural resources. The Union has helped many countries to prepare National Conservation Strategies, and demonstrates the application of its knowledge through the field projects it supervises. Operations are increasingly decentralised and are carried forward by an expanding network of regional and country offices, located principally in developing countries.

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

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