# FORESTRY OUTLOOK STUDY FOR AFRICA

## SUBREGIONAL REPORT
## EAST AFRICA

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AFRICAN DEVELOPMENT BANK
EUROPEAN COMMISSION
FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS

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# Foreword

Forests and wildlife play an important role in the economies of the East African countries and provide a wide range of goods and services. However, these resources are facing severe strain on account of the rapid growth in demand and inadequate investment to maintain and enhance the productivity of ecosystems. The large extent of the arid and semi-arid lands, the frequent occurrence of droughts and consequent famines, the high population density in the uplands and their vulnerability to erosion and land degradation warrant a thorough assessment of the future role of forests and forestry in the subregion. As the countries adapt to the emerging opportunities and challenges, the forestry situation is bound to undergo changes. This report, prepared within the framework of the Forestry Outlook Study for Africa (FOSA), provides an account of the current situation, the driving forces and what is likely to happen up to the year 2020 if the present tendencies persist. Further, the report also outlines what may be done to improve the situation, especially to address the pervasive problems of poverty and environmental degradation facing the countries in the subregion.

Considering the diversity within East Africa, there will be obvious differences in the development of the forest sector between countries. FOSA has attempted to capture some key aspects of this diversity and indicated the changing opportunities and challenges. The subregional and regional overview provided by FOSA would help to strengthen the knowledge base of the national forest programmes.

While the FOSA provides an insight into the potentials and challenges and indicates the various options, it also has a broader purpose of stimulating discussion on the future of forests and forestry, providing an indication of the long term changes and how the countries and the different stakeholders could take advantage of their strengths and overcome the weaknesses. In this regard FOSA should be seen as a process, raising the appropriate questions and seeking answers based on a critical analysis of the situation, current and emerging, in the larger context. FAO in partnership with the countries and other organizations will continue to strive to support this process taking advantage of the insights provided by FOSA.

M. Hosny El-Lakany
Assistant Director-General
Forestry Department
Food and Agriculture Organization of the United Nations

# Contents

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# Abbreviations

| | |
|---|---|
| **ADB** | African Development Bank |
| **ASALS** | Arid and Semi-Arid Lands |
| **COMESA** | Common Market for Eastern and Southern Africa |
| **CDM** | Clean Development Mechanism |
| **ECA** | Economic Commission for Africa |
| **FAO** | Food and Agriculture Organization of the UN |
| **FOSA** | Forestry Outlook Study for Africa |
| **FTA** | Free Trade Areas |
| **GDP** | Gross Domestic Product |
| **HIPC** | Highly Indebted Poor Countries |
| **KIRDI** | Kenya Industrial Research and Development Institute |
| **NEPAD** | New Partnership for Africa's Development |
| **NGO** | Non-Governmental Organization |
| **NWFP** | Non-Wood Forest Product |
| **PTA** | Preferential Trade Areas |
| **UNAIDS** | Joint United Nations Programme on HIV/AIDS |
| **UNCED** | United Nations Conference on Environment and Development |
| **UNDP** | United Nations Development Programme |

# Executive summary

The East Africa subregion comprises of the continental countries of Djibouti, Eritrea, Ethiopia, Kenya, Somalia, United Republic of Tanzania and Uganda and the island countries of Comoros, Madagascar, Mauritius and Seychelles. Differences in their ecological and socio-economic conditions will continue to have an impact on forests and forestry in the countries in the subregion. This report describes the long-term outlook for the development of the forest sector in East Africa, taking account of current and emerging economic, social, institutional and technological changes.

## CURRENT SITUATION

The current forestry situation in East Africa can be summarized as follows:

- forest cover is being depleted at a rapid rate. Between 1990 and 2000 forest cover in the subregion declined at the rate of over 500 000 ha per annum;
- current efforts to adopt sustainable forest management are far from adequate. Planned and unplanned conversion of natural forests into other uses has undermined long term sustainable use of resources;
- although plantations occupy more than 1 million ha, they are poorly managed and hence their contribution to wood production is far below the potential;
- increasingly private woodlots are becoming an important source of wood supply. Secure tenure and increase in prices of wood and wood products have encouraged private sector involvement in farm planting. On the other hand tree growth in communal land is getting depleted on account of uncontrolled felling;
- most wood is used as fuel, and demand for woodfuel will continue to increase, as will resource degradation in communal and public forests and woodlands;
- the forest industry is poorly developed. Although there has been some efforts to establish modern saw mills, wood industry is still dominated by sawmills with outdated technology and low recovery. Pitsawing is a major informal sector activity;
- pulp and paper production is declining as a result of economic and environmental problems;
- the current equilibrium between production and consumption of wood and wood products largely stems from the low level of demand on account of the low incomes. An increase in income would stimulate demand and in the absence of expansion of domestic production, increased imports, especially of industrial roundwood, sawnwood, plywood, paper and paper products, will become inevitable;
- the subregion has a network of well-known national parks and game reserves, including some that are privately managed. These have been the backbone of tourism, but face several constraints, especially as a result of land use conflicts;
- East Africa is highly vulnerable to environmental degradation. Drought and famine, regular features in most countries there, have both direct and indirect impacts on the forest sector.

## DRIVING FORCES

The fate of forests and forestry in the next two decades will be determined by the combined direct and indirect effects of several factors. They can be broadly grouped as: (i) political and institutional, (ii) demographic, (iii) economic, (iv) technological and (v) environmental.

- in recent years, all East African countries have made significant policy and institutional changes. Democratic systems of government are taking root and most governments are now committed to decentralizing their forest administration as part of an overall policy of devolution of administrative responsibilities to subnational entities. Emphasis on private sector participation and community resource management has also increased. These trends will gather momentum in the coming years;
- at the current rate of population growth, by 2020 there will be an additional 107 million people in East Africa. Some of this population increase will take place in the poorest and most environmentally fragile countries, such as Ethiopia;

- with the exception of some of the island countries, the economic performance of most countries has been poor. During 1990-2000 the average GDP growth for the subregion has been about 2.8 percent. Since the per capita income is low and growing only slowly, purchasing power is unlikely to increase substantially. Poor growth of the manufacturing and service sectors would imply that land will remain the main source of livelihood for most people, increasing the the land use conflicts and consequent adverse effect on forests;
- the situation in the small island countries differs considerably from the mainland countries. Although some of them, especially Mauritius and Seychelles, have very high population densities, their economies are highly diversified, and the development of tourism, manufacturing and services sectors has been of particular help in reducing dependence on land;
- although technological changes have tremendous potential, they have been slow to take hold in East African forestry. In general, institutional capacity for scientific and technological development is very weak;
- environmental issues - the depletion of water resources, desertification, land degradation, etc. - will remain key problems. Periodic drought and famine are key features of the subregion, especially the Horn of Africa.

**IMPLICATIONS**

Considering the above driving forces and the various scenarios that affect the roles of the different actors, the key features of the situation emerging over the next two decades could be described as follows:

- deforestation is expected to continue at least at the same rate as experienced during the past decade;
- most natural forests and woodlands are likely to be exploited unsustainably. Some improvement may take place in countries such as Tanzania depending upon their success in promoting community participation;
- except for Tanzania, the opportunity to expand plantations in East Africa is limited as a result of intense pressure on the relatively productive land and the limited productivity in arid and semi-arid areas;
- where property rights are well defined, tree planting is expected to increase and become a major source of wood. Trees on communal land will however continue to be depleted;
- wood will continue to be the most important source of household energy, especially for cooking. Forests and woodlands close to urban areas will be subjected to intensive exploition and rapid depletion;
- sawmilling efficiency is expected to improve especially in view of the compulsion to utilize small-dimension logs from plantations and farm woodlots. However, many of the existing units may become uneconomical on account of increasing competition and this is likely to have an impact on employment and income;
- dependence on non-wood forest products is expected to persist, although many such resources will be depleted through overexploitation;
- wildlife will continue to be an important resource with unique potential. However, increasing conflicts will have a negative effect on wildlife-based tourism. Future opportunities will depend upon whether local communities participate in wildlife management and share the benefits;
- watershed protection will become a primary concern. Appropriate institutional arrangements to share costs and benefits between lowland and upland communities will be necessary;
- the role of forests in mitigating climate change in East Africa is minimal. There is very little scope for attracting investment for afforestation and reforestation especially under the Clean Development Mechanism;
- dependence of the poor people on goods and services provided by forests is likely to persist and as the extent of poverty increases, forestry will have to play a more pro-active role in alleviating poverty.

**PRIORITIES AND STRATEGIES**

Since extreme poverty and environmental degradation will remain the key problems in most countries in the East Africa subregion in the next two decades, poverty alleviation and environmental protection are expected to remain the main objectives of social and economic development. Forestry will also have to contribute to these objectives by redefining its priorities and strategies as indicated below:

- poverty alleviation efforts need to focus on (a) producing basic needs goods and services, especially those required by the poor and (b)

enhancing employment and income, thus improving the access of the poor to the basic needs goods and services;
- protection and restoration of upland watersheds and arresting land degradation and desertification.

Efforts to accomplish the above priorities would largely focus on policy, legal and institutional changes to enhance the freedom of action by different stakeholders. Policy and legal changes would strengthen the ongoing efforts to decentralise administration and to develop capacity at the local level. Some of the key institutional changes would include:

- revitalising the public sector forestry organizations to enable them to play a facilitating role; this would require a thorough reorientation of the functions and structure of forestry departments moving away from the traditional production/ policing responsibilities;
- improving the functioning of the market mechanism enabling a much larger number of people, especially the poor, to participate in the market system as producers and consumers; and
- improving the performance of the informal sector through addressing some of its drawbacks.

In the context of East Africa, an integrated approach to land is the key to resolve the conflicts and in many cases this will be more effective than a stand-alone forest policy. Augmenting investment in science and technology, enhancing the access to information and improving regional and subregional cooperation are key elements in such a strategy.

Chapter 1

# Introduction

## BACKGROUND

The Forestry Outlook Study for Africa (FOSA) has been undertaken as part of the ongoing effort of the FAO to provide a regional perspective of the future developments in the forestry sector. Endorsed by the African Forestry and Wildlife Commission and the Near East Forestry Commission, FOSA aims to identify emerging opportunities and constraints in enhancing the contribution of forestry to sustainable development. As globalization accelerates economic integration, it is essential to develop appropriate responses to the rapidly changing environment. It is in this context that the Forestry Outlook Study for Africa was undertaken in partnership with the African countries and international, regional and subregional organizations. This report on East Africa is one of six reports produced as part of FOSA.

## OBJECTIVES OF THE STUDY

The overall objectives of the study are to assess the status and trends in forests and forest management, evaluate likely changes in view of the various driving forces and assess what the sector will look like by the year 2020.

## SCOPE AND COVERAGE

This report covers seven continental East African countries - Djibouti, Eritrea, Ethiopia, Kenya, Somalia, Tanzania and Uganda - and four island countries in the Indian Ocean - the Comoros, Madagascar, Mauritius and Seychelles (see Box 1). The focus of this report is to identify the likely impact of the economic, demographic, social, institutional and technological changes during the next two decades on forests and forestry and how the sector may respond to the emerging opportunities and challenges.

## APPROACH TO THE STUDY

FOSA is a highly participatory initiative, involving all the countries and key organizations in the subregion. To facilitate input from countries, each one nominated a national focal point, who, with the help of a working group, produced a country outlook paper. Subregional meetings were held at the beginning to plan the FOSA process and later to review the main findings of the country reports[1]. A baseline study on population, income and forest resources provided the background information on critical variables that impact the forest sector (African Development Bank, 2000) . Based on the Global Forest Supply Model, FAO developed estimates of production and consumption of wood and wood products (see Rytkönen, 2001). FAO also undertook a review of the available data on woodfuel consumption and developed estimates of future woodfuel consumption (Broadhead *et al.*, 2001). Most of the coordination and preparation of the draft subregional report was undertaken by a consulting expert from the subregion[2] (see Owino,

BOX 1

**EAST AFRICA SUBREGION**

For the purposes of FOSA, the following countries constitute the East Africa subregion: the Comoros, Djibouti, Eritrea, Ethiopia, Kenya, Madagascar, Mauritius, Seychelles, Somalia, United Republic of Tanzania and Uganda.


[1] The FOSA planning meeting for East Africa was held in Addis Ababa, 17-19 April 2000, and the subregional technical review meeting in Nairobi, 7-9 November 2000.

[2] Efforts in the East Africa subregion were coordinated by Professor Fred Owino, whose report forms the basis of this subregional report.

2001). In support of this effort, the African Development Bank, through the Swedish Trust Fund, contracted ORGUT Consulting AB of Sweden to prepare two thematic papers, one on the main factors affecting forestry and the other on key issues in forestry (African Development Bank, 2001a and 2001b). The draft of these reports was presented and discussed during a regional technical review meeting held in Addis Ababa from 17 to 19 September 2001. A revised version of the report that amalgamated the various inputs were presented to the African Forestry and Wildlife Commission during its thirteenth session held at Libreville, Gabon in March 2002. This final version of the report incorporates the comments and suggestions from the members of the African Forestry and Wildlife Commission and others who reviewed the draft report.

**STRUCTURE OF THE REPORT**

Chapter 1 provides the background, objectives, scope and overall approach to the study. An overview of the forestry situation in the subregion, focusing on the state of forests and tree cover and the flow of goods and services, including the current state of wildlife management, is given in chapter 2. Chapter 3 discusses the main factors causing change and how they could alter the path of developments in the forest sector. Chapter 4 explores alternative scenarios, specifically focusing on how the various actors respond to changing opportunities. The implications of the driving forces in the context of the persistence of "business-as-usual" scenario are discussed in chapter 5. Strategies and actions required to move the sector into a more desirable path of development - the Great Transition scenario - are discussed in chapter 6. Chapter 7 summarizes the main findings and conclusions.

Chapter 2

# Overview of forests and forestry

Forests and forestry play a major role in the economies of East African countries by providing a variety of goods and services. Apart from the production of wood and other products, the wildlife resources are particularly important as they support the flourishing tourism industry in the subregion. Increasingly, the environmental services of forests and woodlands, especially protection of watersheds and combating desertification, have become critical in the context of the persistence of food insecurity in many countries in the subregion. This chapter provides an overview of the state of resources and the key issues concerning their sustainable management.

## FOREST AND TREE RESOURCES

Except for Uganda, East African countries have large areas of arid and semi-arid land, with annual rainfall well below 500 mm and a very long dry season. The resulting low productivity of land, coupled with limited opportunities for diversification, often leads to unsustainable use. In arid and semi-arid areas there is severe degradation, especially when livestock numbers far exceed the carrying capacity. Most of the population is concentrated in the limited high-productivity highlands of Eritrea, Ethiopia and Kenya, and the intense land use pressures are a major factor contributing to land degradation and other environmental problems such as soil erosion and downstream siltation.

### Forest cover

Information on forest cover for most countries in the subregion is scanty and often outdated. There are six broad agro-ecological zones in East Africa, each with different forest production and conservation potential: (i) the highlands/montane forest belt, (ii) the mid-elevation Lake Victoria basin, (iii) the Miombo woodlands of Tanzania, (iv) the mangrove forests along the Indian Ocean coast, (v) the extensive arid and semi-arid lands which cover the bulk of the land area in Djibouti, Eritrea, Somalia and Kenya, and (vi) the tropical forests on the islands of Madagascar and, to a lesser extent, the Comoros. Most forests are in zones (i), (iii) and (iv). There are limited forest resources in zone (ii). Forest and tree resources in zone (v) are largely treated as common access resources, with very little effort being made to manage them sustainably.

The total forest cover of East Africa is estimated at 85.6 million ha, or about 21 percent of the land area of the subregion. As with other subregions, the distribution of forests in East Africa is uneven. Ethiopia and Djibouti have very little forest cover, while nearly 44 percent of Tanzania is forested. The countries of continental East Africa have a combined forest cover of some 69.6 million ha, which amounts to only 10.7 percent of total forest cover of Africa. Tanzania, with 1.2 ha per person, has the highest forest cover per capita.

TABLE 1
**Changes in forest cover 1990-2000**

| Country | Forest cover in 1990 | Forest cover in 2000 | Proportion of forests in 2000 | Annual change rate |
|---|---|---|---|---|
| | (000 ha) | (000 ha) | (%) | (000 ha) |
| Comoros | 12 | 8 | 4.3 | n.s. |
| Djibouti | 6 | 6 | 0.3 | n.s. |
| Eritrea | 1 639 | 1 585 | 13.5 | -5 |
| Ethiopia | 4 996 | 4 593 | 4.2 | -40 |
| Kenya | 18 027 | 17 096 | 30.0 | -93 |
| Madagascar | 12 901 | 11 727 | 20.2 | -117 |
| Mauritius | 17 | 16 | 7.9 | n.s. |
| Seychelles | 30 | 30 | 66.7 | n.s. |
| Somalia | 8 284 | 7 515 | 12.0 | -77 |
| Tanzania | 39 724 | 38 811 | 43.9 | -91 |
| Uganda | 5 103 | 4 190 | 21.0 | 0.2 |
| **Total East Africa** | **90 739** | **85 577** | **20.8** | **-514** |

*Source:* FAO, 2001b.

The most widespread forest type in East Africa is the savannah woodland and thicket, which accounts for 62.9 percent of the total forested area of the subregion. This forest type is found in all East African countries and provides the habitat for a rich diversity of wildlife. The Miombo woodlands of Tanzania extend over a wide area and constitute about 20 percent of East Africa's forests. The montane forests of Eritrea, Ethiopia, Uganda and Tanzania cover a total area of about 11 million ha, or 12.8 percent of all forested areas in the subregion, and are the most threatened by human settlement and agricultural expansion. Mangrove forests are found along the Red Sea and Indian Ocean coasts and account for 0.19 percent of total forest cover.

Wood productivity of East African forests varies significantly between the humid zone and the arid and semi-arid areas. For the indigenous forests

productivity is about 1-3 $m^3$/ha/year, while for plantations of exotic species it is about 10-15 $m^3$/ha/year. Furthermore, past mismanagement and continuing overexploitation mean that even areas of high productive potential have been severely degraded in countries such as Eritrea, Ethiopia and Kenya.

#### Deforestation

The annual rate of deforestation in East Africa between 1990 and 2000 was an estimated 0.51 million ha, or about 10 percent of the annual deforestation rate for all of Africa (FAO, 2001b). Most deforestation took place in Madagascar, Kenya, Tanzania and Uganda. Today, the forest resources of East Africa are steadily disappearing and those that are left are being degraded. Expanding commercial and subsistence cultivation has contributed to deforestation. Extensive forest clearance, including the excision of plantations has taken place in countries like Kenya in order to settle landless people.

The basic causes of deforestation and degradation are the same in all the countries. They stem from a growing demand for land and forest products and inadequate efforts to implement sustainable management as a result of economic, social and institutional constraints. Encroachment, resettlement, wildfire, overgrazing and drought have all undermined the resource base. Overgrazing has particularly been a problem in arid and semi-arid areas.

#### Natural forests and woodlands

Although natural forests and woodlands account for almost 99 percent of the forest cover, there are no remaining primary forests as most of them have been modified through various human interventions. Forest management has traditionally focused on gazetted forest reserves, which were established to produce tropical hardwoods on sustained yield basis. In countries such as Uganda and Kenya, selective logging of valuable species (e.g. *Khaya anthotheca* in Uganda) became widespread, altering the structure and composition of the forests. Over the years management prescriptions have undergone changes in response to economic, political and institutional factors, and sustainability considerations have been relegated to second place, or simply ignored. Overexploitation and encroachment have undermined sustainable management of most forests and woodlands in Kenya and Uganda, irrespective of whether they are owned by governments or by communities. The situation is not very different in the extensive Miombo woodlands, which are the predominant forest formation in Tanzania (see Box 2). Miombo woodlands have a wide range of uses, including the production of woodfuel and the collection of non-wood forest products, and more important as a habitat for wildlife.

Countries such as Kenya have banned logging in indigenous forests, although this has often been counterproductive encouraging more illegal logging and consequent forest degradation (see Box 3). Severe deforestation is also taking place in the Comoros and Madagascar.

In short, the area of natural forests and woodlands under sustainable management is negligible. With increasing demand pressures, some of the management systems developed in the early decades of the twentieth century have been abandoned or become ineffective[3]. Most of what exists today are secondary forests, which will continue to be a major source of wood. Although there has been considerable discussion on the wider application of criteria and indicators for sustainable

BOX 2

**MANAGEMENT OF WOODLANDS IN TANZANIA**

Natural forests account for most of the forested area and are hence the most important in terms of their productive and protective functions. It is reported that of the 13 million ha of forests declared as reserved forests, approximately 1.6 million ha or 12 percent consist of catchment reserves. Management plans prepared for these forests focus on protection to ensure that watershed values are not undermined as a result of human intervention. However, institutional inadequacies are causing considerable problems for their implementation.

With regard to the management of productive forests (with a reported area of 23.8 million ha), very little information is available on the annual area harvested, management system, area regenerated, annual allowable cut, quantity of wood actually extracted, etc. There have been isolated inventory efforts in certain districts, largely based on requests from district authorities. Some permanent sample plots have been established recently to assess the growth rates of Miombo woodlands. Thus, although policies stipulate sustainable management as the basic tenet, it is difficult to assess the extent of actual implementation of SFM.

[3] A typical example of this is the Budongo Forest Reserve, Uganda's largest mahogany forest, which has been a major source of timber since the beginning of the twentieth century and has been logged selectively for over 60 years. More than three-quarters of this forest have been exploited through selective logging, significantly altering its composition (see Mwima *et al.*, 2001).

BOX 3

**MANAGEMENT OF NATURAL FORESTS IN KENYA**

Since 1985, logging has been banned in the indigenous forests of Kenya. However, an increasing demand for timber, especially for the construction and furniture/joinery industries, has made illegal logging in these forests a lucrative business.

It is estimated that over 50 000 $m^3$, valued at 350 million Kenyan shillings, is illegally extracted from natural forests annually, despite the ban (Wass, 1994). Illegal extraction of poles/posts is estimated to occur in 40 percent of indigenous forests, woodfuel in 23 percent, timber in 22 percent and charcoal in 20 percent. Prior to the ban, selective cutting in natural forests by licensed sawmillers was the common practice. The lack of proper management plans and felling schedules based on the concept of sustained yield management means that illegal felling by timber poachers has led to overexploitation to such an extent that most of the species of commercial value are now severely depleted. In the majority of natural forests, stocks of desirable species have been depleted below what would normally be considered commercial levels and very few high-quality mature trees can be found. Some limited extraction of wood products from natural forests by licensed individuals is currently allowed, but such authorization is limited to woodfuel, deadwood for carving, poles and posts.

(Mbugua, 2001)

forest management, they are yet to find application on a sufficiently large scale to make a perceptible impact.

### Forest plantations

The estimated area of plantations in the East Africa subregion is currently about 1 million ha, or 1.2 percent of the forest cover, but the actual area could be much smaller. The annual planting rate is estimated at about 15 000 ha. Most of the plantations are in Ethiopia, Kenya, Madagascar and Tanzania and consist of fast growing exotics such as *Pinus patula*, *Cupressus lusitanica* and *Eucalyptus spp*. (see Table 2). Many of these plantations were established in the 1960s and 1970s with donor support to supply industrial wood. However, after donor support was discontinued, plantation management has largely been neglected. Poor management, illicit felling and encroachment have reduced plantation productivity considerably. Often plantation establishment has been largely guided by silvicultural considerations and end uses, markets and economic viability have been neglected.

In general, plantation management in East Africa has been poor: thinning and pruning have not been conducted regularly, and fire and aphid infestation have caused problems. As a result of the limited suitable land area, as well as land use conflicts, plantation forestry is unlikely to become a major source of wood supply in East Africa, and dependence on natural forests and woodlands will continue.

Private-sector interest in developing plantations is slowly emerging. There have been some recent private sector initiatives in plantation projects, especially in Tanzania and Uganda. For example, teak plantations have recently been established in the Kilombero Valley of Tanzania. There have also been an expansion of woodlots in Kenya in private lands. Long term viability of these depends on a number of factors, most important being security of tenure and markets.

Among the island countries, Madagascar has a substantial area under plantations, mostly eucalypts and pines. Stimulated by both public and private investment, these plantations have replaced some

TABLE 2
**Forest plantation areas, annual planting and species mix**

| Country | Total forest plantations | Annual planting rate | Acacia | Eucalyptus | Tectona | Other hard woods | Pinus | Other softwoods | Unspecified |
|---|---|---|---|---|---|---|---|---|---|
| | (000 ha) | (000 ha) | (000 ha) | (000 ha) | (000 ha) | (000 ha) | (000 ha) | (000 ha) | (000 ha) |
| Comoros | 2 | - | - | 2 | - | - | - | - | - |
| Djibouti | - | - | - | - | - | - | - | - | - |
| Eritrea | 22 | 4 | - | 11 | - | - | - | - | 11 |
| Ethiopia | 216 | 2 | - | - | - | - | - | - | 216 |
| Kenya | 231 | 2 | 26 | 39 | - | - | 53 | 76 | 37 |
| Madagascar | 350 | 6 | 10 | 163 | - | 61 | 109 | 7 | - |
| Mauritius | 13 | - | - | - | - | 1 | 8 | 2 | 2 |
| Seychelles | 5 | - | - | - | - | - | - | - | 5 |
| Somalia | 3 | - | - | - | - | - | - | - | 3 |
| Tanzania | 135 | - | 13 | 3 | 3 | 68 | 35 | 14 | - |
| Uganda | 43 | 1 | - | 23 | - | - | 13 | 6 | - |
| **Total East Africa** | **1 020** | **15** | **49** | **241** | **3** | **130** | **218** | **105** | **274** |

*Source:* FAO, 2001b.

natural forests. However, the condition of the plantations has deteriorated as a result of poor management and more particularly of periodic fires.

East Africa's limited forest resource base and the poorly developed state of forest industries make the subregion highly dependent on imports, especially of value-added products like paper and paper products, wood based panels, etc. This will have important implications on the economic viability of forest plantations. Unless there are substantial efforts to improve productivity and to link plantations with efficient processing, plantation programmes are unlikely to attract investments

**Trees outside forests**

Trees are an integral part of traditional land use systems, providing a range of products, including construction timber, woodfuel and non-wood forest products (see Box 4). In recent years, decreasing wood supplies and increasing prices have stimulated investment in tree planting by farmers. In countries such as Kenya (see Box 5), Tanzania and Uganda, farm forestry is an increasingly important source of wood. Expansion of farm forestry will however depend on favourable policy and institutional environment, especially secure land tenure and improved market access.

Communal land is another important source of wood and non-wood products in a number of countries. In most cases these have become free-access resources and the weakening of traditional systems of management have led to resource degradation. Thus, while privately owned farms are expected to become an increasingly important source of wood, supply from communal land is likely to decline.

BOX 4

**TREES OUTSIDE FORESTS - TANZANIA**

Trees form an integral part of the farming system in several of the agroecological regions. In many areas trees are the most important component of the farming system. Trees like coconut, cashew, mango, and the shade trees in coffee and tea plantations provide timber and woodfuel. However, very little reliable countrywide estimates are available on the extent of tree growth outside forests as also their contribution to meeting the wood requirements, especially woodfuel. The National Reconnaissance Level Land Use and National Resource Mapping Project provides some indication of the area under different categories which could be potentially used to provide an approximate indication of the extent of trees outside the forests. The forest inventory undertaken in the Arusha, Dodoma and Singida regions do provide some information on the volume of tree growth under the different land uses, including crop lands with trees. Other than this there is no information on the extent of tree growth outside forest land and their potential and actual contribution to meeting wood and other requirements.

BOX 5

**WOOD PRODUCTION FROM FARM LANDS IN KENYA**

Wood production from farmlands and settlements, according to Kenya's Forestry Master Plan (1994), consists of 73 percent woodfuel, 20 percent timber and 7 percent pole. The amount of wood fuel available in farmlands and settlements in 2000 is estimated at 9 $m^3$/ha (or a total of about 82 million $m^3$). The farmlands and settlements are expected to provide more wood for fuel attaining a maximum of 15 $m^3$/ha or a total of 155 million $m^3$ by 2020.

(Mbugua, 2001)

**WOOD AND WOOD PRODUCTS**

Forests and woodlands and trees outside forests, produce a range of goods and services. The flow of goods and services is largely determined by their biophysical characteristics, the nature of demand and the type of human intervention. A broad indication of the goods and services provided by forests is given below.

**Woodfuel**

Undoubtedly woodfuel is the most important forest product in East Africa and the main source of household energy in the subregion. Of the total amount of wood produced in the East African countries, almost 95 percent is used as fuel. This constitutes about 80 percent of household energy in the countries of the subregion and some 60 to 70 percent of total energy consumption. In 2000 the consumption of woodfuel, including charcoal, is estimated as about 199 million $m^3$. Between 1990 and 2000, the consumption of woodfuel has increased at the annual rate of 1.6 percent.

Although there has been a lot of discussion on the wood energy crisis, including its environmental consequences, there are major gaps in information on the demand and supply of woodfuel. A substantial proportion of rural supply is obtained from unmanaged sources, including bushland and spontaneous growth in

fallow land. In the heavily populated and intensively farmed areas of the subregion (for example around Lake Victoria), most woodfuel is produced - largely incidentally - on farms under tree crop farming system and this is on the whole sustainable.

While localised shortage exists in several rural areas, urban woodfuel supply is becoming more critical in the subregion. With urbanisation, there is a shift in household demand, resulting in the increased use of charcoal. This is particularly resulting in the degradation of forest and woodland resources close to urban centres. Although urban households have access to alternative sources of energy, fuel-switching depends on a number of factors, especially certainty of supplies, prices and ability to pay. In many urban areas of East Africa, privatisation (or commercialisation) of energy utilities has substantially increased the costs of commercial fuels resulting in the increased use of woodfuel. In addition to urban household demand, there are also several industries (for example brick-making) that depend on wood as the main source of energy. In the Comoros, distilleries producing ylang, an ingredient in perfumes, are almost entirely dependent on wood as the source of energy. Declining wood supply on account of unsustainable harvesting has led to the closure of many ylang producing units.

Efforts to address the wood energy problem include, (a) enhancing wood supply through establishing plantations specifically to meet urban needs, (b) promoting more energy-efficient cooking devices, and (c) supporting alternative sources of energy. The outcome of these efforts have been at best mixed. Investments in energy plantations have been far from adequate to meet the growing urban demand. Improved cooking devices are yet to find wider use for a variety of factors. Some efforts have been made to promote alternative energy sources, including biogas, solar energy and liquefied petroleum gas. Although decentralized renewable systems, especially solar and wind energy, are likely to emerge as important options in the future, they are unlikely to become a viable alternative to woodfuel in East Africa during the next two decades.

#### Industrial roundwood and wood products

The total industrial roundwood production in East Africa in 2000 is estimated as about 10.1 million $m^3$ or about 5 percent of the total roundwood (industrial roundwood + woodfuel) production. Poor forest resources mean that East Africa is unlikely to become a major producer of industrial roundwood. And low incomes imply that it is nor a major consumer too. Recent estimates (see Table 3) indicate that production and consumption are more or less in balance, albeit at low levels of consumption.

TABLE 3

**Industrial roundwood production and consumption (2000)**

| Country | Production | Consumption |
|---|---|---|
| | (000 $m^3$) | (000 $m^3$) |
| Comoros | 9 | 9 |
| Djibouti | n.a. | n.a. |
| Eritrea | 2 | 2 |
| Ethiopia | 2 459 | 2 459 |
| Kenya | 1 977 | 1 977 |
| Madagascar | 93 | n.a |
| Mauritius | 13 | 29 |
| Seychelles | n.a | n.a |
| Somalia | 110 | 106 |
| Tanzania | 2 314 | 2 304 |
| Uganda | 3 175 | 3 175 |
| **Total East Africa** | **10 156** | **10 061** |
| **Africa** | **68 826** | **63 655** |

*Source:* FAO, 2002.

Only in the case of Mauritius the consumption far exceeds production, largely reflecting the limited resource availability and its ability to import industrial roundwood. Its per capita consumption of industrial roundwood is about 0.024 $m^3$, while for the entire subregion it is 0.055 $m^3$.

An important feature of wood use is the low proportion of industrial roundwood that is processed as sawnwood and other value-added products. Almost 75 percent of the industrial roundwood consists of poles, fence posts and construction materials that are used with minimal processing. In 2000, sawnwood production in East Africa was approximately 1.0 million or about 11 percent of African production. Uganda and Kenya are the main producers of sawnwood, although in 2000 Madagascar reported a substantial increase in sawnwood production as compared to the previous years. Kenya, Tanzania and Ethiopia also produce a small quantity of wood panels, newsprint and printing and writing paper. As shown in Table 4 East Africa's share in the production and declines significantly as the degree of processing increases.

Capacity utilization in wood industry in East Africa varies considerably, largely on account of raw material shortages as well as other problems including infrastructural problems. This is particularly so in the case of production of wood based panels and paper and paperboard production.

TABLE 4
**Production of other wood products – 2000**

| Country | Sawnwood | Wood panels | Newsprint | Printing and writing paper |
|---|---|---|---|---|
| | (000 $m^3$) | (000 $m^3$) | (000 tonnes) | (000 tonnes) |
| Comoros | n.a | 0 | 0 | 0 |
| Djibouti | n.a | 0 | 0 | 0 |
| Eritrea | n.a | 0 | 0 | 0 |
| Ethiopia | 60 | 25 | 1 | 3 |
| Kenya | 185 | 52 | 14 | 18 |
| Madagascar | 485 | 5 | 0 | 2 |
| Mauritius | 5 | 0 | 0 | 0 |
| Seychelles | n.a | 0 | 0 | 0 |
| Somalia | 14 | 0 | 0 | 0 |
| Tanzania | 24 | 4 | 8 | 6 |
| Uganda | 264 | 5 | 0 | 0 |
| **Total East Africa** | **1 039** | **91** | **23** | **29** |
| **Africa** | **7 667** | **2 057** | **368** | **658** |

*Source:* FAO, 2002.

Sawmills provide the most jobs and consume the most wood of all East African forest-based industries. Pit-sawing is widespread. Those who engage in pitsawing traditionally target certain hardwood species and operate in natural forest areas. Most saw mills are of small scale using technology that results in low recovery rates. Few run continuously throughout the year. These mills supply local markets, where there is little demand for high-quality wood. A few larger units do exist, and some even find an export market. In the recent years there has been some investment in modern saw mills, which rely on sawlogs from Central Africa.

### Forest products trade

Although the consumption of wood products is low, most countries are dependent on imports to meet the demand for several of the products. The value of forest products imports has increased substantially from about US$75 million in 1990 to US$179 million in 2000 (see Table 5). Exports also have increased, but far less than imports, from US$14 million in 1990 to US$42 million in 2000.

It is obvious from Table 5 that value-added items (particularly wood panels and paper and paper board) account for most of the import bill. And for obvious reasons - limited forest resources and high demand stemming from its high income - Mauritius is the major importer of forest products in the subregion.

As regards exports, most of it is as industrial roundwood and sawnwood (which together accounted for 53 percent of the value of exports in 2000). In 2000 the subregion also exported paper and paper board worth about US$11.57 million, mainly from Kenya, but also some re-exports from Mauritius. Madagascar has emerged as the major exporter of industrial roundwood from the subregion. With the limited resource base and the high rate of deforestation, this points to the long term unsustainability of forest products exports from Madagascar.

TABLE 5
**Value of forest products imports by East African countries**

| Products | 1990 | 2000 | Major importers in 2000 |
|---|---|---|---|
| | (US$ million) | (US$ million) | (share in percentage) |
| All Forest products | 75.08 | 179.47 | Mauritius (38%), Kenya (18%) |
| Industrial roundwood | 0.40 | 2.89 | Mauritius (79%) |
| Sawnwood | 10.44 | 20.03 | Mauritius (71%) |
| Wood based panels | 8.41 | 20.88 | Mauritius(42%), Ethiopia(19%) |
| Paper and paper board | 55.43 | 125.80 | Mauritius (33%), Kenya (22%) |

*Source:* FAO, 2002.

### Non-wood forest products

East African forests produce a large variety of non-wood forest products like gums and resins, medicinal and aromatic plants, tannins and dyeing materials, nuts, berries, honey, wax, etc. Several of them are subsistence products providing nutrition, critical in situations of drought and famine. Traditional medical systems, the only affordable alternative available to most rural and urban population, are very much dependent on medicinal plants. Several of the products have been commercialised and traded within and outside the countries. Table 6 provides some general indication of some of the important products and the data available on them.

A substantial proportion of non-wood forest products collection, processing and use takes place in the informal sector. Therefore, no reliable statistics are available on their contribution to income and employment, and data are available only for commercialized items such as gum arabic, frankincense, shea butter, honey, beeswax, tannins and mushrooms. Honey and beeswax are the most important non-wood forest products from the Miombo woodlands of Tanzania, with an estimated annual production potential of 150 000 tonnes of honey and 10 000 tonnes of beeswax. Honey alone is estimated to contribute about one-third of the income of Miombo-area households. Tannin production based on wattle bark (*Acacia mearnsii*) has been a major NWFP industry in Kenya, but this has been facing a number of problems in the recent years. Production of mushrooms

BOX 6

**NON-WOOD FOREST PRODUCTS IN EAST AFRICA**

**Medicinal plants**. In many rural areas, traditional medicines are the normal way of treating disease. Some plants used are well known and widely used, while many others are only recognized and used locally. Local people possess traditional knowledge of the medicinal value of many tree and shrub species. A good example of an important medicinal plant is *Prunus africana*, the bark of which is used as a remedy for prostate disorders and stomach ache.

**Gum arabic**. Produced from *Acacia senegal*, the best and most widely recognized gum arabic comes from Sudan, where it is traditionally cultivated in gum gardens. It is also widely produced in the lowland areas of many countries in East Africa, where the gum is simply collected from trees in the wild.

**Gums.** The olibanum gums, frankincense and myrrh, are obtained from various species of the genera *Boswellia* and *Commiphora*. Production is restricted to the dry savannahs of Ethiopia, Eritrea, Dijbouti and Somalia, which produce hundreds of tonnes of incense each year.

**Beekeeping**. Honey and beeswax are true forest products. In many rural areas, beekeeping is a major activity. Members of the Dorobo tribe, which is closely associated with the Masai, are all beekeepers. Honey and wax can also be collected in the wild, although the use of beehives is now the norm. Honey is sold in local and export markets. Beeswax was once a major export of Tanzania.

(FAO, 2001a)

TABLE 6

**Main non-wood forest products in East Africa**

| Country | Main non-wood forest products | Available data |
|---|---|---|
| Djibouti | Fodder plants | No information available |
| Eritrea | Exudates (gum arabic from *Acacia senegal,* olibanum from *Boswellia papyrifera*)<br>Utensils<br>Leaves from doum palm (*Hyphaeae thebaica)* | In 1997, Eritrea exported 49 tonnes of gum arabic, 543 tonnes of olibanum and 2 064 tonnes of doum palm leaves |
| Ethiopia | Exudates (gum arabic, olibanum, and myrrh from *Commiphora myrrha*)<br>Medicinal plants<br>Honey and beeswax | Ethiopia is one of the largest producers of olibanum in the world, with an annual production of 1 500 tonnes<br>Annual production of gum arabic was 350–400 tonnes in 1988–1994<br>In 1976–1983, annual honey production ranged from 19 400 to 21 000 tonnes, representing 24 percent of Africa's total honey production |
| Kenya | Fodder plants<br>Exudates (e.g. *Boswellia spp.*)<br>Tannins (*Acacia mearnsii*) | Annual production of tannins averages 9 700 tonnes, of which 7 800 tonnes is exported |
| Somalia | Exudates (myrrh, olibanum, and apopanax from *Commiphora spp.)* | Annual production of myrrh is estimated at some 4 000 tonnes with a total value of about US$16 million.<br>In 1987, exports of olibanum were 200 tonnes from *Boswellia carteri* and 800 tonnes from *B. frereana* |
| Tanzania | Fodder plants<br>Medicinal plants<br>Honey and beeswax | Major medicinal plants include *Cinchona* spp. (plantations of this exotic species yielded 756 tonnes of bark in 1991, worth US$258 000) and *Prunus africana* (an annual yield of 120 tonnes, worth US$240 000 to 1.2 million) |
| Uganda | Honey<br>Bush meat | Export of some 50 kg of shea nut butter in 1996 |

*Source:* FAO, 2001a.

for local consumption and exports has also grown rapidly. In the island countries, products such as palm hearts, coconuts and medicinal plants and herbs are marketed locally and serve as a vital source of income. In Seychelles, a local apiculture market has begun to develop. In the Comoros, the rural population has benefited from grinding almonds into powder for sale.

Although there are a large number of non-wood forest products, only a few have been commercialized. A substantial part of the trade takes place through networks of collectors, transporters and traders, often with strong links to exporters in the case of products in demand on external markets. Without exception, these products require limited processing. Since most products are simply collected from the wild, there is no incentive to manage them sustainably. Domestication and more organized cultivation have been limited to a small number of items. Increasing demand for some of the products has resulted in their over exploitation and depletion. Many of the products are free-access resources and in the context of weak tenure, there are no incentives to conserve and manage them sustainably.

## WILDLIFE RESOURCES

### Protected areas

Probably the most important natural asset of East Africa subregion is its wildlife, which forms the basis of its growing tourism industry. The total extent of protected areas in East Africa is estimated at about 56.7 million ha or about 13.8 percent of the geographical area (see Table 7), which is the highest in comparison with other subregions in Africa. However, human-wildlife conflicts have increased as a result of population growth and the expansion of settlements. Wildlife habitats are shrinking fast as a result of deforestation and growing demands for

alternative land uses. Conflicts between livestock, which is one of the most important source of livelihood, and wildlife are increasing. This is particularly the case when local communities do not benefit from tourism, and wildlife competes with cattle for the limited resources of fodder and water. These conflicts become severe during periods of drought.

TABLE 7
**Extent of protected areas in East Africa**[4]

| Country | Area (000 ha) | Proportion of land area (%) |
|---|---|---|
| Comoros | - | - |
| Djibouti | 10 | 0.4 |
| Eritrea | 501 | 4.3 |
| Ethiopia | 18 700 | 16.9 |
| Kenya | 4 538 | 8.0 |
| Madagascar | 1 232 | 2.0 |
| Mauritius | 4 | 8.0 |
| Seychelles | 45 | 99.0 |
| Somalia | 524 | 1.0 |
| Tanzania | 26 262 | 30.0 |
| Uganda | 4915 | 20.0 |
| **Total East Africa** | **56 731** | **13.8** |

*Source:* UN, 2003.

### Management of protected areas

Institutional arrangements for management of wildlife vary between the different countries. In Ethiopia, Kenya, Uganda and Tanzania, wildlife management is governed by policies, legislation and institutional arrangements separate from those for forests. Until the early 1980s, national park and game reserve management was largely the responsibility of central governments, with these areas enjoying protection by armed guards and their management being strongly driven by wildlife research and education programmes. Since the mid-1980s, these countries have faced steady declines in the status of their parks and reserves. Support for research and education has fallen sharply, while government support for protection has decreased against the background of increasing poaching pressures. More recently, insecurity in game parks and reserves has posed serious problems for the tourism industry.

There has been increasing involvement of the private sector in the management of parks and game reserves. In Kenya there are a number of privately owned parks. The recent years have also seen efforts to commercialise and privatize all or some aspects of parks management. Private sector already play an important role in managing tourism in the national parks. Conflicts in the management of protected areas largely stem from the skewed distribution of costs and benefits of protected area management. Local communities bear a large share of the costs of wildlife protection, especially when wildlife damages property and life (see Box 7). Several initiatives are underway to facilitate community participation in protected area management.

BOX 7
**ISSUES IN WILDLIFE MANAGEMENT IN ETHIOPIA**

A number of factors have contributed to the decline of wildlife management in Ethiopia. The key problems facing conservation efforts in protected areas are land use conflicts, lack of clear policies for conservation and development of the sector. The crucial problem remains to be the problem of implementation of conservation objectives against the interests of the local communities.

(Bekele, 2001)

### Wildlife based tourism

Tourism is one of the rapidly growing industry in several of the East African countries (see Box 8) and in the case of many countries this could largely be attributed to the wildlife resources. Notwithstanding temporary setbacks often triggered by international developments, tourism is expected to grow and East Africa is in a position to benefit from this significantly. In addition to managing the habitat scientifically and ensuring improved protection, enhancing the tourism potential requires:

- improvement of the infrastructural facilities; and
- ensuring that local communities benefit from tourism development.

With their diverse landscapes and rich biodiversity, the potential for ecotourism is high in all East African countries. Uganda leads East Africa in ecotourism development. For example, in the Mabira and Budongo Forests of Uganda, local communities share in the income generated by ecotourism by offering catering

BOX 8
**TOURISM IN KENYA**

In Kenya, the tourism industry is a major source of foreign exchange and employment, despite recent woes. The industry provides about 480 000 jobs, because of the labour-intensive nature of tourist activities. Kenya has adequate tourism facilities. However, perceptions of insecurity in recent times have seriously affected the industry. The worst period was 1998, when ethnic fighting in some parts of the country caused a sharp decline in tourism

[4] Based on recent estimates by the World Conservation Monitoring Centre made from updated maps and including protected areas outside forests, as well as marine parks.

services, crafts for sale and dramatic performances. The newly formed Uganda Community Tourism Association is already making a significant impact in the promotion of ecotourism.

However, the direct benefits of ecotourism are still limited. Ecotourism needs to be marketed better. For example, the Uganda Forest Resource Management and Conservation Programme has been created to promote the involvement of the private sector and local communities in ecotourism initiatives. The factors that have hindered the development of ecotourism in Uganda include poor accessibility to some tourist sites, inadequacy of other facilities, especially lodging.

In the case of the island countries, especially Seychelles and Mauritius, tourism is largely based on its beaches. However, their forests and wildlife offer alternative attractions. More importantly, forests maintain the environment and enhance the overall attractiveness of these countries. This is particularly important in view of the need to regulate water flows and to protect the coastal ecosystems.

#### Bushmeat

Game meat - or "bushmeat" - is much less popular in East Africa than in other subregions of Africa. Some of the local communities have strong cultural prohibitions against eating a variety of wildlife species. Rabbits, guinea fowl, quail, antelope and others species are exploited for food, although the scale of this is limited and it is unlikely to have a significant impact on species abundance. Traditional wildlife hunting for game meat is a vanishing practice.

In the last ten years or so, wildlife farming for game meat has increased substantially in the subregion, particularly in Kenya. Ostrich and crocodile farming are thriving, both for food and other products. Game meat is already popular in a few restaurants catering largely to foreign tourists. It is still too early to predict the long term trend and how the local population will respond to this opportunity

### ENVIRONMENTAL SERVICES

Some aspects of the provision of environmental services by forests and woodlands have been briefly indicated in the earlier sections. Important service functions of the East African forests and woodlands include conservation of biological diversity, protection of watersheds and control of desertification. These functions are particularly critical as regards ensuring food security.

#### Biodiversity conservation

All East African countries, except Somalia, are signatories to the Convention on Biological Diversity. Many biodiverse locations were established as protected areas many years ago, but although appropriate policies and strategies for biodiversity protection are in place, implementation is far from satisfactory. Many areas are remote, making management and protection difficult. Some of the areas that are very rich in biological diversity such as the Eastern Arc, the East Usambara Mountains and Madagascar, are also experiencing strong population pressures.

Most existing protected areas were established at a time when population pressure was much less than it is today, and when there were fewer legal hurdles for governments that wanted to move people and acquire land. Recent legislation in Tanzania and Uganda makes it extremely difficult and costly for the governments to expand the extent of protected areas in view of the intensifying conflicts. In many cases institutional and policy constraints result in conflicting actions. Notwithstanding the increasing awareness of the long term significance of protecting biodiversity, confronted with other pressing priorities biodiversity conservation gets negligible attention of the decision makers.

#### Watershed protection

Considering that most of the land in East Africa is arid and semi-arid, and most of the population is concentrated in the highlands, access to water is a key issue. The situation will become critical in the coming years.

The highland catchment forests of Eritrea and Ethiopia have largely been destroyed. As a direct consequence, these countries are faced with erratic stream flows and associated soil and water management problems. Eritrea has mounted an active programme of forest enclosures to encourage the re-establishment of natural forests. In Ethiopia, the National Forestry Action Plan, adopted in 1994, has accorded high priority to reforestation of catchment areas.

In the Comoros, the lack of available surface water as a result of forest degradation means that many inhabitants depend upon rainwater. In Seychelles and Mauritius the water problem is acute. Improvements in catchment management are vital in the context of sustaining the tourism industry, an important element in the economies of both countries.

Environmental consequences arising from degradation of the Nile watershed are emerging as critical problems for all downstream countries. As domestic demand for water increases in Sudan and Egypt and the land use problems in the Nile catchment countries intensify, mechanisms to resolve conflicts must be developed.

**Desertification and land degradation**

Increasing pressure on land suggests a worsening of land degradation and desertification, especially in the context of very limited investments on land and water management. Almost 80 percent of the land in East Africa comprises of Arid and Semi-arid Lands (ASALS) and most of it suffers from degradation on account of poor soil and water management. Increasing frequency of droughts has undermined agricultural production resulting in severe famines. In the recent years, the severity of famines has increased - especially in the Horn of Africa - requiring massive relief measures to overcome starvation and deaths.

All the indications are that the problems of desertification and land degradation are likely to persist and intensify in the near future. Considering the intense pressure on the limited highland area, further expansion of agriculture - including animal husbandry - is most likely to take place in the ASALS. Such agriculture expansion may not be planned properly and in the absence of appropriate soil and water management, the problem of desertification is likely to worsen.

Trees and forests do play an important role in arresting land degradation and desertification. This has been particularly realised by local communities, who have raised windbreaks and shelter belts to prevent the movement of sand dunes and to reduce the impact of desiccating winds on agricultural crops. However, investments in these efforts have been far from adequate to address the problem effectively. Weak tenure arrangements and the low levels of investment are major factors contributing to land degradation.

The upland areas of Eritrea, Ethiopia and Kenya face another type of resource degradation. In view of the very high population density, land use is very intensive, but seldom involves application of modern inputs or adoption of effective soil and water conservation measures. Cultivation has been extended to fragile land, especially mountainous slopes. Steep terrain combined with intensive use of the land has accelerated land degradation through erosion and loss of fertility. For example, about 2 million ha of cropland in the Ethiopian highlands have been irreversibly degraded, and are experiencing an estimated annual sediment loss of 20 tonnes per hectare. Accelerated desertification in most countries is recognized as the main cause of food insecurity. This remains the dominant intervention area for the Inter-Governmental Agency for Development.

**SUMMARY**

The overall forestry situation in East Africa can be summarised as follows:

- forest cover is being depleted at a very rapid rate. During 1990 to 2000 the annual loss of forest cover is estimated as about half a million hectares;
- current efforts to adopt sustainable forest management are far from adequate; most forests and woodlands are managed unsustainably on account of economic, policy and institutional constraints;
- the scale of plantation activity is rather limited. Most of the plantations - largely under public ownership - are not managed efficiently and consequently their productivity is extremely low;
- tree growth on communal land has declined owing to increasing pressures and the declining capacity of traditional community organizations to manage the resources sustainability. However there has been an increase in tree planting in private lands, which is becoming an increasingly important source of wood;
- nearly 95 percent of the wood is used as fuel. Increased urban woodfuel demand is resulting in rapid depletion of forests and woodlands close to urban centres;
- about 75 percent of the industrial roundwood is used as poles, posts and other construction materials and only the remaining is used in further processing as sawnwood, wood based panels, paper and paper products, etc.;
- wildlife is one of the key resources of most countries in the subregion and forms the backbone of the growth of tourism. Notwithstanding the efforts to protect the wildlife through a network of protected areas, increasing land use conflicts and poaching are having significant negative effects on the wildlife.
- East Africa is highly susceptible to environmental degradation, including desertification. The other key problems relate to watershed degradation and loss of biological diversity.

Chapter 3

# Factors affecting the forest sector

The current state of forests and forestry in East Africa as outlined in the previous chapter is an outcome of the effect of a multitude of factors, most often outside the forest sector. An understanding of how these are likely to evolve is therefore critical to get an insight into the future of the forest sector. Broadly these factors can be grouped as: (i) political and institutional, (ii) demographic, (iii) economic, (iv) technological and (v) environmental. The following sections outline key trends in these areas and the nature of their impacts

## POLITICAL AND INSTITUTIONAL CHANGES

In view of their wide ramifications, political and institutional changes will have an overwhelming direct and indirect impact on forests and woodlands. Democratic systems of governments are emerging and increasingly changes in governments are effected by ballots. The overall trends in the political and institutional arena in East Africa can be characterised as follows:

- decentralization and devolution of administrative responsibilities to subnational entities, especially provinces, districts and local bodies;
- increasing acceptance of participatory approaches, including community-based management and joint forest management;
- policy and institutional changes in favour of an increased role for the private sector; and
- emergence of civil society organizations as an important force in influencing governance in general and forest resource management in particular..

These developments are having a direct and indirect impact on forests and forestry by altering the behaviour of the various actors. The impact of these are briefly described below:

### Decentralization and devolution of administrative responsibilities

Most countries in the subregion are implementing policy and institutional changes (see Box 9)

BOX 9

**INSTITUTIONAL CHANGES IN FORESTRY IN EAST AFRICA**

Most countries in the subregion are implementing major institutional changes, with administrative decentralization as a key component of their development policies. In Eritrea, development planning and implementation is vested in the administrative regions, although the central Forest Service, part of the Ministry of Agriculture, has yet to harmonize its operations and responsibilities with regional-based teams.

In Ethiopia, the government has recently launched its policy of administrative decentralization, although it has yet to be fully implemented. The previous Forest Department has been transformed into a "Forestry Team" under the Natural Resources Development and Regulatory Department of the Ministry of Agriculture.

Since the formulation of a new draft forest policy in 1994, Kenya has toyed with various options for institutional reform of the forest sector. The thrust of the proposal is to: (i) trim down the present Forest Department into a smaller body primarily charged with overall regulatory responsibilities for the sector and management responsibility only for natural forests; (ii) create a parastatal forestry board to manage industrial plantations on a business basis; (iii) encourage greater private-sector investment; (iv) promote farm forestry; and (v) promote structured community participation in forest management.

Uganda is undertaking a major institutional reform of the forest sector. A national Forest Sector Co-ordination Secretariat is already functional. A new forest policy and new legislation have been approved. As part of these reforms, the present Forest Department will be transformed into a semi-autonomous agency, which will clearly separate the productive and normative roles of government. In this way, the government will devolve and privatize plantation and woodlot production activities.

The new forest policy and new beekeeping policy in Tanzania are particularly strong on decentralization and the promotion of community participation in forest management and protection. Many districts have employed their forestry staff directly, with effective planning and implementation of field programmes already entrenched at the district level. Among the countries of the subregion, Tanzania has made the greatest progress in promoting community participation in forest management. In some cases, significant progress has been made in negotiating joint forest management agreements with forest-adjacent communities.

BOX 10

**DECENTRALIZATION: AN UNCHARTED TERRITORY**

A key element in decentralization is the need to synchronize different aspects of public administration such as revenue collection, expenditure policy and administrative regulations. Most countries find it difficult to coordinate these various components, and decentralization of the various administrative functions may therefore progress at different speeds, creating problems of coherence and administrative tensions.

Weak law enforcement and corruption are still very serious problems. Accountability at the local level may be weak, indeed possibly weaker than at the central level. Local governments may be as adept as national ones at using public resources for political patronage. Deeply entrenched local elites are often skilled at using decentralized institutions for their own purposes. Depending on the circumstances, corruption at the local level may simply replace - or, worse still, compound - that at the central level. Decentralization is essentially a political undertaking in the sense that it involves a redistribution of power away from the central state in favour of decentralized government institutions. The state bureaucracy has often resisted decentralization. The resistance from organized power groups within the administration explains the often-observed gap between official declarations and implementation.

(Contreras-Hermosilla, 2002)

especially focusing on decentralisation of administrative responsibilities to the sub-national levels. Provincial, district and local bodies are being empowered to manage natural resources, including forests and woodlands. The process is in the early stages in most countries. The eventual outcome will depend on balancing the need to promote participation against the multitude of conflicting objectives that forests and trees have to fulfil. On one hand, the changes could negatively affect the efficiency of forest management, especially in the context of the limited capacity of decentralised administration to manage the resources sustainably (see Box 10). On the other hand, there are also unique opportunities to improve resource management when the local bodies feel fully committed and has a direct stake in the outcome. There are indications that decentralisation of resource management is preparing the ground for far-reaching changes in the forest sector (see Alden-Wily, 1999)

**Community participation**

Another related change is the increasing emphasis being given to local community participation in resource management. Historically in most East African countries local communities have developed appropriate institutional arrangements to manage community owned resources. Over the last two decades, there have been efforts to rediscover the importance of participatory natural resource management. Most countries have modified or revised their forest policies and legislation to facilitate community participation in forest resource management. Forest legislation has recognized community ownership - and in some countries, for example Tanzania, facilitating the establishment of village reserves.

Although the extent of community participation in forest resource management is still very limited, it is expected to gather momentum in the coming years. Most publicized participatory approaches have been driven by donor support, casting doubt on their sustainability. There is a long way to go before the "success stories" seen to date are replicated on a wider scale and make a significant impact on the resource-management scenario. This would require substantial efforts to improve institutional capacity and technical skills.

**Private sector involvement**

Another key policy element that is having a far-reaching impact on forests and forestry is the increasing emphasis on private-sector involvement. Although in many countries, the private sector is a dominant player in agriculture, industry and services, forestry - especially forest management - has largely remained the domain of the public sector. However, this is changing. Recent forest policies clearly visualize the involvement of the private sector in wood production. In addition to facilitating private-sector

BOX 11

**PRIVATIZATION OF FOREST PLANTATIONS**

"Despite the numerous potential advantages, the privatization of forest plantations has moved slowly in Africa. While privatization is a major policy priority at the national level and has been carried out with some intensity in other sectors, it has yet to permeate the forestry sector. The prospects for an intensification of privatization processes in the forest plantation sub sector in Africa are generally weak. Few plantations are commercially attractive, there is a lack of public consensus that this is the best way to go and there are various vested interests that will lobby against it. The capacity of both the public and private sector to manage the process is weak"

(Contreras-Hermosilla, 2002)

investment, many countries are transferring forest plantations to the private sector. In many cases privatization has been initiated as part of economic reforms, especially under the structural adjustment programmes aimed to reduce government expenditure. However, hitherto the progress as regards privatization of forestry, especially plantations has been limited (see Box 11). Partly this stems from the fact that many of the plantations established hitherto are not commercially viable. With years of neglect, their productivity is low making them unattractive for private sector acquisition. Interestingly, there are considerable private sector efforts in the cultivation and management of trees. Where land tenure is secure (see Box 12), there has been a surge in the cultivation of trees in woodlots or as an integral part of farming systems, especially in homesteads and on coffee and tea plantations. These have become an important source of wood supplies, especially in countries such as Kenya, Tanzania and Uganda.

Another area of increasing private-sector participation is the management of national parks and game reserves. Kenya already has a number of private parks that play a major role in protecting wildlife[5]. With increasing wildlife-related tourism, private-sector interest in park and game reserve management has grown. Several public parks are commercialising many of the functions, sometimes handing over activities like tourism to the private sector.

BOX 12

**LAND TENURE**

Current land and tree tenure systems in most countries have significant limitations for tree growing and forest conservation. In the extreme, the traditional Diessa and Tsilmi land tenure systems in Eritrea and Ethiopia set major limitations on tree growing by rural populations as the user rights are rotated among individuals after a period of five to seven years. The current free access arrangements for the vast forest and tree resources in trust lands in Kenya, Uganda and Tanzania pose limitations to effective management and conservation, inasmuch as there is no link between resource ownership and use, and hence no willingness to manage them. Land tenure is under review in most countries of the region, and the outcome will have a significant impact on tree growing. Assured user rights are expected to encourage tree growing. It is also important to note that land reforms and the assignment of forest land to the landless could have immediate negative effects by causing deforestation to make way for crops.

**Growing role of civil society**

Civil society is fast becoming a significant voice in forest management and protection. For example, in Kenya, there are several non-governmental organizations active in taking up public interest issues relating to forestry. In fact the role played by important NGOs like the Green Belt Movement have significantly helped to create awareness on the implications of various government actions and to build up public pressure to reverse decisions that would have had long term adverse impacts. In Uganda, there are several active women's groups concentrating on forestry activities, particularly in Kampala, Masaka and Kabale. Their recent involvement as stakeholders has elicited mixed reactions from traditional players. All the indications are that depending on the progress of democratization, civil society will emerge as a major player, helping to bring about transparency and social accountability. Forestry issues, which in the past have been largely dealt with by public sector organizations, will be subjected to intense public scrutiny.

**Civil wars and conflicts**

Poverty and the competition for the limited resources often fuel conflicts, both internal and external. Most countries in the subregion have suffered from such conflicts. For over a decade, continuing clan wars in Somalia have prevented the emergence of a viable government. The war between Eritrea and Ethiopia had significant negative impact on the development process by diverting the limited resources. Internal conflicts, largely of ethnic origin, but all of which can be traced to resource use conflicts, affect most countries, including Ethiopia, Kenya and Uganda, often spilling across borders. Madagascar went through a difficult period of political turmoil in the recent months, affecting its economic performance.

Civil wars and conflicts pose a major challenge to development, especially as they derail progress by disrupting normal economic activities and destroying human and physical capital. Substantial resources that should have been used for social and economic development are diverted for supporting or containing conflicts. Resolving these conflicts and developing appropriate institutional mechanisms to identify

[5] Kenya has 50 private protected areas with a total area of over 12 200 km$^2$, while Tanzania has one private protected area covering 465 km$^2$. The conservation role of the private protected areas is crucial (see Watkins *et al.*, 1996).

potential areas of conflict and resolve them before they flare up are critical to economic development. By virtue of their location, most forestry activities are highly susceptible to the negative impacts of conflicts. No sustainable management of forests is possible in conflict-prone areas. While persistence of conflicts often discourages the use of forest land for agriculture and other uses, often they go hand-in-hand with illegal logging. Increased poaching in some of the national parks and game reserves of East Africa is partly a spill over effect of conflicts, facilitated through the easy availability of arms.

## DEMOGRAPHIC CHANGES

### Population growth

Population growth is undoubtedly a major factor affecting forests and forestry in all East African countries. In 2000, the population of the subregion was estimated at 182.1 million, or about 23 percent of Africa's population (see Table 8). Population density in East Africa varies from 16 people per km$^2$ in Somalia to almost 600 people per km$^2$ in Mauritius, partially reflecting variations in land productivity and its consequent carrying capacity. Since most land in the subregion is arid, population densities in East Africa are high in proportion to arable land area, especially since a substantial portion of the population lives in the highlands of Eritrea, Ethiopia and Kenya and the fertile area around Lake Victoria.

TABLE 8
**Population of the subregions of Africa**

| Subregion | 1980 | 1990 | 2000 | 2010 | 2020 |
|---|---|---|---|---|---|
| | (million) | (million) | (million) | (million) | (million) |
| North Africa | 108.6 | 140.2 | 170.4 | 208.8 | 239.0 |
| **East Africa** | **104.5** | **141.2** | **182.1** | **230.0** | **289.0** |
| Southern Africa | 69.5 | 89.7 | 113.4 | 128.7 | 150.2 |
| Central Africa | 54.4 | 73.6 | 97.9 | 127.0 | 163.8 |
| West Africa | 132.2 | 177.8 | 234.0 | 277.6 | 344.0 |
| **Africa** | **469.2** | **622.5** | **797.8** | **972.1** | **1 186.0** |

*Source:* Figures for 1980, 1990 and 2000 from World Bank, 2002 a. Projections for 2010-2020 from African Development Bank, 2000.

Between 1980 and 2000, the population of East Africa grew by about 77 million, with an average annual growth rate of 2.8 percent. Although the growth rate is declining and is expected to be about 2.4 percent during the next two decades, projections to the year 2020 indicate an increase of about 107 million. This number is significantly larger than the increase experienced in the period 1980-2000. Since the balance between population and the environment is already strained, such an increase will significantly affect natural resources, including forests and woodlands, and strain the carrying capacity of the system considerably Table 9 indicates variations in population between East African countries. As can be seen, the size of the population varies considerably between the countries, suggesting variability in the size of markets and in resource use pressures.

TABLE 9
**East Africa – Population distribution**

| Country | Population in 2000 | Estimated population in 2020 |
|---|---|---|
| | (million) | (million) |
| Comoros | 0.56 | 1.09 |
| Djibouti | 0.66 | 0.95 |
| Eritrea | 4.10 | 6.10 |
| Ethiopia | 64.30 | 102.94 |
| Kenya | 30.09 | 39.72 |
| Madagascar | 15.52 | 26.16 |
| Mauritius | 1.19 | 1.34 |
| Seychelles | 0.08 | 0.09 |
| Somalia | 9.71 | 18.73 |
| Tanzania | 33.70 | 52.51 |
| Uganda | 22.21 | 39.41 |
| **Total East Africa** | **182.12** | **289.05** |
| **Africa** | **797.80** | **1 186.13** |

*Source*: African Development Bank, 2000.

Population density is an important indicator of resource use pressure. In East Africa it ranges from about 16 per km$^2$ in Somalia to nearly 600 per km$^2$ in Mauritius. Mauritius has a highly diversified economy which is able to support high population densities without causing substantial degradation. In the case of Ethiopia, people are primarily concentrated in the more productive but highly vulnerable highlands. About 80 percent of Ethiopian population lives in the highlands. According to an estimate by Ethiopian government by 2015 the population in the highlands alone will increase to 88.6 million (Government of Ethiopia, 1994). In Eritrea, 65 percent of the total population is concentrated in the central highlands zone. In these countries, population growth will exert pressure on the areas with the greatest productive potential, which are already highly degraded. This will have serious consequences for agriculture and other land uses. More important, intensive land use has wider ramifications for the Nile basin countries by increasing siltation and downstream flooding.

### Rural/urban distribution of population and migration

As in other subregions of the continent, East Africa is also experiencing rapid urbanisation. For example, urban populations have doubled in Kenya and Tanzania over the past 20 years. For the region as a whole, urban population is expected to grow from 44.6 million people in 2000 to about 115 million by

2020. Ethiopia, Kenya and Tanzania in particular will account for a significant proportion of this increase.

Growing urban demands for forest products and services will accompany the migration, undermining the resilience of areas surrounding cities. The impact of increasing urban demand for wood energy has been discussed in the previous chapter. With more people living in urban areas, the demand for charcoal is expected to increase, especially when access to commercial fuels is limited. An immediate effect of this is the rapid depletion of wood resources in areas close to urban centres. Urban migration will also have significant consequences for the forest work force, with negative effects on the number of skilled workers available for forestry activities in rural areas.

In addition to urban migration, Africa is generally characterized by substantial migration between countries and out of Africa, especially of relatively skilled people. There is also internal seasonal migration within most African countries. Except for rural to urban migration, these flows are mainly towards commercial agricultural and mining districts. In many areas labour migration and remittances are important for the household economy. Income from migrant labour is a major source of livelihood for rural households and it also supports investment in intensification and diversification of agricultural production.

#### Refugees and internally displaced people

Famines, wars and conflicts are among the major causes of refugee movements in the subregion. Years of famine in Ethiopia and conflicts in Uganda, Ethiopia, Somalia and Eritrea have led to disruption of life for a large number of people making them refugees and displaced persons. Wars and conflicts outside the region, such as those in the Democratic Republic of the Congo, Burundi and Rwanda, have also brought a large number of refugees into East Africa, further enhancing its economic, social and ecological vulnerability. While displacement and the ensuing uncertainty have discouraged long term investment in resource management, it has also resulted in severe resource depletion in areas where refugees and displaced people have been settled temporarily.

#### Impact of HIV/AIDS

HIV/AIDS poses a major threat to development in all East African countries. For example, 1.5 million Kenyans are suffering or have died from this disease, and the rate at which it is spreading is rapidly increasing. HIV/AIDS has overburdened national healthcare systems and threatens the most economically productive segment of the population. In Ethiopia, Kenya and Uganda, it is a significant factor contributing to rural poverty. Uganda has demonstrated how concerted action could improve the situation. The direct and indirect impact of the disease on forests and the forestry workforce will continue perhaps for the next ten years and could linger on up to 2020. HIV/AIDS will significantly reduce the capacity of governments and households to invest in sustainable management of forest and tree resources especially in the context of the depletion of human capital and the compulsion to use the limited financial resources to meet the mounting healthcare needs.

#### Effects of demographic changes on forests and forestry

The increase in population and other demographic changes discussed above will have major consequences for forests. There is already a great deal of pressure in every country to clear forests for agriculture in order to feed people, as is exemplified by Ethiopia and Kenya, where landless people have already converted some forests. The need to ensure food security, especially in the absence of improvements in agricultural technology will pose the biggest challenge to forestry between now and 2020. Urbanisation will continue to exert pressure on the forests close to urban centres, especially to meet the growing demand for food as well as forest products, especially woodfuel. The overall impact of HIV/AIDS is still uncertain. Undoubtedly, it will result in a drastic decline in human resources as well as strain the financial resources of households and governments, undermining investment in sustainable management of forests and other resources.

### ECONOMIC CHANGES

Another key factor that will impact forests and forestry is the overall change in the economic situation. As income increases, the nature of demands placed on forests changes and usually there is a shift towards more value added products and services. The key questions in the context of East Africa would therefore be:

- Will there be an increase in the income resulting in a significant shift in the demand for forest products and services ? and
- What will be the extend of structural changes in

the economies, reducing the dependence on land ?

An attempt is made to address the above questions focusing on the overall changes in income, its distribution and the role of the different sectors in providing employment and income.

**Income and poverty**

With the exception of the island countries of Mauritius and Seychelles, East Africa is one of the poorest regions in the world. The total gross domestic product (GDP) of the subregion in 2000 was approximately US$42.5 billion, about 7 percent of the total GDP of Africa, although it accounts for 23 percent of Africa's population. The combined GDP of the seven continental countries (Djibouti, Eritrea, Ethiopia, Kenya, Somalia, Tanzania and Uganda) is a little under that of Nigeria alone and only about one-fifth that of South Africa. Ethiopia, the largest country in the subregion, accounts for 35 percent of the East African population but just 16 percent of subregional GDP. With a gross per capita income of US$100, Ethiopia is the poorest country in Africa. At the other extreme, the island countries of Mauritius and Seychelles rank as middle-income countries.

TABLE 10
**East Africa – GDP and its growth**

| Country | GDP at current prices in 2000 | GDP in 1990 | GDP growth rate 1990-2000 | Per capita income in 2000 |
|---|---|---|---|---|
| | (million US$) | (million US$) | | (US$) |
| Comoros | 220 | 250 | (2.1) | 380 |
| Djibouti | 495 | 418 | 2.8 | 840 |
| Eritrea | 635 | 437 | 4.2 | 170 |
| Ethiopia | 7 451 | 5 568 | 1.7 | 100 |
| Kenya | 9 876 | 8 533 | 2.0 | 360 |
| Madagascar | 3 815 | 3 212 | 2.7 | 260 |
| Mauritius | 5 253 | 3,123 | 5.2 | 3 800 |
| Seychelles | 569 | 369 | 5.4 | 7 310 |
| Somalia | n.a. | 917 | - | n.a. |
| Tanzania | 6 419 | 4 259 | 7.8 | 280 |
| Uganda | 7 728 | 4 304 | 3.7 | 310 |
| **Total East Africa** | **42 461** | **32 052** | **2.8** | **233** |
| **Africa** | **595 002** | **464 624** | **2.4** | **671** |

*Source:* World Bank, 2002 a.

The overall per capita income of the subregion in 2000 is US$ 233, about 35 percent of the regional per capita income. In Ethiopia, the most populous country in the subregion, per capita income declined between 1990 and 2000. This decline is compounded by the skewed distribution of income. In most countries income inequalities have increased. Low per capita incomes, poor growth rates and inequitable distribution result in a high incidence of poverty. Although poverty statistics refer only to formal sector activities, they still reflect the dire economic situation. Most East African countries have recently made poverty reduction a key development objective.

Low incomes and poverty are further reflected in various human development indicators such as literacy rates, infant mortality, life expectancy and access to safe drinking water. The most recent human development indicators show that the East Africa subregion is one of the least developed in the world (UNDP, 2001).

**Land dependence**

Continental East African countries are highly dependent on land, with agriculture contributing a substantial proportion of GDP and employment. In Ethiopia, for example, agriculture accounts for 32 percent of GDP and 70 percent of employment. Although the share of agriculture in GDP has declined (largely due to the increase in the share of the services sector), most of the employment is still accounted by agriculture. The continued dependence on land coupled with the absence of technological improvements has resulted in unsustainable uses, and hence in declining agriculture productivity (see Box 13). Any future improvement in the forestry situation will depend on the growth of non-land-based sectors of the economy. If past growth rates are any indication, there is little likelihood of major structural changes that will reduce the dependence on land.

Most agriculture is based on traditional technologies and hence any increase in production is critically dependent on expanding cultivation to new areas. The proportion of irrigated land is very low. Since most agriculture is rainfed, crop production and thus the

BOX 13

**FARMING SYSTEM IN THE ETHIOPIAN HIGHLANDS**

The main farming system in the Ethiopian uplands is the "Highland Perennial System", which supports one of the highest rural population densities (more than one person per hectare of land). Land use is very intense and holdings are very small with more than 50 percent of holdings less than 0.5 ha. The main trends are diminishing farm size, declining soil fertility and increasing poverty and hunger. People cope by working land more intensively, but returns on labour are low. The overall growth potential and poverty reduction potential is considered fairly low, because of the very small size of farms, the low resource situation, the shortage of appropriate technologies and the poor development of markets and off-farm activities.

(Carloni, 2001)

livelihood of people are extremely vulnerable to droughts. Domestic demand for staple foods is largely met through low-input, low-technology subsistence cultivation.

East Africa has a well-developed commercial agricultural sector, comprising mainly of tea, coffee, cocoa and sugar and new crops such as cut flowers, fruits and vegetables. All these are primarily export-oriented. Most of these are cultivated in the more productive land and require substantial investments. Technological improvements are limited to such export crops. The price of export crops are subjected to substantial fluctuations depending on global demand and supply. There has been a long term decline in the price of several of these. For example, in the recent years the price of coffee has registered a steep decline, adversely affecting the economies of several countries, especially Ethiopia, Kenya and Uganda.

In view of the low productivity of the land and the fact that the bulk of the population is concentrated in the few areas where productive potential is high, there is intense pressure on land and resource use conflicts are therefore widespread. Population growth has resulted in the extension of cultivation to marginal areas, resulting in degradation. In countries such as Kenya, the shamba system, introduced to reduce conflicts between agriculture and forestry, is now ineffective. A substantial area of forests, including plantations, has been converted into agriculture. Even in Tanzania, which is less densely populated, the historical pattern of development has led to the concentration of people in more productive areas, resulting in intense land use pressures.

BOX 14

**MAURITIUS AND SEYCHELLES: A DIFFERENT SCENARIO**

The island countries of Mauritius and Seychelles are a case apart on account of their very high population densities and per capita incomes and the diversification of their economies. For example, Mauritius is one of the strongest economies of Africa with a per capita income of over US$3 800 in 2000. Traditionally the economy of Mauritius has relied on exports of sugar and textiles/garments and on tourism. Over the past 10 years, the financial and business services sector has emerged as the fourth pillar of the economy with a sustained annual growth of over 8 percent. This has been possible on account of the high quality of human resources. The Seychelles economy has also grown rapidly, with tourism and fishing as the lead sectors. Seychelles' current per capita income is about US$7 300, with tourism alone employing 30 percent of the labour force. The diversification of these countries' economies has brought about a substantial reduction in the pressure on forests. A large proportion of efforts is now focused on protecting the environment, especially on improving water supplies and increasing scenic values in support of tourism

**Prospects for structural shifts**

East African economies, excepting those of the island countries of Mauritius and Seychelles (see Box 14), are primarily dependent on low-input agriculture and animal husbandry, which account for most of the rural income and employment. Although some countries such as Kenya and Tanzania have formulated development strategies focusing on industrialization, the necessary conditions that would facilitate industrialization are not in place. Economic fundamentals, especially savings and investments, suggest low growth rates and limited industrialisation and economic diversification. Service-based economic activities are largely restricted to tourism. The low purchasing power of the people and the predominance of subsistence production keep the internal demand low and hence the scope for domestic production. Industries thus will have to depend on external markets. With economic liberalisation, local industries have to compete with cheaper imports. All these would suggest considerable uncertainty as regards structural shifts in the economy and the dependence on land is unlikely to decline significantly.

**Economic reform and structural adjustment programmes**

During the last two decades there have been significant efforts to liberalize East African economies and reorient the role of the public sector. In the years immediately following independence, governments assumed a lead role in all aspects of economic development. However, in most cases government intervention in productive activities neither increased the availability of goods and services nor helped to increase the surplus available for investment. Loss-making public enterprises have thus been a major drain on government budgets.

Almost all East African countries are now implementing major structural reforms with a focus on sustainable, diversified and equitable growth, an open market economy and greater participation of the private sector. Some countries are also undertaking large-scale

sectoral policy reviews. For example, Eritrea, Ethiopia, Kenya and Uganda have recently embarked on wide-ranging agricultural sector reviews. Some have introduced far-reaching market liberalization policies, particularly to enhance production of commodities focusing on regional and international markets. These policy changes will have major consequences for forests and forestry by altering the role of the various players, changing the intersectoral linkages and directly and indirectly altering opportunities and constraints for investment.

If development continues to rely heavily on low-intensity agriculture, there is the likelihood of continued depletion of natural forests. Thus, the World Bank report "Can Africa claim the 21st century" stressed that: "Africa's future economic growth will depend less on exploiting its natural resources, which are being depleted and are subject to long-run price declines, and more on its labour skills and its ability to accelerate a demographic transition" (World Bank, 2000b). Skill improvement will create viable options for shifting away from current land-based activities. However, whether this will be accomplished or not depends on investments in human resources, especially health care and education. All the indications are that investments in these spheres are far less than what is required to promote all-round human resource development and to facilitate the process of industrial development.

**Regional and global integration**

The overall policies of economic liberalization adopted in the recent years by most countries have enhanced the opportunities for subregional and regional integration of the countries in East Africa. In response to trade liberalization in the subregion, significant shifts in economic links and structural changes could influence developments in the forest sector. For example, trade liberalization in East Africa could encourage some countries to shift their focus from wood production to manufacturing and technology-based activities, although markets that are more open to global competition may have a negative effect on a number of traditional producers.

The emergence of preferential trade areas (PTAs) and free trade areas (FTAs) with harmonized tariff policies will have a significant effect on regional trade in commodities. The Common Market for Eastern and Southern Africa (COMESA) is the only functioning FTA in Africa. Member countries range from Egypt in the north to Swaziland in the south. COMESA, started as a PTA in 1984, has gradually evolved into an FTA. It spans a market of nearly 400 million people with a combined GDP of US$175 billion. Djibouti, Egypt, Kenya, Madagascar, Malawi, Mauritius, Sudan, Zambia and Zimbabwe are already full members of COMESA, while other members - Burundi, the Comoros, Eritrea, Rwanda, Uganda, Angola, the Democratic Republic of the Congo, Ethiopia, Namibia, Swaziland and Seychelles - are gradually reducing their tariffs.

There are several potentially useful mechanisms for market integration in the subregion. At the continental level, the newly formed African Union (formerly the Organization for African Unity) is already addressing African economic integration and food security issues. For example, a strategy paper has been drafted on practical steps for successful market integration of agricultural commodities (FAO, 2000). Apart from Tanzania, all the countries of the subregion are members of the Inter-Governmental Agency for Development. Kenya, Uganda and Tanzania have recently signed the East African Community Treaty. Tanzania is a member of the Southern African Development Community. Thus, the East African countries have sufficient mechanisms for effective market integration and for overcoming the limitations imposed by small domestic markets.

The success of regional and subregional integration will depend upon the political commitment of the countries involved, especially for resolving the various political, economic and institutional issues. Considering the fact that intra- and subregional trade is currently low, and most countries tend to produce similar goods and services, there are limits to what can be accomplished through improved intraregional trade. In the short term, free trade within the subregion would result in the shifting of industry locations, in price reductions, and undoubtedly in reduced profitability and the closure of many of the companies that previously operated in a closed environment. Problems such as those of access to markets because of tariff and non-tariff barriers and the supply responses of the producing countries (especially in view of various constraints, including infrastructural weaknesses) limit the advantages to be gained from free trade.

**External debt**

The high level of debt in East African countries, which totalled US$30.18 billion in 2000, or about 71 percent of GDP, is a critical factor, affecting the economic development of the countries. The amount

of debt varies from country to country and can be as high as 86 percent of GDP, as in Ethiopia. Most debt is owned or guaranteed by the government, and is often the result of unproductive borrowing for questionable investments in the past. Debt servicing is a major drain on the export incomes of East African countries. In some cases over 20 percent of all export income goes to interest payments (for example in the Comoros, Kenya and Uganda). The Highly Indebted Poor Countries (HIPC) initiative under implementation in a number of countries in the subregion aims to reduce the debt burden to "sustainable levels". Often this initiative is conditional on the adoption of liberalisation policies, including privatisation of public assets. The future development scenario will largely depend on reducing the debt burden significantly.

## TECHNOLOGICAL CHANGES

### The overall state of technology

Limited natural resources and increasing population pressure in East Africa necessitate technological changes in order to bring about a sustainable increase in productivity. A major driving force is the accelerating pace of technological development, especially information technology. The key question is whether Africa as a whole, and more particularly a resource-poor subregion like East Africa, will be able to take full advantage of these developments.

Some countries have policies emphasizing the need to develop, adapt and apply technology. However, resource constraints and other problems are hampering concrete action. Research and educational institutions have become weaker and there is very little private-sector investment in developing relevant technologies. Most multinational corporations are focused on marketing existing products and technologies and have little interest in developing new technologies that address local needs, especially the needs of those with a limited ability to pay for them.

As official development assistance and direct foreign investment have declined in all East African countries, so has investment in research and development (see Box 15) activities. Current public- and private-sector budget allocations for research and development are insufficient to generate new technologies. Kenya and Uganda have developed and promoted industrial parks to stimulate innovation and technology development. However, they have had very little impact and the manufacturing sectors have stagnated or declined. The dumping of cheap products has seriously depressed the manufacturing sector in a number of countries.

BOX 15

**RESEARCH AND DEVELOPMENT IN KENYA: THE FATE OF KIRDI**

Buoyed by a once-vibrant manufacturing sector, Kenya established the Kenya Industrial Research and Development Institute (KIRDI) in the early 1980s to spearhead technological innovation. KIRDI developed some valuable "home-grown" technologies, particularly for manufacturing and food processing. However, budget allocations and staffing for KIRDI have steadily declined in the last ten years to levels below those required for innovation.

While the East African countries aspire to join the rest of the world in the technological era, their capacity to develop, adapt and apply modern technology is limited. According to a recent world assessment, none of the countries of the subregion is listed among the "dynamic adopters" of new technology (UNDP, 2001). Kenya has a technology achievement index of 0.129, which falls below the range for dynamic adopters (0.2-0.34). East African countries need to make quantum leaps in investment to develop their capacities to generate and adopt technology.

### Technological changes in the forest sector

The state of technology in the forestry sector is a reflection of the overall state of science and technology in the countries. Globally there have been significant technological changes helping to improve the efficiency of almost all forestry activities, including resource assessment and inventory, management of natural forests and plantations, tree improvement, harvesting, transportation and processing. Developments in molecular biology have widened the use of a range of tropical products. More important, the range of species and dimensions that can be used to make high-value wood products has increased considerably. The rate of wood recovery has increased, reducing raw material requirements. Technological improvements in pulp and paper production have helped considerably to reduce effluents.

Environmental policies and legislation in countries such as Kenya and Uganda would require significant changes in forestry practices and wood processing industries. Depending on the extent to which these laws are enforced, major changes can be expected, especially in heavily polluting pulp and paper mills. Moreover, rapidly growing pressure for forest certification may

BOX 16

**RELIANCE ON OUTMODED TECHNOLOGY IN KENYA'S SAWMILLS**

Sawnwood production in Kenya is constrained by outmoded technology and insufficient utilization capacity. Currently, some 450 sawmills produce 200 000 $m^3$ per year, but actual installed capacity is 400 000 $m^3$ per year, which means that 50 percent of their capacity is idle. Moreover, many small sawmills rely on circular saws and only a few larger ones rely on modern bandsaws. Overall, wood recovery is very low (30-40 percent) which results in inefficiency and environmental pollution.

trigger some changes in forestry practices, although this will largely depend on awareness of the consumers and their willingness to pay a premium for wood and other products obtained from sustainably managed areas.. Concerns regarding waste disposal from sawmills operating with outmoded technologies may encourage a transition to more modern ones.

However, for a variety of reasons forestry has been slow to respond to the changes and to adopt new technologies. Changes if any have been largely at the instance of externally funded projects that enabled the introduction of new technologies. In most cases, they have not been sustained once the donor support has ceased. With increasing pressure to comply with environmental regulations, there are very few options. In general, public-sector forestry agencies have not been able to adapt and improve technologies, largely because of institutional and financial problems. On the other hand private sector has been able to bring about substantial improvements in technology, but rather focused on those that improve productivity and profitability.

All countries have benefited from modern information and communication technologies. There has been a rapid growth of e-mail and other modern communication technologies, although the growth rate may soon level off when most of those who could afford it have been reached. This allows these countries to share information with the rest of the world efficiently. In Kenya, Uganda and Tanzania, pagers and cellular telephones are available at affordable prices and may be used by forest resource managers. The capacity to use modern information and communication technologies already exists in most countries, although the proportion of people having access to such technologies still remain very low.

## ENVIRONMENTAL ISSUES

The environmental services provided by forests are growing in importance compared to their productive functions. The United Nations Conference on Environment and Development (UNCED) and various post-UNCED initiatives have brought these issues to the forefront of discussions at all levels. Society increasingly recognizes the significance of forest-based services, especially protection of watersheds, combating desertification and biodiversity conservation.

### Water and forests

Since most of the East Africa subregion is arid or semi-arid, the relationship between forests and water is critical. Water scarcity limits opportunities for intensive agriculture in most areas. Land use conflicts also stem from issues of access to water, especially between settled cultivators and herders. One area of common concern is the ecological stability of the Lake Victoria basin, shared by Kenya, Uganda, Tanzania, Rwanda and Burundi. Under the East African Treaty of Cooperation, Kenya, Uganda and Tanzania have launched a long-term Lake Victoria basin rehabilitation programme, with external support. This programme will address both catchment rehabilitation and lake pollution.

Similarly the Nile Watershed Initiative is attempting to integrate national efforts to ensure the stability of the Nile watershed, which extends beyond the subregion into Sudan and Egypt. Land use changes and consequent erosion in the Blue Nile catchment area already causes major downstream environmental damage in Sudan and Egypt. Future responses to these regional environmental concerns will involve significant changes in the nature of forestry activities.

The growing concern about water stress is expected to result in a closer scrutiny of the linkage between water and forests. Impacts of reforestation/afforestation in altering the water flow, especially in the arid and semi-arid lands will have to be carefully assessed. Choice of species and silvicultural practices will have to take cognizance of their impact on water-flow and the availability of water to other uses.

### Desertification and land degradation

Desertification is a key issue for most East African countries, especially in the arid and semi-arid areas. Land degradation is also a problem in the highlands of Eritrea, Ethiopia, Kenya, Tanzania and Madagascar. This is further exacerbated by the occurrence of

BOX 17

**PROLONGED DROUGHT CAUSES HAVOC FOR PASTORALISTS IN KENYA**

The prolonged drought of 1999 caused havoc for pastoralists in Kenya (mainly the Masai and Borana), forcing them to drive their dying cattle long distances to secure pastures in highland forests and even cities like Nairobi. The Masai even drove their cattle across the border into Tanzania. This sudden shift in grazing areas caused major conflicts with private ranchers, local communities and the Forest Service. There were ethnic fights between Boranas and Merus over grazing rights, and the government had to intervene to ensure stability. Forests suffered degradation and many cattle died from diseases contracted in their new grazing habitats. So debilitating were the drought effects on pastoralists that they formed a strong pastoralist movement to protect their interests in the future.

droughts and famines, which are particularly severe in the Horn of Africa. Almost 80 percent of the subregion consist of arid and semi-arid lands with low productivity. Successive years of low rainfall result in low agricultural production. A large proportion of people is thus highly vulnerable to famine, requiring significant emergency support. These recurrent disasters force radical shifts in resource allocation, and often short term compulsions get precedence over long term support for sustainable resource management (see Box 17).

As in other parts of the world, East African countries are experiencing disconcerting climatic changes, possibly associated with global warming. For example, some recent studies have shown that the snowcap on Mount Kilimanjaro in Tanzania is melting at a rate that will result in its complete disappearance by about 2020. The snowcap on Mount Kenya is following a similar trend. In 1998-1999, Kenya, Uganda and Tanzania were severely hit by El Niño rains, which caused heavy damage to roads and other infrastructures. These experiences have greatly increased public awareness of the importance of forests at both the local and global levels. This public awareness will compel countries to adopt appropriate measures to improve land uses addressing the environmental concerns.

**Conservation of biological diversity**

All the East African countries except Somalia are signatories to the Convention on Biological Diversity. Most countries in the subregion are richly endowed with flora and fauna. The medium-elevation forests such as the Budongo Forest of Uganda and the Kakamega Forest of Kenya, which are eastern frontiers of the Congo basin forest type host the richest flora in the subregion. These forests have over 300 tree and shrub species. Montane and coastal forests are also rich in biodiversity. For example, forests such as Mount Elgon and Arabuko-Sokoke in Kenya and Usambara in Tanzania have over 200 tree and shrub species.

The drylands of the subregion are home to a rich diversity of indigenous plants and animals. The wildlife of the subregion is world-famous for its diversity and abundance. The chain of lakes associated with the Great Rift Valley and Lake Victoria present a rich aquatic diversity of great ecological interest and importance for tourism. Dryland biodiversity is a natural resource of critical ecological, economic and social value to all the countries of East Africa.

Biodiversity protection highlights many constraints and opportunities. Obviously, certain areas must be excluded from conventional development. This raises a host of issues, especially with regard to meeting the

BOX 18

**TRADITIONAL ARRANGEMENTS FOR FOREST REHABILITATION IN ERITREA**

The 'Forest/Woodland Closure System' in the highlands of Eritrea is an old tradition practised by the local communities, many decades before to overcome the shortage of grass and wood. It was applied for the purpose of sustaining the resources through a rational utilization. The 'Closure System' became a cultural behaviour of the rural communities in that part of the country and constituted a form of natural resource management, inherited from the previous generation and based on the rotation and temporary protection techniques. The system was found effective in sustaining the production capacity of natural vegetation and securing continuous supply of fodder resources and other products to the growing livestock and human population. It seems that actual government forest and woodland closure policy has been inspired from that popular approach for natural resources management. The role of the government policy will, therefore, be to consolidate and organize that approach on a scientific basis.

"The 'Closure' policy is nowadays widely implemented throughout the country and the local people are increasingly aware of the necessity for the conservation of these renewable resources. Because of this system the natural vegetation in the closed areas is regenerating successfully and the attitude of the local people in general is encouraging.

(Ghebrendrias, 2001)

needs of local communities. There are, however, opportunities to develop systems of resource management that take advantage of local knowledge and the traditional arrangements for resource conservation (see Box 18).

Mainstreaming biodiversity conservation in forestry would require substantial changes in several forestry practices, including logging of natural forests, establishment and management of plantations, and management of protected areas. Similar changes will be required in several other sectors. The impact of increasing concern for the conservation of biological diversity on forestry and other land uses will depend on:

- the ability to define acceptable levels of trade-off between competing objectives;
- institutional arrangements to mainstream biodiversity conservation into all key sectors; and
- the human and material resources that will be available to support conservation efforts.

All the indications are that notwithstanding the interest and commitment of the countries, institutional and resource constraints will affect the efforts to conserve biological diversity.

### IMPACT OF ENVIRONMENTAL CONCERNS ON FORESTRY

Environmental issues described above - watershed degradation, desertification and loss of biological diversity - will have an increasing effect on the forest sector directly and indirectly. The growing public awareness will result in closer scrutiny of forestry activities. While forestry will find wider acceptance and many of the issues that foresters have been raising in the past would get recognition, increasingly there will be compulsion to give priority for the environmental services. Forestry activities will come under increasing public scrutiny focusing on their direct and indirect impact on the environment. There will be increasing pressure to apply principles of sustainable management taking full account of the environmental and social implications.

BOX 19

**KEY FACTORS AFFECTING FORESTS AND FORESTRY IN EAST AFRICA**

- In recent years, all East African countries have made significant institutional changes at the national level. Most governments have committed themselves to decentralizing their forest administration. Emphasis on private sector participation and community resource management has also increased. These trends will gather momentum in the coming years.
- At the current rate of population growth, by 2020 there will be an additional 107 million people in East Africa. The population will be distributed unevenly, which will have a significant impact on natural resource use. Some of this population increase will take place in the poorest and most environmentally fragile countries.
- The economic performance of most countries has been poor. The per capita income is low and growing only slowly, so that purchasing power is unlikely to increase considerably. Since the manufacturing and service sectors are poorly developed, people will remain highly dependent upon the land. This will create greater pressure on forests.
- The situation in the small island countries differs considerably from the mainland countries. Countries like Mauritius and Seychelles have very high population densities, but their economies are highly diversified and the development of tourism and other sectors has helped to reduce land dependence.
- Although technological changes have tremendous potential, they have been slow to take hold in East African forestry. In general, the institutional capacity for scientific and technological development continues to be very weak.
- Environmental issues - the depletion of water resources, desertification, land degradation, etc. - will remain key problems. Periodic drought and famine are key features of the subregion, especially the Horn of Africa. Ability to address these problems remains far from satisfactory. If the present trend continues, a worsening of the situation could be expected, especially as the increasing population puts additional pressure on the limited resources.

### DRIVING FORCES: AN OVERVIEW

Evidently what happens to forests and forestry will be largely an outcome of what happens outside the sector. In this regard East Africa will continue to face a number of problems stemming from population growth, poor economic performance and low levels of skills and technologies. With low economic growth rates and poor economic diversification, dependence on land is expected to persist. With low levels of investment in improving productivity, much of the increase in agriculture production will be through expansion of cultivation to new areas. An overview of the driving forces impacting forests and forestry in East Africa is provided in Box 19.

Chapter 4

# Future scenarios

The driving forces described in the earlier chapter will directly and indirectly impact the forest sector. Some general indication of the likely impact of the individual factors have already been given. However, in view of the interaction between the different factors, their collective impact could be very different. This chapter provides a framework for scenario analysis, helping to identify the broad pattern of developments both in the economies of the countries and the forest sector.

## APPROACH TO DEFINING SCENARIOS

The approach to defining scenarios in the context of FOSA has been discussed in detail in the Regional FOSA Report. Traditional scenario analysis is largely based on quantitative variables like population growth rates, income changes, etc. In the context of rapidly evolving societies, especially those undergoing major political and institutional changes, scenario analysis based on a limited number of quantitative variables have significant limitations in indicating the likely changes. It is for this reason that FOSA adopted the scenario approach developed by the Stockholm Environment Institute (see Gallopin *et al.*, 1997) with appropriate changes to make it relevant to the African forestry context.

Much of what happens to forestry is dependent on the actions of multitude of actors - wood cutters, charcoal producers, collectors of non-wood forest products, traders, farmers, local communities, entrepreneurs, government agencies, civil society organizations, bilateral and multilateral organizations, corporate investors, etc. Fundamental to scenario analysis is to assess the conditions under which these multitude of actors operate and how their behaviour is determined by the changing political and institutional environment.

Focusing specifically on the policy and institutional environment, FOSA has identified three core scenarios: (i) public-sector dominance, (ii) market-forces and, (iii) informal sector and two likely variants based on how the dominant tendencies in the core scenarios evolve over time, namely fortress scenario and the Great Transition. The following sections describe specific features of these scenarios, in particular the broad tendencies and their implications on the forest sector.

## PUBLIC SECTOR DOMINANCE

Historically the public sector has been a dominant player, influencing the use of publicly owned resources and to a lesser extent even privately owned resources. Public sector responsibility during colonial period largely focused on maintaining law and order and exploitation of valuable resources. With independence, most governments enlarged their responsibilities to include various development functions, including the provision of support to agriculture, industries and services and even direct involvement in these. Governments also formulated and implemented policies and legislation that guided/impacted the behaviour of other actors as regards resource management. Public sector dominance has been particularly significant in the forest sector and in most countries the forestry department assumed the following responsibilities:

- logging and management of natural forests, to supply wood to other public-sector agencies and to generate income to support other governmental functions;
- plantation establishment and management, particularly to meet industrial raw material requirements and sometimes to meet urban wood energy needs;
- establishment and management of wood processing industries;
- research and training; and
- management of protected areas.

In addition to these functions, forestry departments were also responsible for the formulation and implementation of policies and legislation that guided the use of public and private resources. In many countries rules and regulations relating to the felling of trees from private lands and transport of forest products, establishment of wood industries, etc. were formulated and implemented by governments affecting the behaviour of other actors.

However, as society develops, the roles and responsibilities of the public sector are undergoing

changes and the direction and pace of change will depend on how the governments and other actors manage the change process. Increasingly the private sector is emerging as a major player in forestry including in wood production and processing. And the once dominant public sector is on the decline in many countries due to:

- the inability to provide goods and services efficiently and economically; and
- the declining state of public resources, as governments are unable to maintain and improve resources while other users share no responsibility for managing them.

In many countries public sector reforms implemented to reduce government expenditure have significantly down-sized governmental agencies including forestry departments. Future paths of public sector development could take place in any of the following directions depending upon the perception and ability of the society to manage the change:

- an overall decline in the capacity of the public sector agencies as a consequence of declining resource availability, especially as other actors emerge to assume many of the functions relating to production of goods and services;
- restructuring of public sector agencies, resulting in a redefinition of its functions, specifically focusing on the provision of policy and legal framework to facilitate the efficient functioning of other actors.

In most of East Africa, there has been a weakening of government forestry organizations, largely due to resource constraints. Some attempts have been made to reorganize forestry organizations. For example Uganda is in the process of establishing an autonomous forestry board, providing more operational flexibility. Wildlife management in Kenya, Tanzania and Uganda have substantial managerial flexibility and a number of their functions have been commercialised. The changing role of the public sector is discussed later in relation to the specific situation in East Africa.

**MARKET FORCES**

As the public sector's role weakens and policies and institutional reforms in favour of increased involvement of private sector becomes effective, resource allocation decisions will be increasingly influenced by market forces. In the East Africa subregion private sector involvement in forestry activities - especially harvesting and processing of forest products - is quite substantial. With secure tenure and increasing demand for wood, farmers and private entrepreneurs are also investing in tree growing. There has also been significant private sector involvement in the management of parks and game reserves. Key features of this scenario include:

- growing private sector involvement in establishing and managing wood processing industries and the sale of publicly-owned companies to the private sector;
- privatization of government plantations;
- establishment of woodlots by landowners in response to the increasing demand for wood; and
- involvement of the private sector in national parks and protected area management.

Initiatives in these directions will result in a very different situation in the next two decades. However, some major problems may need to be addressed, including the following:

- governments may be unable to develop a clear framework for the effective and efficient operation of the private sector, and more particularly to provide a level playing field. Transparency is critical when privatizing public operations, if privatization is to increase public benefits;
- in the absence of an organized private sector with the necessary resources and capacity to manage plantations or forest products industries, economic liberalization may not necessarily result in enhancing the supply of goods and services;
- a major weakness of dependence upon market forces is that the ability to pay will determine the type of goods and services that are produced. Poverty will limit the access of the vast majority of the people to essential goods and services , while most resources may be devoted to produce non-essential goods and services for those with the ability to pay for them. Similarly, research and development critical to improving public welfare may not receive much attention;
- market mechanisms could undermine the provision of public goods, including environmental services, since they are known to be ineffective in addressing externalities.

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BOX 20

**PRIVATIZATION OF FOREST PLANTATIONS**

In 1997 the Kenyan Government commissioned a study on the privatization of forest plantations. Although follow-up decisions have yet to be made, it was stressed in the new forest policy that the proposed government forestry agency will not be involved in plantations and other productive activities. The Tanzanian Government has more recently announced its intention of privatizing plantations, beginning with Mufindi-based plantations. Although some issues remain to be resolved, it is clear that the move to privatize plantations will take place in the near future.

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- in the absence of an organized private sector with the necessary resources and capacity to manage plantations or forest products industries, economic liberalization may not necessarily result in enhancing the supply of goods and services;
- a major weakness of dependence upon market forces is that the ability to pay will determine the type of goods and services that are to be produced. Poverty will limit the access of the vast majority of the people to essential goods and services , while most resources may be devoted to produce non-essential goods and services for those with the ability to pay for them. Similarly, research and development critical to improving public welfare may not receive much attention;
- market mechanisms could undermine the provision of public goods, including environmental services, since they are known to be ineffective in addressing externalities.

The consequences of the market forces scenario, especially with respect to the opportunities and constraints they present for East Africa, are discussed later.

**INFORMAL SECTOR**

Although the public sector and market forces have been the most visible, a substantial proportion of forestry activities - including logging, transportation, and the production and collection of non-wood forest products - is outside their purview, falling within the broad realm of the informal sector. In many cases the growth of the formal sector (in the form of the public sector and market forces) has not been able to meet the needs of the vast majority of the people. The informal sector has grown more rapidly, owing to the following factors:

- market forces and government-managed production have not been able to meet the demands for wood and wood products of a large number of people, particularly those with limited purchasing power. The informal sector has grown to address these needs. For example, most of the woodfuel needs of rural households are met through the informal sector. Similarly several non-wood forest products, including medicinal plants, are collected and directly used by households;
- limited employment opportunities in the formal sector have led to an increase in the number of people who are willing to work in the informal sector. Entry and exit from the informal sector is easy and most activities require very limited capital and skills.

In addition to employment and income, the informal sector will remain a major source of subsistence products, which will be particularly important during periods of drought and famine.

Some informal activities with links to markets will become more organized at the marketing end, which will be dominated by intermediaries, but very few of the benefits will flow to those operating informally. Since their activities are "illegal", those involved in collecting forest products are unlikely to have any interest in conserving and managing the resources. Meanwhile, those involved in trade are likely to be more concerned about profit maximization, largely through surplus extraction from those involved in collection and processing.

The informal sector is likely to expand further, as demands for products and services increase and opportunities for formal-sector employment remain limited. A number of breaking points could thus emerge:

- as population and the demand for products increase, competition for limited resources will become intense and, as is already evident, resources will be rapidly depleted in the absence of investment to improve and conserve them. In most East African countries, woodfuel collection has already depleted forests close to urban centres, and the same situation applies to a number of non-wood forest products, especially some of the important medicinal plants;
- since most forest products are collected from free-access resources, including communal land and

even forest reserves where protection is unsatisfactory, production costs are low, enabling the informal sector to meet the demands of those with limited purchasing power. This undermines economic viability - and therefore the willingness to invest in more organized production;

- while the informal sector plays a critical role, especially by providing employment and income to a large number of people, income from these activities tends to be very low. Most informal sector activities require low skills and very limited capital investments, which, although an advantage in enabling the participation of the poor, often only provides subsistence income, leaving very little to improve the standard of living through investment in education, skill improvement or other productivity enhancing inputs. Most often a large number of poor are trapped in low-income generating informal sector activities as they have very little choice;
- a major problem with the development of the informal sector is its criminalization. Historically rules and regulations have been formulated to exclude the people from using the resources and to appropriate them meet narrowly defined interests. Hence a substantial segment of informal sector activities are illegal. This often subjects those involved in them to exploitation. Where resources are valuable, some of the informal sector activities are managed by well organized criminal gangs.

Thus, while the informal sector is an important source of livelihood for a very large number of people excluded from formal economic activities, the current pattern of its development is such that it could soon reach its limits on account of resource depletion. At best it will continue to provide bare minimum subsistence income, giving very little choice to those who are trapped in it.

**FORTRESS SCENARIO**

As resource use conflicts intensify, there will be an increasing tendency to protect the resources through exclusion of certain users, especially in the informal sector. A fortress approach is most often adopted in the case of economically valuable resources, as in the case of forests that are rich in valuable species or in the case of important national parks and game reserves. Typically the fortress scenario involves intensive efforts to exclude those who are likely to undermine the value of the resources and to ensure that benefits from them are available to a limited number of those who are able to pay. In many countries, the fortress scenario pervades the daily lives of most people. The thrust of the fortress scenario is focused on:

- identifying resources and areas that are economically and/or ecologically valuable; and
- strengthening policing functions to exclude unauthorized people from entering the area or using the resources.

There are several examples of an emerging fortress situation in East African forestry, especially with regard to the management of national parks and forests and plantations of valuable species. For example, unarmed Kenyan forest guards could no longer effectively patrol and protect forests on Mount Kenya and in the Aberdare Range, prompting the government to hand over their protection and management to the better organized and equipped Kenyan Wildlife Service. In some instances, paramilitary forces have been engaged to safeguard forests under siege. Conflicts are particularly serious in Kenyan and Tanzanian national parks, especially as domestic cattle compete with wildlife for limited fodder and water during periods of drought, while criminal gangs conduct poaching operations.

However, in the long run, the fortress scenario is also unstable as a result of the following factors:

- the increasing cost of protection makes operations less and less profitable, so that at some point they are no longer viable;
- as the fortress situation worsens, changing conditions undermine the very purpose of protecting the area. This is particularly the case with some game reserves, which are protected primarily to attract tourism. Restrictions imposed to strengthen protection make the area less attractive to tourists, leading to a shift in tourism to more desirable locations. Such a situation is in fact already emerging in certain areas. The increasing need to allocate resources to protect staff and property would eventually make the fortress scenario unviable. Industries and tourists are likely to move to countries and locations which are more secure and less expensive.

Often the fortress situation could deteriorate further if measures are not taken to address the resource use conflicts. No fortress is invincible and depending on the political, social and institutional environment a complete breakdown of all formal and informal

arrangements is often possible resulting in what can be referred to as barbarization. There are already situations where state has become virtually non-functional and many of the traditional social systems have become irrelevant. A typical example of this is the current situation in Somalia where warring clans and groups prevent any meaningful development.

**THE GREAT TRANSITION**

The Great Transition scenario is diametrically opposed to the fortress scenario and emphasizes the potential role of all economic actors. It addresses the deficiencies of the public, private and informal sectors, empowers all the key actors and adopts a comprehensive approach to social and economic transformation, giving due attention to such issues as sustainability and cultural and social diversity. This process taps into the collective efforts of all interest groups to take full advantage of their diverse strengths. Many recent initiatives, for example the New Partnership for Africa's Development (NEPAD), are steps towards accomplishing the Great Transition.

However, there are constraints to accomplishing the Great Transition, and these relate particularly to:

- development of a collective vision of where society wants to be in the future;
- definition of a widely accepted but location-specific strategy to fulfil the vision, taking into account the strengths and weaknesses of the existing situation; and
- involvement of those who are likely to lose from the Great Transition, by focusing on "win-win" potentials.

Implementing the Great Transition in forestry would require fundamental changes specifically aimed at enhancing the freedom of the various actors within a widely accepted vision of future. Specific features of forestry in the Great Transition would be as follows:

- forestry would become fully integrated into all land uses, and traditional discipline-based divisions would disappear;
- more trees would be grown on farms and other private land, meeting most demands for woodfuel and industrial roundwood;
- sustainably managed plantations, respecting environmental and social stipulations, would meet the balance of wood requirements. These could be largely privately owned, but government agencies could play a leading role in facilitating them;
- environmental protection would be assigned a very high priority, and most natural forests and woodlands would be set aside for protecting watersheds and biodiversity. Local communities, however, would have access to these areas and benefit from their products and services under widely accepted institutional arrangements;
- the market mechanism would operate within a transparent and widely accepted policy and legal framework that would have appropriate checks and balances;
- the public sector would largely discharge a facilitating and regulatory function, enabling other actors to play their respective roles and providing a framework for conflict resolution. In addition, it would provide policy guidance, assessing overall trends, identifying potential problems and initiating appropriate action to resolve conflicts;
- civil society assumes a lead role in making sure that larger public interests are not compromised.

Although fragmented and sometimes inadequate, there have already been some efforts to move towards the Great Transition scenario. As discussed earlier, most countries have stepped up efforts to decentralise government administration, including natural resource management and participatory approaches enabling community involvement are receiving greater attention. Efforts are underway to reorganize forestry agencies focusing on their regulatory functions. Civil society organizations are playing an important role in brining transparency and accountability. The unfolding of the Great Transition would however depend on strengthening these efforts and preparing the society to address the emerging problems.

**SCENARIOS: THE REAL WORLD**

The five scenarios described above represent a range of possible futures for East Africa and its forestry sector. Each of the above scenarios empowers people in different ways. Under the public-sector dominance scenario, the key player is the government, which assumes most of the direct responsibility for managing resources. Under the market forces scenario, decision-making shifts to the private sector, which includes industries, farmers and other entrepreneurs. In a perfectly competitive situation, decision-making under the market forces scenario is guided by prices and the ability of consumers to pay for the goods and services. Those who are unable to participate in the marketplace are left out of the

scenario and are dependent on the informal sector. Thus the informal-sector scenario is a residual outcome, largely driven by those who are left out of the market mechanism as well as who are not served by the public sector.

It is also shown that one scenario can lead to another depending upon how society adapts to the changes and how corrective action could be taken to avoid negative tendencies. Besides, all the scenarios are dynamic and change in response to their specific limitations. Most often different scenarios could co-exist driving the developments in different segments of the same sector. The overall situation that could emerge in East Africa could be summarized as follows :

The situation in most countries could be depicted as a combination of the three core scenarios, namely (a) public sector dominance, (b) market forces and (c) informal sector. Each of these segments have their strengths and weaknesses. In the "business as usual" situation this combination could persist largely maintaining the present situation, with some shifts in the relative importance of the three core elements. Failure to address the problems in each of the above scenarios could result in increased resource use conflicts, often ending up in a fortress scenario, which, if not addressed, could even lead to a complete socio-economic breakdown. Addressing these problems and supporting the positive tendencies in each of the three core scenarios could on the other hand lead to the scenario of Great Transition. The next chapter attempts to answer some of the key questions relating to forests and forestry in East Africa in the next two decades focusing on what is likely to happen if the business as usual situation prevails.

Chapter 5

# Forests and forestry in the next two decades

The current forestry situation in the subregion is characterized by a number of negative tendencies. East Africa is losing forest cover at the rate of about 514 000 ha per year. Economic growth remains low and in the absence of structural changes in the economies dependence on land will persist. In the absence of technological improvements in agriculture, increased food production will largely come through extension of cultivation to new areas. An estimated population increase of over 107 million people in the next 20 years will put considerable pressure on remaining forests and woodlands. Because of low incomes and poor growth rates in the next two decades, poverty is expected to persist. The situation will be further exacerbated by inequities in income distribution. Dependence on forests to meet basic needs, as well as providing the additional land required for agriculture and animal husbandry, will continue. It is in this context that the implications of the scenarios discussed earlier need to be considered to understand how the forestry situation in the subregion is likely to evolve over the next two decades.

## SOME KEY QUESTIONS

In defining the future priorities and strategies for forestry development, policy-makers and planners are confronted by several questions and issues. Identifying these and addressing them in the context of the driving forces and scenarios described earlier are the essence of defining the outlook for the sector. Some of the key questions regarding East African forestry are as follows:

- Taking account of the various factors affecting forestry, how will the forest cover in East Africa change during the next 20 years ?
- Will the area of forests and woodlands that is managed sustainably increase ? What are the opportunities and constraints in this regard ?
- What is the scope for forest plantations in East Africa? What are the opportunities and constraints in expanding the forest plantations ?
- Are there conditions that will facilitate an increase in tree cultivation outside forests so that this can become a major source of wood ?
- Is dependence on wood energy likely to decline in the foreseeable future ? or can we assume that the provision of energy will continue to be the most important function of forests and woodlands ?
- How will the supply and demand of wood and wood products evolve ? What are the prospects for developing an efficient forest-based industry in the subregion ?
- What are the prospects for development of non-wood forest products ?
- What will happen to the flow of environmental goods and services from forests and woodlands ? Could East Africa play an important role in mitigating global climate change and take advantage of emerging opportunities from carbon trading ?
- How can wildlife management, especially wildlife-based tourism, promote rural development ? What is the potential for wildlife management to emerge as a key area of opportunity for East Africa ?
- What is the potential role of forestry in combating poverty in the subregion ?

An attempt is made below to analyse the issues involved in these questions and to indicate where the sector is heading to 2020.

## FOREST AND TREE RESOURCES

### Changes in forest cover

The East Africa subregion lost about 5.14 million ha of forest between 1990 and 2000, or approximately 10 percent of the cover reduction for the whole of Africa. Much of this deforestation took place in poor, highly populated countries such as Madagascar, Kenya, Uganda, Tanzania and Ethiopia and Somalia. The following key factors will determine changes in forest cover over the next 20 years:

- the subregion's population will increase by about 107 million by the year 2020. In view of the slow pace of economic development and very slow structural changes in economies, agriculture and other land-based activities, especially animal husbandry, will continue to be the most important sources of livelihood. Moreover, technological progress in agriculture is likely to be slow in view

of limited access and limited ability to adopt productivity-enhancing technologies on a wide scale. Much of the increasing demand for food and other items is likely to be met through horizontal expansion of agriculture, which will significantly contribute to forest cover reduction. Only countries such as Mauritius and Seychelles have been able to develop diversified economies that are less dependent on land. In all other countries the pressure on forests will persist;

- as land use conflicts intensify, the capacity of the public sector to address them and manage forests sustainably becomes very critical. In most East African countries the public sector is weak and all the indications are that this is unlikely to change very much in the next two decades. Financial constraints limit the ability of governments to invest additional resources in strengthening the public sector. Given the poor performance of economies, the ability to raise additional resources and use part of them to improve public-sector performance is likely to be limited. In countries such as Somalia the public sector has completely disintegrated. Tanzania and Uganda show some indications of stability and improvement. In the cases of Eritrea and Ethiopia, it may take some time to develop strong institutional mechanisms at decentralized levels. On the whole, persistence of the current situation of a weak public sector would suggest continued deforestation. Market forces are unlikely to develop adequately to provide the necessary basis for protecting and sustainably managing resources;
- a substantial proportion of forests and woodlands is under customary control. While there are some successes regarding community participation in countries such as Tanzania, these are yet to become widespread. Unless substantial efforts are made to improve the capacity of communities to manage the resources, a continued decline in the condition of woodlands and other areas under community control could be expected. With increasing population, there is likely to be increasing resource use conflicts;
- the situation is expected to be further exacerbated by the rapid growth of informal activities. Neither public-sector management nor community management may be able to check the expansion of the informal sector - woodfuel collection, illegal logging, pitsawing, etc. - thus contributing to forest decline. The problem will be particularly acute in the arid and semi-arid areas characterized by poor growth rates and the already degraded state of forests.

All the above elements suggest a continuation of the trend of forest-cover decline recorded during the recent global forest resource assessment. A substantial improvement from this trend of forest cover decline will take place only if there is a significant improvement in the agriculture sector, especially through wider application of productivity enhancing technologies and major structural changes in the economies through the development of industrial and services sectors thereby reducing the dependence on land. As such the prospects of such changes are not very evident.

**Sustainable management of natural forests and woodlands**

Some of the countries, such as Uganda, Kenya and Tanzania, do have a long history of sustained yield forestry, largely focusing on timber production. Silvicultural systems were designed to produce high-quality logs to meet export demand. During the last three decades, however, these management systems have become ineffective on account of the following factors:

- increased demand for wood and wood products resulting in removals far above the sustainable levels of production;
- a substantial decline in the area under natural forests and increasing resource use conflicts; and
- an overall reduction in the capacity of public-sector institutions, especially forest departments, to implement sustainable forest management.

There are probably no natural forests in East African countries today that can be said to be managed sustainably. Furthermore, there are very few tracts of forests that are large enough to make their use economically viable. Although there have been attempts by various forest departments in the subregion to manage their forest resources sustainably, most of them face a number of technical, institutional and financial constraints. As discussed below, all the indications are that these constraints will persist and even intensify in the next two decades limiting the scale of adoption of sustainable forest management:

- the limited resources available to forestry agencies will hamper the adoption of sustainable forest management on a wider scale. Although awareness

of issues involved in sustainable management is widespread, the capacity to translate this into action is very limited. The few success stories are largely a result of external financial and technical support, and it is unlikely that resources required to scale them up and enhance the area covered under sustainable forest management will be available on a long term basis;

- wider adoption of sustainable forest management will critically depend on its economic viability. While some of the more productive forests in the moist zone could yield a reasonable return on investment, very little of this is reinvested to maintain and improve productivity. Income from these forests in fact subsidizes less productive segments within the forestry sector or used for the development of other sectors. In the case of woodlands in the less productive zones, sustainability can be ensured at low intensities of use. Improving productivity and maintaining the intensity of use at acceptable levels require substantial investments. All the indications are that this is unlikely to come forth considering the poor resource situation of the governments and local communities;
- most of the natural forests now available are low-value secondary forests, and most of the present and future supplies of wood and non-wood forest products are expected to come from these. However, in view of their relatively greater accessibility, these forests are subject to intense pressure. Considering the limited investment in conserving and managing these forests, degradation is likely to continue;
- substantial extent of use of natural forests and woodlands takes place in the framework of the informal sector. Uncertain property relations, combined with poverty, will inhibit investments contributing to resource depletion.
- efforts to promote community participation in resource management may bring about some positive changes, if communities can establish appropriate institutional mechanisms to develop and implement sustainable management programmes;
- a substantial area of land has been set aside as national parks, which excludes it from management for timber production - although even these areas are not free from encroachment, fire and illegal logging.

Hence the adoption of sustainable forest management on a wider scale may take considerable time, especially in view of increasing pressure on natural forests and woodlands and the limited ability of the key actors to invest in SFM. However, depending upon how the institutional and technical capacity of community-based organizations is improved, there may be some increase in the extent of sustainably managed forests under community ownership/control.

**Role of plantations in wood supply**

As discussed earlier, the current rate of annual planting in East Africa is about 15,000 hectares and most of it is undertaken by forestry departments. Future pace of plantation development will largely depend on the perceptions and capabilities of the of the public sector. There are also some indications of greater involvement of the private sector as influenced by market mechanism. The future of the forest plantation programme will depend upon which scenario dominates. If the public sector remains dominant, the situation could be as follows:

- resource-starved public agencies, especially forestry departments, may not be able to expand and maintain existing plantations. As in the past, investment in plantations under forestry departments is likely to remain very low. Operations such as thinning and protection against fire, pests and disease are likely to be neglected, thus undermining productivity;
- there will be very little investment in the application of modern technologies, including tree improvement and other productivity enhancing technologies;
- many public-sector plantations, especially in the fertile uplands, will suffer from encroachment and illegal harvesting, reducing their economic viability. In Kenya, for example, plantations have already suffered from extensive encroachment and excision. This situation is unlikely to change unless there are more fundamental improvements in policies as well as in social and economic conditions;
- during the 1960s and 1970s large industrial plantations have been established in several countries to augment wood supply to forest industries. However, in the absence of investment in industries there has been no demand for wood from these plantations. Distance to markets/ports

has limited the scope for utilizing the wood from these plantations. This has resulted in the neglect of the plantations, exposing them to fire, pest damage and illicit removal;

Some plantations under government ownership are likely to be transferred to the private sector, although consequent improvement in management is dependent on a number of factors, most important being their economic viability. The scope for increased private-sector investment in large-scale plantations is limited except in less densely populated countries like Tanzania. Some issues affecting private sector involvement in plantations are as follows:

- the willingness to acquire public-sector plantations depends on such factors as productivity and access to markets. Plantations established by forestry departments are not necessarily based on these considerations;
- the process of transferring government plantations to the private sector is unclear. A transparent system of valuation and a mechanism for identifying prospective buyers must be developed;
- some plantations are located in very densely populated, highly productive areas with a high potential for more profitable alternatives. Privatization will not necessarily help to reduce the pressure on these plantations, unless some of the social and economic issues in the area are addressed.
- many of industrial plantations are far away from markets and processing facilities affecting their competitiveness. While local prices tend to be low on account of pricing policies and the availability of wood from the informal sector, global prices also tend to be low on account of intense competition. This is particularly the case with pulpwood. And considering the anticipated increases in global supplies during the next two decades, prices are unlikely to increase substantially, making pulpwood plantations in East Africa economically less attractive.

The prospects for significant expansion of forest plantations under the public or private sector are hence limited. The only country in the subregion with some potential for expanding forest plantations is Tanzania, because of the availability of large tracts of productive land and a relatively low population density. Some of the areas are also located close to the coast, with comparatively better access, making the cost of transporting wood for export reasonable. None of the other countries in the subregion has these advantages.

BOX 21

**PLANTATIONS IN EAST AFRICA**

The existing plantations in East Africa are all situated far from the coast and any port. This makes exporting wood expensive, since transportation costs are high. Poor management means that the wood produced is of poor quality. On the world market East Africa competes with pines grown in New Zealand and South Africa, which produce good-quality wood that is located closer to ports. The basic conditions are very different, putting the subregion at a disadvantage. Lower labour costs in East Africa are cancelled out by higher transportation costs and the lack of quality production. In addition, technology and silvicultural systems are lagging behind.

### Trees outside forests

Although many countries in the subregion have substantial stocks of trees outside forests, these are fast being depleted. The future expansion of trees outside forests will be dominated by two scenarios: (i) market forces, in the case of land with well-defined property rights; and (ii) the informal sector, in the case of communally owned land with uncertain tenure. The overall direction of change during the next two decades could be as below:

- where ownership is secure, the increasing price of wood will encourage further planting, as is happening in Kenya and Uganda. In Kenya trees grown on farms have already become a major source of wood compensating the reduction in supplies from government forests. The Plan for the Modernization of Agriculture in Uganda emphasizes the importance of agroforestry and envisions support for growing trees on farms and homesteads;
- in Kenya, many woodlots were established by well-off absentee owners, largely as a means of holding on to land. This may have an impact on management, including the species grown and productivity;
- so far as trees on communal land are concerned, the future will depend on how sustainable management systems are implemented, and in particular how the removal of wood is regulated. In most cases, traditional communal arrangements are on the decline, especially in the context of increasing population pressure, weakening community cohesion and the increasing penetration of market forces. Existing land use arrangements under

BOX 22

**COMMUNITY PARTICIPATION IN FOREST MANAGEMENT**

"When it comes to forests important enough to have been already designated as Government Forest Reserves, community participation is more erratically posed. In general, Tanzania is positioned at one extreme in this respect, and Zambia at the other. A clear opportunity to autonomously manage a Government Forest is provided in the former, through the declaration of Village Forest Management Areas embracing all or part of a Government Reserve. Some nine National Forests have already seen development in this."

(Alden-Wily and Mbaya, 2001)

communal ownership do not encourage the cultivation and management of trees on communal land. What will happen to tree growth on communal land during the next two decades will thus depend on land tenure changes and to what extend communities are able to build up the necessary capacity to manage the resources sustainably;

- Tanzania is making significant progress in strengthening community organizations for natural resource management (see Box 22). The necessary policy and legal changes are in place. Considering the experience of local communities in decentralized planning, the prospects of wider adoption of community-based management in Tanzania is promising and will have a positive impact on trees in communal areas;

The future of trees outside forests in East Africa by 2020 could be summarized as follows:

- there will be an increase in tree planting on private farms in response to increasing prices and demand. In the humid areas of countries such as Kenya and Uganda, trees grown on farms and homesteads will become a major source of local wood supplies, especially sawnwood;
- in most other countries, except Tanzania, ill-defined land tenure could lead to further loss of trees from communal land;
- depending on the progress of policy, legal and institutional reforms, community-based management systems are expected to become strongly entrenched in Tanzania. This could result in the sustainable management of trees on communally managed land. Regulations guiding harvesting and management will help to increase tree cover in some areas.

## WOOD AND NON-WOOD PRODUCTS

No major changes are expected in use of wood, as energy production is expected to remain the main end use. In view of the limited options for energy switching, woodfuel will provide most of the domestic energy needs as also those of some of the traditional industries like bakeries, brick-making, etc. The general trends with regard to the consumption of wood and other products are indicated below.

### Wood as a source of energy

Table 11 provides the estimates of woodfuel consumption in the East Africa subregion. With the exception of Mauritius and Seychelles, in all the other countries in East Africa wood will remain as the main source of household energy.

Between 2000 and 2020 the total woodfuel consumption is expected to grow at an annual rate of 1.5 percent, lower than the population growth rate, resulting in a decline in per capita consumption. However, there will be considerable inter-country differences in wood energy use, reflecting the state of economic development, availability of alternative energy sources and access to woodfuel. These will be more pronounced between the economically well-off countries like Mauritius and Seychelles and the rest of the East African countries. The per capita consumption of woodfuel for the entire East Africa in 2000 is estimated as 1.093 $m^3$ and this is expected to decline to about 0.930 $m^3$ by 2020. Estimated consumption for Mauritius and Seychelles is 0.185 $m^3$ and 0.163 $m^3$ for 2000 and 2020 respectively. Changes in woodfuel demand and supply will be largely guided by the evolution of the market forces and informal sector scenarios, as discussed below:

TABLE 11

**Estimated woodfuel consumption in East Africa 1990–2020**

| Country | 1990 | 2000 | 2010 | 2020 |
|---|---|---|---|---|
| | (000 $m^3$) | (000 $m^3$) | (000 $m^3$) | (000 $m^3$) |
| Comoros | 204 | 301 | 401 | 509 |
| Djibouti | 302 | 441 | 537 | 619 |
| Eritrea | 1 959 | 2 818 | 3 367 | 3 896 |
| Ethiopia | 77 597 | 98 985 | 116 057 | 133 156 |
| Kenya | 15 481 | 17 845 | 18 909 | 19 581 |
| Madagascar | 6 552 | 9 637 | 12 483 | 15 210 |
| Mauritius | 227 | 220 | 216 | 217 |
| Seychelles | 14 | 16 | 17 | 18 |
| Somalia | 7 773 | 11 687 | 16 200 | 21 773 |
| Tanzania | 18 567 | 20 787 | 22 836 | 25 340 |
| Uganda | 31 026 | 36 330 | 42 560 | 48 403 |
| **Total East Africa** | **159 703** | **199 065** | **233 583** | **268 722** |

*Source:* Broadhead *et al.*, 2001.

- undoubtedly most of the production and consumption of woodfuel will take place within the framework of the informal sector. This will be particularly the case as regards demand for and supply of woodfuel in the rural areas. Low incomes and the relatively high cost of alternative fuels (and in many situations the non-availability of commercial fuels) will necessitate the continued reliance on woodfuel. In most cases demand and supply will be in balance and seasonal shortages will be overcome through the use of other sources of biomass energy, especially crop residues;
- the situation in the urban areas will however be very different. While there is some scope for fuel-switching, this will depend on household income and the prices of alternative fuels like kerosene, electricity and gas. All the indications are that a substantial proportion of urban households will continue to depend on woodfuel - especially charcoal - as it will remain the most affordable energy. Privatization of utilities has in some cases increased the costs of utilities like gas and electricity resulting in reverse switching, increasing the demand for woodfuel;
- most urban demand will be met through the interlinked functioning of the informal sector (especially in the collection of woodfuel) and the market forces scenarios. Most collection will be unorganized and will result in the depletion of forest and woodland resources close to urban centres. Woodfuel will reach the end-users through a network of transporters, wholesalers and retailers, who are unlikely to invest in managing the resources sustainably;
- current efforts to improve energy efficiency through improved devices are far from adequate. While these approaches are technically appropriate, there are yet to find wider adoption on account of a host of other factors;
- since returns are low, the scope for establishing large-scale woodfuel plantations is limited. Most woodfuel needs will be met from woodland and tree resources on farmland. With increasing urban demand, forests and woodlands adjoining urban areas will continue to be depleted.

In short, while demand will continue to increase, there will be inadequate efforts to enhance the supplies largely on account of the low rate of return from woodfuel plantations. Further, majority of the consumers are low income households who will continue to rely on low cost supply sources. Considering the current and anticipated changes in income, no major shifts are expected during the next two decades. The production and use of woodfuel will continue to be a low-investment, low-technology activity, largely because of the low purchasing power of the majority of consumers.

#### Industrial roundwood and other products

Very little information is available on the different sources of industrial roundwood supply and their long term trends. As such most of the supplies are obtained from government-owned forests, including plantations. But in view of inadequate efforts to implement sustainable forest management, supply from these are unlikely to increase. Low investment in establishing and managing plantations suggests that there is unlikely to be an increase in industrial roundwood supply from plantations.

Currently the informal sector is playing an important role in supplying industrial roundwood. This is largely through illegal logging, not only from forests within the subregion, but also from those in the adjoining countries, especially in the Congo basin. Obviously, this cannot be sustained in the long term. Some increase in supply from private planting is expected, depending on how private investors perceive the financial viability of investments in tree planting. Increased imports of industrial roundwood could depress local prices, undermining the economic viability of private investments.

As per the figures reported by countries, the industrial roundwood production and consumption in East Africa for the year 2000 is estimated as about 10.39 million $m^3$ and 10.83 million $m^3$ respectively. Production and consumption forecasts suggest a very modest increase, primarily for the reasons indicated earlier. On the whole the subregion is expected to remain a low producer and consumer of industrial roundwood.

Further, the proportion of industrial roundwood used in the production of value-added items is very low. Available data suggest that most of it is used as

TABLE 12
**Estimated production and consumption of industrial roundwood in East Africa**

| Product | 2000 | 2010 | 2020 |
|---|---|---|---|
| | (million $m^3$) | (million $m^3$) | (million $m^3$) |
| Production | 10.39 | 11.18 | 12.28 |
| Consumption | 10.83 | 11.96 | 13.34 |

*Source*: FAO, 2002; Rytkönen, 2001.

"other industrial roundwood", especially poles, pit props and fence posts. In 2000, for example, "other industrial roundwood" accounted for 76 percent of the total industrial roundwood production of Ethiopia, Kenya, Tanzania and Uganda (FAO, 2002). This pattern of use may change depending on the rate of urbanization and the increasing demand for sawnwood for construction. The most likely scenario will be a shift from use as other industrial roundwood (with very limited processing) to sawnwood. Other than this shift, no major changes in the end uses of industrial roundwood are likely.

Table 13 indicates an increase in the consumption of wood based panels and printing and writing paper. However production, especially as regards printing and writing paper, is unlikely to increase, necessitating continued dependence on imports of these value-added products. Low demand suggests the limitations of expanding domestic manufacturing, especially in the case of industries characterised by substantial economies of scale. Further, an increase in imports on account of the adoption of liberalised economic policies would make domestic production unviable.

**TABLE 13**
**Estimated consumption and production of selected forest products in East Africa**
**(production figures in parentheses)**

| Product | 2000 | 2010 | 2020 |
|---|---|---|---|
| Wood-based panels (000 $m^3$) | 201 (91) | 241 (104) | 294 (126) |
| Printing and writing paper (000 tonnes) | 88 (29) | 102 (29) | 119 (29) |

*Source:* FAO, 2002; Rytkönen, 2001.

### State of forest industries

The undeveloped state of forest industries in the subregion is largely a reflection of the overall situation of low industrial development in the subregion. Since most wood is consumed primarily in unprocessed form, the demand for value-added products is low. Sawmilling is the largest forest-based industry, with sawmills falling into three categories:

- public-sector enterprises, established in the 1970s and 1980s, which have largely become dysfunctional on account of various problems;
- private-sector units largely dependent upon timber obtained from government reserves or communal land; and
- informal-sector milling, especially pitsawing, which is highly dispersed and is often dependent on logs obtained illegally.

In the context of the above situation, prospects for change in the sawmilling industry are uncertain (see Box 23). Most public-sector units are characterised by low productivity and high production costs making them uneconomical. The large number of private sector saw mills also face the problems of low productivity and low capacity utilization, partly because of outmoded technology and irregular wood supplies. In this situation, only pitsawing units survive, largely because they often operate illegally and pay no royalties. However, pitsawing will also cease to be sustainable in the long run, as cheaper log supplies dry up.

A positive change requires a number of conditions, for example:

- sustainable management of natural forests and plantations and support for growing trees on private land to ensure a stable wood supply;
- improvements in sawmilling technology to increase efficiency and rates of recovery - particularly important in the context of decreasing log dimensions as more supplies are obtained from plantations and farm forestry plantings;
- formalization of the pitsawing industry and support for improvements in technology and access to markets; and
- improved efficiency in the use of sawnwood, especially through standardization of products.

Changes in the above direction are likely to be very slow. Some of the oldest sawmills will cease to operate altogether, making way for modern units

BOX 23

**PROSPECTS OF INVESTMENT IN FOREST INDUSTRIES IN EAST AFRICA**

Although there is a high and steady demand for many forest products, there has been no major investment in wood processing plants largely because of the shortage of raw material. The liberalization of the economies in most countries has influenced the forest industry sector in that an addition of many smaller privately owned sawmills has occurred, designed to cut smaller dimension logs from plantations at a sawmill capacity of not more than 10 $m^3$ per day. In Tanzania, there has been privatization within the forest industry sector and a few sawmills and wood working industries have been taken over by the private sector, but it has not changed the overall situation much. Throughout Eastern Africa, the industry as a whole is much run down and in need of restructuring.

(African Development Bank, 2001b)

more suited to cutting smaller-sized logs. Those with access to working capital will take the lead in modernization. As timber prices rise, adaptation will be needed, leading to a self-adjustment process. Wood production must be integrated with processing in order to make supplies more certain. With trade liberalization, a proportion of urban demand is likely to be met by imports.

The other major industries in the subregion are pulp and paper and plywood. There are two pulp and paper mills in East Africa, namely the Pan African Paper Mill in Kenya and the Southern Paper Mill owned by the Tanzania Development Corporation. The Pan African Paper Mill is very old, uses outdated technology, has not been able to address the problem of environmental pollution and largely depends on a subsidized supply of raw materials. This, coupled with its low capacity utilization, casts doubts on its long-term survival. The Southern Paper Mill in Tanzania ceased operations in 1998, and efforts to privatise are being made, although hitherto there has been very little response from potential buyers. The following factors need to be considered in assessing the future potential of the pulp and paper industry in East Africa:

- the low internal demand on account of the limited purchasing power;
- the large investment required to establish and manage pulp and paper units that are efficient and environmentally appropriate;
- the social appropriateness of a modern pulp and paper unit in the context of its low employment potential, especially in view of the need to increase employment opportunities in East African countries; and
- the scope for meeting domestic demand through imports at competitive prices in the context of liberalized trade and, more particularly, the large unutilized capacity in the industry as a whole.

One potential area of development is the production of secondary products, especially furniture, partly to meet the increasing urban demand, but also for exports. With trade liberalization and improved access to industrial roundwood from Central Africa, there is some scope for setting up modern sawmilling and furniture industries. Developments in this direction will largely depend on investors' perceptions of its profitability, sustainable supply of saw logs, cost of production and competition from other producers.

**Non-wood forest products**

The production, consumption and processing of and the trade in non-wood forest products will be influenced by the following scenarios:

- the informal sector, especially as regards subsistence production and consumption;
- market forces in the case of many of the popular traded items; and
- the public sector, with respect to selected high-value items obtained from forests.

In most situations, as economic progress takes place, a shift away from non-wood forest products toward more processed and refined products occurs. In East Africa, the following situation is likely to develop:

BOX 24

**FUTURE OF NON-WOOD FOREST PRODUCTS**

The subregional thematic study undertaken by the African Development Bank (2001) identifies the following scenarios as regards the future development of non-wood forest products:

Scenario 1: The way the NWFPs are collected and used today throughout the subregion will lead to a situation where these resources will become exhausted. The existing situation of a total absence of management will not be improved under this scenario. Although current policies and practices in place in most countries now encourage local communities to become involved in forest management, this has so far not enabled local communities to work with NWFPs.

Scenario 2: Under this scenario, local communities might be able to undertake management of NWFPs, but the marketing mechanism required to promote he sale of these products will not be there.

Scenario 3: This is exactly the situation experienced throughout the subregion for many years. Governments were concentrating on traditional forestry while at the same time exploiting the more valuable NWFPs by imposing a government monopoly on sale and marketing of these products. Under this scenario, local communities are not provided with the incentives and market opportunities that are required to promote these valuable and desired products.

Scenario 4: This is the scenario to change the situation for the better. Local communities as well as the private sector are provided with incentives to cultivate and market NWFPs. Government could support by undertaking research and open up marketing possibilities. To boost exports, the receiving countries should remove trade barriers.

(African Development Bank, 2001b)

- rural and urban communities will continue to depend on non-wood forest products because of the persistence of low incomes and consequent limited access to alternative, but more expensive products available on the market. This will particularly be the case with many traditional medicines;
- many products will be obtained from the wild. In the absence of efforts to conserve and systematically manage them, the availability of some of the more popular items may decline;
- domestication and cultivation of some of the valuable items may be initiated in response to growing demand. This will largely be undertaken by the private sector;
- local processing will largely rely on traditional knowledge. In the absence of investment to improve scientific and technological capacity, East African countries may not be able to take full advantage of the resources and their traditional knowledge.

While there is considerable potential to enhance the contribution of non-wood forest products to the livelihoods of rural communities, it will largely depend on efforts to conserve and manage the resources and improved market access. Depending on the products, markets and who controls the resources a range of situation can develop in the NWFP frontier (see Box 24).

### FOREST-BASED SERVICES

Increasing pressure on forests and woodlands to meet the demand for products and the high dependence on them by the local communities would make it extremely difficult to give a high priority to the provision of environmental services. The implications of the business-as-usual scenario on the provision of environmental services are briefly discussed below.

#### Watershed protection

Throughout the subregion, including the island countries, availability and access to water will become a critical issue and even a cause of conflict between groups and countries. The severity of the problem will increase during the next two decades on account of:

- population growth will necessitate further agricultural expansion to meet additional food requirements;
- the concentration of people in the highlands implies significant downstream effects as a result of the expansion of cultivation and the nature of agricultural practices.

BOX 25

**LAKE TURKANA, ETHIOPIA/KENYA**

Studies based on successive satellite imageries indicate a substantial decline in the water levels in Lake Turkana and a significant increase in the delta of the Omo River which discharges into the lake. With reduced inflow and very high rates of evaporation, the salinity of the lake has increased considerably, affecting the local communities living on the shores of the lake.

(http://edcwww.cr.usgs.gov/earthshots/slow/turkana)

Against a background of low investment in soil conservation, the impact of erosion and of changes in stream flow on downstream water supplies is already serious (see Box 25). Rapid urbanization is generating an increased demand for urban water supplies. In many major cities in East Africa, the water supply situation has become precarious and is expected to worsen in the next two decades.

- East Africa is the source of the Nile River, the lifeline of a number of countries in the subregion and North Africa. As populations grow and the demand for water increases, there will be increasing discussion and possibly even conflicts of view on issues relating to catchment management and how the costs and benefits are to be shared.

As the situation worsens, the following options may become important:

- development of a system to compensate those in the uplands for protecting watersheds by adopting appropriate land uses - arrangements that will be particularly required between countries downstream and those upstream; and
- technical and financial support for the adoption of integrated land use planning in the uplands.

Watershed management will undoubtedly emerge as a key concern for all the countries of the subregion, and this will require a better understanding of the role of forests and trees in regulating water yield. There is however a clear danger that this issue may be neglected and the failure to develop an acceptable mechanism for conflict resolution may result in severe degradation with its severe adverse consequences.

#### Control of desertification

Since most of the subregion is arid and semi-arid, desertification is a major concern for most countries. The situation is further compounded by the increasing frequency of droughts in the Horn of Africa affecting

most countries directly and indirectly. Desertification accentuates the vulnerability of the poor, who are dependent on low productivity land and who are unable to invest in improved technologies. All the indications are the problem of desertification will persist and there is unlikely to be substantial efforts to address desertification for the following reasons:

- in view of the poor resource situation, most governments will find it difficult to mobilise public resources to combat desertification on a sufficiently large scale. The limited resources available will be largely used up in addressing other more urgent tasks, like improvement of education and healthcare;
- uncertain land tenure and the conflicts stemming from diverse uses will inhibit any private or community investment in addressing desertification and land degradation. The financial, technical, institutional and organizational capacity required to address the problem effectively is far beyond what can be mobilised by the communities or individuals;
- while traditional systems of land use were well adapted to the low and fluctuating productivity, increasing population and sedentarization have undermined this. All the indications are that the situation may worsen in many countries.

### Forests and climate change

There is increasing recognition of the role of forests as carbon sinks and accordingly carbon sequestration through afforestation/ reforestation has been identified an activity that qualifies for support under the Clean Development Mechanism (CDM). Some initial efforts have already been made in East Africa as an early effort to explore the potentials of carbon plantations. However, the long-term prospects of establishing plantations under the CDM and mobilising substantial resource flows through carbon trading are uncertain because of the following factors:

- considering the predominance of arid and semi-arid areas and their low biomass productivity, the prospects of wider adoption of afforestation and reforestation to sequester carbon are limited. Most areas in the East Africa subregion may not have a comparative advantage in this regard in order to attract the limited resources that may eventually become available;
- areas with comparatively high biomass productivity are also areas with intense land use pressure. The high opportunity cost of land would increase the per-unit cost of carbon sequestration, making it less attractive;
- establishing plantations for carbon sequestration requires a long-term commitment not to make any land use changes. Considering population growth and related pressures, it will be extremely difficult to set aside productive land for sequestering carbon for a long period. The fact that many plantations are subject to intense biotic pressures, resulting in illicit felling, encroachment and officially sponsored logging, is a clear indication of the limitations of such an option.

## WILDLIFE MANAGEMENT

An account of the current state of wildlife management in East Africa was given earlier in this report. The public sector bears the chief responsibility for wildlife management, although the private sector is playing an increasingly important role, especially in promoting tourism. Most wildlife management is focused on national parks and game reserves, whereas wildlife outside such protected areas is under threat as a result of poaching and habitat destruction. Considering the main factors affecting forestry in the various countries, the situation that could emerge during the next two decades is as follows:

- as human and cattle populations increase, conflicts will intensify, with significant negative effects on habitat and wildlife populations in protected areas. Such conflicts could become serious, especially during periods of drought when water and fodder availability declines and cattle and wildlife will compete for the limited resources;
- in view of the pressure on land, the scope for expanding the network of protected areas is limited. Efforts will have to concentrate on improving the management of existing protected areas;
- no national park or game reserve can be protected and managed without the full involvement of local communities. This will require appropriate institutional arrangements that ensure benefit-sharing and the full involvement of the local communities, taking advantage of their knowledge and skills.
- while tourism is projected to grow, it is also a highly vulnerable industry susceptible to short term declines in response to a number of internal and external factors. Among these the perception

of security is a key factor that already had some impact on tourism in the recent years;

- since tourism is a highly globalized industry, the net gains from tourism to countries and communities will depend upon how effectively local entrepreneurs are able to take advantage of emerging opportunities. With privatization and globalization, there is a danger that the benefits from the growth of tourism may not be fully captured within East Africa, with most of them accruing to multinational tourism companies;
- a key factor that will affect the future growth of wildlife-based tourism in East Africa is that of infrastructure facilities, including access by air and accommodation. In the short term the lack of such facilities could limit the growth of wildlife-based tourism.

The experience of various East African national parks indicates the need to develop niche markets based on the unique features of different areas, while the various organizations concerned with protecting wildlife and promoting wildlife-based tourism must adopt a coordinated approach. This will be critical in realising its long-term growth potential.

The long-term prospects for effectively protecting and managing national parks and wildlife reserves depend upon the emergence of internal tourism, so that people within the countries develop a stake in the conservation of the areas in question, identifying them as symbols of national pride. Although economic growth is slow and the immediate prospects for any rapid growth of internal tourism are limited, there is some growth potential for the next two decades. Income from internal tourism may not be high, but its multiplier effect could be substantial, since most of it will be spent within the country and on locally produced goods and services

## FORESTRY AND POVERTY ALLEVIATION

Historically the role of forests and forestry in meeting the basic needs of people and addressing poverty has been transient. While communities living close to forests depend on forests for a variety of products and services, forest-dependence declines as access to traded goods and services increases. Several studies have highlighted the high degree of dependence of rural communities on forests for nutrition, medicines, woodfuel, construction material and a large number of other products and services including provision of income through formal and informal activities. In a situation of extreme poverty, as in the case of many parts of East Africa, access to forest resources would be very critical. It is important to consider the future prospects of forestry solutions for alleviating poverty, considering the various driving forces and probable scenarios.

- if the current trends persist, poverty will remain as a major development issue in the next two decades. Increasing population, low growth rates of income and the continued dependence on low-input-low-productivity agriculture is expected to exacerbate the situation. The problem will be further compounded by the high rate of HIV/AIDS infection;
- addressing poverty would require a reorientation of development in favour of (a) production of goods and services required by the poor and (b) increasing the income available to the poor to enhance their access to essential goods and services. Ability of the public sector to reorient development to address poverty directly is likely to remain constrained. The same holds good in the case of market forces and consequently an increasing number of poor will continue to depend on the informal sector activities to meet the essential needs.

All the indications are that during the next to decades forests and forestry in most of East African countries will have to play an important role in addressing poverty, largely as a fall out of the failure of the development of other sectors. In many rural areas, forestry is probably the only source of income and employment. The importance of this is unlikely to diminish in the next two decades. Unless this is adequately factored into forest management and appropriate measures are taken, conflicts in forest land use are likely to intensify.

## CONCLUSION

Considering the resource constraints, growing population pressure, and the limited prospects for rapid economic growth, the forestry situation in the subregion is unlikely to improve significantly. Forest cover will continue to decline and efforts to adopt sustainable forest management may remain far from adequate. The increasing demand for wood and wood products will be met from a diminishing resource base. This will be further compounded by the periodic occurrence of drought and famine.

This overall perception of what is likely to happen under the business-as-usual scenario is widespread (see

Box 26). There are however some indications of change stemming from various initiatives. Chapter 6 outlines the framework of a strategy articulating some of the ongoing efforts to enhance the role of forestry in sustainable development.

BOX 26

**EAST AFRICANS' VIEW OF THEIR FORESTS**

As part of the Forestry Outlook Study for Africa, a questionnaire survey was conducted to ascertain the views of a wide range of players (government agencies, universities, various institutions, international agencies, non-governmental organizations and the general public) on the current and emerging state of forestry in East Africa. Responses totalling to 138 were analysed to assess how people in the subregion perceive the various problems in the forest sector and what options are available to improve the situation. A summary of the findings from the questionnaire survey is given below.

**FORESTS TODAY**

On the whole most of the respondents indicated their dissatisfaction as regards the state of forest management and the availability of goods and services. Woodfuel problem was identified as a major issue. Almost 90 percent of the respondents from Ethiopia indicated this as a critical problem. Another major concern is as regards the degradation of watersheds and desertification and most respondents (between 70 and 92 percent depending on country) indicated that current efforts to protect watersheds and control desertification are inadequate and ineffective.

Almost all respondents consider deforestation and overexploitation of forest resources as major problems. Respondents from Ethiopia particularly stressed the problem of soil erosion and desertification, while those from Kenya and Uganda highlighted the inadequacy of reforestation efforts. Most respondents identified encroachment, illegal logging, corruption and the lack of efforts to adopt sustainable forest management as the main causes of forest degradation. These are exacerbated by population growth, increasing poverty and the weakening of national institutions charged with forest management.

**THE FUTURE OF THE FOREST SECTOR**

Generally most respondents outlined a pessimistic scenario. Almost two-thirds indicated a continued decline in the forest cover and degradation of forests on account of the inadequate capacity to implement sustainable forest management. There is widespread concern on the environmental implications of this especially by way of loss of biodiversity, decline in the quality, watershed degradation affecting the quality and quantity of water supplies and desertification. Concern was also expressed on the declining supply of forest products affecting the viability of local wood industries.

An improvement or stabilization of the forest situation is considered possible, but would require:

- wider adoption of sustainable forest management, especially through participatory approaches;
- increased efforts for reforestation/ afforestation through the involvement of farmers and communities;
- tackling corruption and illegal logging;
- increased emphasis on decentralization and a adoption of participatory approaches;
- technical and institutional support to local communities; and
- favourable tenure system that will encourage improved land uses.

Chapter 6

# Priorities and strategies

The outlook discussed in the previous chapter indicates what is likely to happen if the "business-as-usual" scenario persists. Under this the negative features of the public sector, market forces and informa sector become dominant, resulting in increased land use conflicts, a decline in forest resources and a worsening of the environmental problems, especially watershed degradation and desertification. However, there are options that can help a move away from this situation, largely depending on how some of the positive tendencies could be strengthened and the negative trends could be avoided. The Great Transition scenario, described in chapter 4, outlines how societies could possibly move out of the present predicament. The present chapter discusses the broad priorities and strategies that may be followed to enable forestry to enhance its contribution to sustainable development.

## DEVELOPMENT PRIORITIES

All the indications are that poverty will continue to be a major issue in the coming two decades. Recent estimates indicate that in the medium term (2000-2004) the per capita GDP of sub-Saharan Africa may grow by only about 0.9 percent annually and the long-term scenario (2005-2015) predicts a very modest annual growth rate of 1.9 percent (World Bank, 2002b). Sub-Saharan Africa is the only region in the world where the absolute number of poor people will increase: the World Bank estimates that between 1999 and 2015 the number of people living on less than US$1 per day will increase from 300 million to 345 million. Within sub-Saharan Africa, East Africa is the poorest subregion, suggesting the persistence of poverty and deprivation.

Poverty eradication will obviously remain the most critical development priority for all the countries in the subregion. Considering that industrial development is likely to be slow, people will continue to depend on land and other natural resources to meet most of their needs. In particular such dependence will be very high among the poor whose access to other assets is limited. This means that managing natural resources sustainably and improving their productivity will be the key element in addressing poverty. Careful husbandry of the environment, especially through protecting soil, water and biodiversity, and strengthening the mechanisms to cope with vulnerability arising from drought and famine will be a key element in addressing poverty.

Poverty alleviation and protecting the environment are two sides of the same coin. Environmental degradation cannot be arrested and reversed unless poverty is addressed. Likewise, the improvement of land productivity, the increasing of water availability and the reduction of vulnerability to natural disasters are critical to tackling poverty. These priorities will be relevant to all East African countries, except Mauritius and Seychelles, which have higher per capita incomes and highly diversified economies. Since the economies of these two island countries are dependent upon tourism, environmental protection, especially watershed protection and maintaining scenic values, will be major priorities for them.

## FORESTRY PRIORITIES

In the above context forestry will have to focus on the following areas.

### Poverty alleviation

Forestry's contribution to alleviating poverty may focus on providing goods and services for the poor and improving employment and income opportunities. Although interventions in the forestry sector cannot solve the problem of poverty in its entirety, continued dependence of the poor on forest resources would require that forestry addresses this issue directly and indirectly. The main thrust will be sustainable production of basic-needs goods, especially wood and non-wood forest products, and enhancement of opportunities to generate basic-needs income. Particular attention must be given to:

- meeting the growing demand for woodfuel: within the next two decades, the countries of East Africa are unlikely to reduce their woodfuel consumption significantly; alternatives such as gas, electricity and renewable sources (e.g. solar and wind energy) are unlikely to be available to the poor;

wood and other biomass will continue to be the most important sources of domestic energy; urban woodfuel problem is likely to worsen, exacerbating forest degradation in areas close to urban centres;
- strengthening industries based on non-wood forest products, including medicinal plants, to generate employment and income;
- improving the technical and entrepreneurial capacity of the traditional wood-based industries; and
- enhancing the flow of income from wildlife management to local communities.

In other words, poverty alleviation would require efforts to improve the capacity of the poor to produce and consume goods and services, not only by increasing the availability of the goods and services they require, but also by enabling them to earn the income to enhance their purchasing power. Attention must be focused not on aggregate growth rates, but on the kind of growth that directly and indirectly contributes to increased income and consumption of the poor.

Since most of the poor operate in the informal sector, interventions to address the problem of poverty should focus on improving the performance of the informal sector activities. As discussed earlier, these should address the following problems:
- most informal forestry sector activities are dependent on the free access to resources. Weak tenure is thus an important disincentive for investing in sustainable management;
- low skill and capital inputs are a major feature of most informal sector activities, enabling a large number of resource-poor people to take up various activities. However, this also limits the income that can be earned from these pursuits. A significant proportion of the informal sector products and services cater to the needs of low income consumers, whose ability to pay is limited thus limiting the income they generate;
- several of the informal forestry activities are "illegal" and those involved in them operate without any kind of support, including access to credit, technology and markets;
- with the ease of entry and exit, there is severe competition among those involved in the informal sector activities. Invariably in the absence of appropriate institutional arrangements, resource degradation is a major problem.

Addressing poverty would therefore require substantial efforts to improve the performance of the informal sector as also making necessary changes in the way the public sector operates. Employment generation will remain a primary objective of all forestry activities and this would require development of suitable institutional arrangements as well as adoption of appropriate technologies.

#### Arresting environmental degradation

In the context of the East African subregion the main environmental priorities will be:
- watershed protection: the uplands where there is a high concentration of population is susceptible to severe erosion and as land use conflicts intensify the situation is expected to worsen; watershed protection will hence be the most important priority to arrest environmental degradation; this would require interventions in several areas including institutional arrangements and technology and ensuring that there are necessary incentives to adopt land use practices that arrest and reverse watershed degradation; mechanisms need to be developed and implemented to share the costs and benefits of improved management between those who share the same watersheds;
- land productivity restoration: all the indications are that land will continue to be the most important source of livelihood for most people in the subregion; improving the productivity of land and arresting degradation including desertification will remain another key priority; this will be an area of cross-sectoral action strengthening the linkages between different components of land use, especially crop production, animal husbandry and management of forest and tree resources; improving the productivity of the extensive rangelands and strengthening traditional systems of resource management will be critical to most of the countries; and
- biodiversity conservation: East Africa has extensive protected areas, but biodiversity conservation will depend on the full involvement of the communities, ensuring that they are able to share the benefits thereof; conservation of bilological diversity needs to be mainstreamed into all other land uses including those outside the protected areas.

## POLICIES AND STRATEGIES

Accomplishing the above priorities would require efforts to strengthen the positive tendencies and to address the deficiencies of the core scenarios, namely public sector, market forces and informal sector. Key areas of intervention are outlined below:

### Policy and legal reforms

Policy changes facilitating empowerment of the poor and their full participation in the management of natural resources are fundamental to addressing the problem of poverty and environmental degradation. In recent years, there have been changes in forest policies, permitting community participation and decentralization of resource management as part of the broader development strategy. These need to be pursued and supported through the necessary legislative and institutional changes. Strengthening community initiatives and leadership is a pre-requisite for the success of participatory approaches. Some of the specific areas requiring policy intervention include:

- improvement of land tenure to ensure that those who use resources also have the responsibility for caring for and managing them;
- strengthening of the legal framework for management of communal land, empowering traditional institutions to adapt to the changes; and
- giving due recognition to the role of the informal sector in meeting the needs of the people through improving the legal framework to enhance its operational efficiency.

### Improving the institutional framework

Improving the institutional framework for resource management is the most important area of intervention . Several of the problems in fact stem from the weaknesses of institutional arrangements for managing the resources. Specific attention needs to be paid to the following areas:

#### *Revitalising the public sector*

One of the major problems facing most countries in the subregion is the significant decline in the capacity of public sector institutions, including the forestry agencies. Most forestry departments face severe constraints of human, material and financial resources curtailing their ability not only to fulfil the traditional functions of resource management but also to provide support and guidance to other key players, especially farmers, communities and private investors. Revitalising the public forestry institutions to play a facilitative role is critical to improve the situation. Specifically this should focus on:

- a redefinition of the public sector functions, deemphasizing the traditional resource management responsibilities, but enhancing their facilitating role. Essentially this will require building up capacity for policy development and strategic planning. Much of the attention will be focused on creating a conducive environment for other actors, especially communities, farmers and the private sector to play a lead role in resource management and to function as an effective arbitrator to resolve the various conflicts;
- considering the rapid population growth and the continued dependence on land, there is an urgent need to improve the land use practices, specifically focusing on productivity and sustainability. In view of the limited ability of the poor to pay, it is quite unlikely that market mechanism will be able to address the technology needs of the poor. This would warrant substantial public sector intervention. Research, education and training systems need to be reviewed focusing on their relevance in the context of the changing forestry priorities and strengthened to address the science and technology problems focusing on the needs of the poor.

#### *Making the markets work for the poor*

Enhancing the coverage of markets is a key element in reducing poverty. Unfortunately existing market mechanism covers only a small segment of the population and the majority of the people are outside the purview of market based decision-making. Largely this stems from distortions created by inappropriate policies and legal framework, discouraging most people from operating within the market framework. Empowerment of people and communities should focus on enhancing their linkage with markets, making them more efficient producers and consumers. Key areas of intervention are:

- improving the policy and legal framework enabling the markets to operate efficiently; and
- strengthening the information system especially on supply, demand and prices of goods and services.

#### *Improving the functioning of the informal sector*

All the indications are that the informal sector will continue to dominate the production of wood and

non-wood products and that its role in addressing poverty will remain important in the next two decades. Recognising its relevance and strengthening its positive aspects will be important to address the problem of poverty. However, interventions have to be carefully crafted in order to avoid various pitfalls, making sure, for example, that they do not reduce the flexibility characteristic of the informal sector, especially as regards skill and capital requirements, do not accelerate resource degradation and do not exclude those who are traditionally dependent on informal-sector activities. Particular effort should be directed to:

- increasing access of primary producers to information so that they are not exploited by middlemen and traders; and
- facilitating access to improved technologies and supporting innovation that will enhance the efficiency of those dependent on informal sector activities.

#### *Improved mechanisms for conflict management*

Managing the conflicts between different users and uses is the most critical in the sustainable management of forests. Increase in population and the diverging needs will accentuate the conflicts and much of the efforts will have to be focused on assessing the potentials for conflicts and addressing them before they get out of control and become irreconcilable. In the context of East Africa the areas requiring particular attention as regards conflicts management area:

- rehabilitation of watersheds would require significant changes in the land use practices , especially in the uplands; however this will require substantial support for technological improvements in land use and, where appropriate, resource transfers to compensate the loss that upland communities have to bear on account of foregoing certain options; and
- management of protected areas will require substantial efforts to resolve conflicts requiring greater involvement and participation of local communities; here again mechanisms will have to be developed to compensate local communities for the losses they incur on account of foregoing certain options; some limited experience already exists as regards participatory approaches in wildlife management, especially in Kenya and Uganda; these need to be strengthened and adapted on a wider scale as appropriate to the local needs.

#### *Integration of forestry with other land uses*

Traditionally most communities and households have been growing trees as an integral part of land use. However, the sectoral approach pursued to land use in most countries have highlighted the conflicts between the different uses and often policies relating to different segments of land use are implemented in isolation failing to take cognizance of the linkages. In the context of East Africa such stand-alone policies addressing problems of one sector in isolation have proved to be ineffective. Most often it would be advantageous to develop and implement an integrated land use policy, especially addressing all aspects including agriculture and animal husbandry, rather than formulating a stand-alone forest policy. This will especially be the case in the densely populated uplands and the arid and semi-arid areas.

Agroforestry and silvipastoral systems are already widely used, and appropriate policies should encourage them. Addressing land tenure issues, including some of the existing provisions relating to the duration of user rights, will be of critical importance. There are already some efforts to integrate tree planting into agricultural development strategies, as in the case of the Plan for the Modernization of Agriculture in Uganda. Current efforts to decentralize government administration in several countries would also help to integrate land uses at the local and provincial levels, so long as the compartmentalized approach to development planning is not followed and the necessary capacity is built at the local level to address the intersectoral issues.

#### Regional and subregional cooperation

Strengthening regional and subregional cooperation will be a key element in improving institutional and technical capacity in the forest sector. Specific areas for collaboration include:

- research, education and training, especially by developing centres of excellence to address the common problems of the countries in the subregion; similarities in ecological and economic conditions offer considerable scope for strong collaboration in several areas;
- transboundary parks and protected areas, especially to protect wildlife and develop common approaches for their scientific management; and
- coordination of watershed management, especially in view of the shared nature of several of the critical watersheds in the subregion.

## CONCLUSION

As indicated earlier, some of the countries have already initiated changes, although sometimes fragmented, that would facilitate the accomplishment of the Great Transition. Most countries have assigned a high priority for poverty alleviation and arresting and reversing environmental degradation. The recognition of the linkage between poverty and environmental degradation, highlighted during the World Summit on Sustainable Development, is expected to dispel the dichotomy that was being emphasized earlier. However, it is important to clearly spell out the details of how poverty alleviation and environmental degradation are proposed to be addressed. Most often poverty and environmental degradation are addressed as an afterthought without in any way examining the validity of existing development paradigms. Redefining the priorities with poverty alleviation and environmental protection as the thrust areas will help to focus attention on the causes of the problems and to mainstream them into all activities.

The key thrust of the strategies are in the realm of policy and institutional changes. In addition of improving the policy and legal framework, much of the efforts will be directed at (a) revitalising the public sector to enable it to play a facilitating role, (b) improving the functioning of the market mechanism so that it enhances the opportunities for the poor as producers and consumers and (c) addressing the weaknesses of the informal sector, especially through improving its efficiency and making its functioning more open and legal. Investments to improve the science and technology capacity and access to information are key areas of intervention, especially to enhance the ability of people to address the problem of poverty and environmental degradation. An integrated approach to land use and fostering subregional and regional coppoeration are other critical areas for action.

Chapter 7

# Summary and conclusions

This subregional report provides an overview of the forestry situation in East Africa, highlighting the potentials and constraints to forestry development during the next two decades. As discussed, developments in the forest sector are overwhelmingly influenced by what happens outside the sector. Hence much of the focus of this study has been to examine the likely path of development of the sector in the context of the varied impact of the driving forces and to assess what options are available to bring about changes considering the increasing emphasis on poverty alleviation and arresting environmental degradation. The main findings and conclusions are summarised below.

## KEY FINDINGS

Although the forestry situation in the subregion varies across the countries, there are a number of common features. While the contribution of forestry to GDP is low, forests play an important role in providing basic needs goods like woodfuel and a variety of non-wood forest products, especially medicinal plants. Further, the wildlife resources form the backbone of the tourism industry in most countries in the subregion. With the increasing degradation of upland watersheds and the declining productivity of land due to desertification, increasingly the environmental functions of forests are receiving greater recognition.

### Factors impacting the forest sector

The subregion is at the cross-roads of change and there are several initiatives that could usher significant political, social and institutional changes. Democratic systems of government are taking root and these are expected to percolate to sub-national levels through the ongoing process of decentralisation of administration. Participatory efforts are finding wider acceptance, although there is still a long way before it becomes effective and meaningful. There are also a number of negative tendencies, especially stemming from the persistence of conflicts. An additional population of 107 million by 2020 will intensify the resource conflicts. Other demographic changes, especially urbanisation, population movements and changes in the age structure will impact forests and forestry directly and indirectly.

The economic situation, especially the low GDP and per capita income and their low growth rates are a cause of concern. Excepting a few countries like Mauritius and Seychelles, East Africa remains the poorest region in the world. Considering the low incomes, poor savings and investments, declining overseas development assistance and high external debt, most governments and people have very limited options in the pursuit of social and economic development. All the indications are that no major structural changes in the economies would take place in the next two decades.

### Implications

In general the situation described above would imply that dependence on land and hence the pressure on forests will persist. The outcome of this will be as follows:

- deforestation will continue at least at the rate experienced during the decade 1990-2000;
- progress in the adoption of sustainable forest management will be slow and most of the forests and woodlands will continue to be exploited unsustainably. Depending on efforts to strengthen the institutional capacity, some improvement may take place in the management of woodlands under community control, especially if the supporting policy and legal frameworks are in place;
- except in Tanzania, the scope to expand plantations in East Africa is limited. In the relatively more productive areas, plantations will have to compete with more remunerative options, whereas in the arid and semi-arid areas, low productivity will significantly reduce the financial viability of the plantations;
- the status of trees outside forests in East Africa presents a mixed situation. Where property rights are well defined, planting will increase and this will be a major source of wood in the future. In most other areas over-exploitation may result in a decline in the tree resources;

- in view of limited opportunities to replace woodfuel with alternative fuels, wood will continue to be the most important source of energy for household use. There is no indication that substitutes will emerge. Increased urban demand for charcoal will accelerate deforestation in forests and woodlands close to urban centres;
- a significant proportion of industrial roundwood is consumed as poles, fence posts and other construction materials with minimal processing. The consumption of value added items like sawnwood, panel products and paper and paper products will remain low, largely due to the low demand;
- dependence on non-wood forest products will persist, although many will be depleted by overexploitation. Even if some of the commercially important items are domesticated and cultivated, most countries are unlikely to benefit because of their limited effort to add value to these products;
- wildlife will continue to be a major resource with unique potential. However, increasing conflicts will negatively affect wildlife management and wildlife-based tourism. Participation of local communities is critical to improve the quality of management of protected areas and to ensure long term sustainability;
- considering the growing scarcity of water, watershed protection will become a primary concern. There will be a growing need to design appropriate institutional mechanisms for the sharing of costs and benefits between lowland and upland communities, countries and subregions;
- in view of the high incidence of poverty (stemming from low income and its inequitable distribution) and the limited access to other resources, the dependence of the poor on forests for supply of basic needs goods and services will remain high. Until the economic situation improves forests will form an important safety net for the poor, meeting the demand for woodfuel, medicinal plants, forest derived foods including bushmeat and more importantly as a source of income through employment in a variety of forest based activities.

**PRIORITIES AND STRATEGIES**

In view of the persistence of poverty and the declining state of environment, poverty alleviation and arresting environmental degradation will remain the key development priorities for the East Africa subregion during the next two decades. This would imply that forestry also mainstream these priorities in all its initiatives. Specifically this would require:

- assigning priority to the fulfilment of basic needs, especially through producing goods and services required by the poor and enhancing their income that directly and indirectly improves their access to goods and services; and
- improving land use practices that will help to arrest land degradation, combat desertification and enhance watershed values;

The main strategy to accomplish the above objectives will be largely in the realm of policy and institutional changes by empowering the main actors who have been historically marginalised from playing a positive role in conserving and managing the resources. In addition to changes in policies and legislation, much of the focus would be to improve the institutional framework. Specific areas of action include:

- revitalizing the public sector to play a facilitating role, through creating conducive conditions for other actors - especially communities, farmers and other private investors -to play a lead role in producing goods and services and to provide the necessary mechanism to resolve conflicts; production and trade of wood and its processing, collection, processing and trade of non-wood forest products and management of wildlife will be some of the priority areas where involvement of communities and farmers are to be encouraged and supported;
- improving the functioning of markets to enable a larger number of people to participate in the market mechanism as producers and consumers; specifically this would require the development of a transparent legal framework to protect investments, strengthening the land tenure and removing market distortions; another key area in improving the functioning of the market mechanism would be strengthening the information system, especially enabling the small scale producers to have access to information on production, market demand, prices, etc.; and
- enhancing the efficiency of the informal sector by removing the legal impediments and improving the access of those operating in the informal sector to credit, technology and information.

In the context of East Africa it is extremely critical to adopt an integrated approach to land use, especially in

view of the inadequacies of the compartmentalised sectoral approach being followed now in most countries. There are already a number of examples of successful integration of different land uses at the microlevel through agroforestry, including sylvo-pastoral systems. Further, economic and ecological linkages between the countries warrant substantial efforts to coordinate and integrate efforts at the subregional and regional levels. Research, education and training and management of national parks and watersheds are key areas that could significantly gain through regional/subregional collaboration.

**FOSA FOLLOW-UP**

The FOSA adopted a highly participatory approach involving all the countries and other stakeholders to articulate a broad perception of current and probable future state of forests and forestry in Africa. While the regional overview report gives an account of the continent-wide situation, the subregional reports outline specific features of each of the five subregions. More than providing an indication of what is likely to happen and what needs to be done, the value of FOSA stems from raising key questions and facilitating a rethinking on forestry development in the larger political, economic and social context. As events unfold changing the opportunities and constraints, the FOSA findings need to be revisited and refined to strengthen the formulation and implementation of national forest programmes. Specifically this would involve the following:

- refine the country outlook papers taking into account the broad framework provided by the FOSA regional and subregional reports;
- use the country outlook papers and the regional and subregional FOSA reports to improve the formulation and implementation of national forest programmes;
- strengthen the country capacity in strategic planning; and
- establish a mechanism for regular review of developments in all the key sectors, assess their impact on forests and forestry and refine the forestry development scenarios.

# References


**African Development Bank.** 1998. *Africa development report - 1998.* Oxford, UK, Oxford University Press.

**African Development Bank.** 2000. *Population, incomes and forest resources in Africa: a review of selected trends with projections to 2020.* Report prepared by A. Danielson & M. Hammarskjöld. Abidjan.

**African Development Bank.** 2001a. *Driving forces shaping forestry to the year 2020 in the East African subregion.* Report prepared by M. Nuvunga & H. Sjöholm, Second draft, Abidjan.

**African Development Bank.** 2001b. *Key issues in forestry to the year 2020 in the East African subregion.* Report prepared by M. Nuvunga & H. Sjöholm, Second draft, Abidjan.

**Alden Wily, L.** 2000. *The democratization of forest management in eastern and southern Africa.* International Forestry Review 2(4): 287-294.

**Alden-Wily, L. & Mbaya, S.** 2001. *Land, people and forests in Eastern and Southern Africa at the beginning of the 21st century.* Nairobi, IUCN Eastern Africa Regional Office.

**Bekele, M.** 2001. *Forestry Outlook Study for Ethiopia.* Draft report. Addis Ababa, Ministry of Natural Resources Development and Environmental Protection.

**Broadhead, J., Bahdon, J. & Whiteman, A.** 2001. *Past trends and future prospects for the utilization of wood energy, Annex 2, Woodfuel consumption modelling and results.* Working Paper GFSOS/WP/05, Rome, FAO

**Carloni, A.** 2001. *Global farming systems study: challenges and priorities to 2030. Regional analysis: sub-Saharan Africa.* Rome, FAO.

**Contreras-Hermosilla, A.** 2002. *Forestry Outlook Study of Africa: forest institutional issues.* Rome, FAO.

**FAO.** 1995. *What about the wild animals? Wild animal species in community forestry in the tropics.* Community Forestry Note No. 13. Rome.

**FAO.** 1996. *Non-wood forest products for rural income and sustainable forestry.* Non-Wood Forest Products Series No. 7. Rome.

**FAO.** 1999a. *Yearbook of forest products, 1995-1999.* Rome.

**FAO.** 1999b. *The role of wood energy in Africa.* Wood energy for today and tomorrow (WETT): Regional studies.

**FAO.** 1999c. *Towards sustainable forest management: an examination of the technical, economic and institutional feasibility of improving management of the global forest estate.* Working paper FAO/FPIRS/01.

**FAO.** 2000. *African economic integration and food security: opportunities and challenges for economic integration in food, agriculture, fisheries and forestry.* Rome.

**FAO.** 2001a. *Non-wood forest products in Africa: a regional and national overview.* Sven Walter, ed. Rome, FAO.

**FAO.** 2001b. *Global forest resources assessment 2000: main report.* Rome.

**FAO.** 2002. *FAO yearbook - Forest products 2000.* Rome.

**FAO & World Bank.** 2001. *Farming systems and poverty: improving farmers' livelihoods in a changing world.* Rome & Washington, DC, FAO & World Bank.

**Gallopin, G., Hammond, A., Ruskin, P. & Swart, R.** 1997. *Branch points: global scenarios and human choice.* Resource paper of the Global Scenario Group. Stockholm, Stockholm Environment Institute.

**Ghebrendrias, H.** 2001. *FOSA Country Report for Eritrea.* Asmara.

**Government of Ethiopia.** 1994. *Ethiopian Forestry Action Program.* Addis Ababa, EFAP Secretariat, Ministry of Natural Resources Development and Environmental Protection.

**Ibrahim, M.M. & Youssouf Moussa Omar.** 2001. *Etude prospective du secteur forestier en république de Djibouti.* Djibouti, Service de l'Agriculture et de Forêts, Ministère de l'agriculture, de l'élevage et de la mer.

**Kanabahita, C.** 2001. *FOSA Country Report for Uganda.* Kampala, Forestry Department, Ministry of Water, Lands & Environment.

**Mbugua, D.** 2001. *FOSA Country Report for Kenya.* Nairobi, Kenya Forest Department.

**Mnangwone, I.** 2000. *FOSA Country Report for Tanzania.* Dar es Salaam, Ministry of Natural.

**Mwima P.M., Obua, J. & Oryem-Origa.** 2001. Effect of logging on the natural regeneration of *Khaya anthotheca* in Budongo Forest Reserve, Uganda. *International Forestry Review*, 3(2): 131-135.

**Nyaga, C.R.J.** 1989. Trends in food production under taungya system. In A.M. Kilewe, K.M. Kealy & K.K. Kebaara, eds. *Agroforestry development in Kenya: Proceedings of the Second Kenya National Seminar on Agroforestry.* Nairobi, ICRAF.

**Owino, F.** 2001. *Forestry Outlook Study for Africa: draft subregional report for continental East Africa.* Rome, FAO.

**Pappiah, H.** 2001. *FOSA Country Report for Mauritius.* Port Louis, Ministry of Natural Resources and Tourism.

**Rarivomanana, P.** 2000. Etude prospective du secteur forestier de Madagascar. Ministère des Eaux et Forêts.

**Rytkönen, A.** 2001. *Wood and wood product supply and demand in Africa to 2030.* Working paper for FAO.

**United Nations.** 2003. *UNSD Millenium indicator database*. United Nations Statistics Division, http://milleniumindicators.un.org/unsd

**UNDP.** 2001. *Human development report 2001*. New York, UNDP.

**UNDP/UNICEF.** 2002. *The millennium development goals in Africa: promises and progress.* Report prepared by UNDP and UNICEF at the request of the G-8 Personal Representative for Africa. New York. UNDP/UNICEF.

**UNIDO.** 2000. *African industry 2000: the challenges of going global.* Vienna, UNIDO.

**Vielle, M.** 2001. *A Brief on the Forestry Outlook Study - Seychelles.* Mahé, Seychelles Ministry of Environment and Transport.

**Watkins, C.W., Barrett, A.M., Smith, R. & J.R. Paine.** 1996. *Private protected areas: a preliminary study of private initiatives to conserve biodiversity in selected African countries*. World Conservation Monitoring Centre.
www.unepwcmc.org/products/wcmc.publications/reports

**World Bank.** 2000a. *World development report 2000/2001: attacking poverty.* Washington, DC, Oxford University Press.

**World Bank.** 2000b. *Can Africa claim the 21st century?* Washington, DC.

**World Bank.** 2002a. *African development indicators 2002.* Washington, DC.

**World Bank.** 2002b. *Global economic prospects and the developing countries 2002.* Washington DC.