



CHAPTER 6

FORESTS AND WOODLANDS

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REGIONAL SYNTHESIS

Forests and woodlands occupy an estimated 650 million ha or 21.8 per cent of the land area in Africa (FAO 2005). These account for 16.8 per cent of the global forest cover (FAO 2005). The distribution of forests and woodlands varies from one sub-region to the other, with Northern Africa having the least forest cover while Central Africa has the densest cover. The Congo basin in Central Africa is home to the world's second largest continuous block of tropical rain forest (FAO 2003a).

OVERVIEW OF RESOURCES

Africa's forests and woodlands can be classified into nine general categories including tropical rain forests, tropical moist forests, tropical dry forests, tropical shrubs, tropical mountain forest, subtropical humid forests, subtropical dry forests, subtropical mountain forests and plantations (FAO 2003a). Mangrove forests cover 3 390 107 ha (FAO 2003a). Only 32.5 million ha of forests and woodlands, or 5 per cent of the total forest area, are formally protected (FAO 2003a).

The forest sector in Africa plays an important role in the livelihoods of many communities and in the economic development of many countries. This is particularly so in Western, Central and Eastern Africa where there is considerable forest cover. Africa has a high per capita forest cover at 0.8 ha per person compared to 0.6 ha globally (FAO 2002).

On average, forests account for 6 per cent of Gross Domestic Product (GDP) in the Africa, which is the highest in the world (NEPAD 2003). In Uganda, for example, forests and woodlands are now recognized as an important component of the nation's stock of economic assets and they contribute in excess of US\$546.6 million to the economy through forestry, tourism, agriculture and energy (Emerton and Muramira

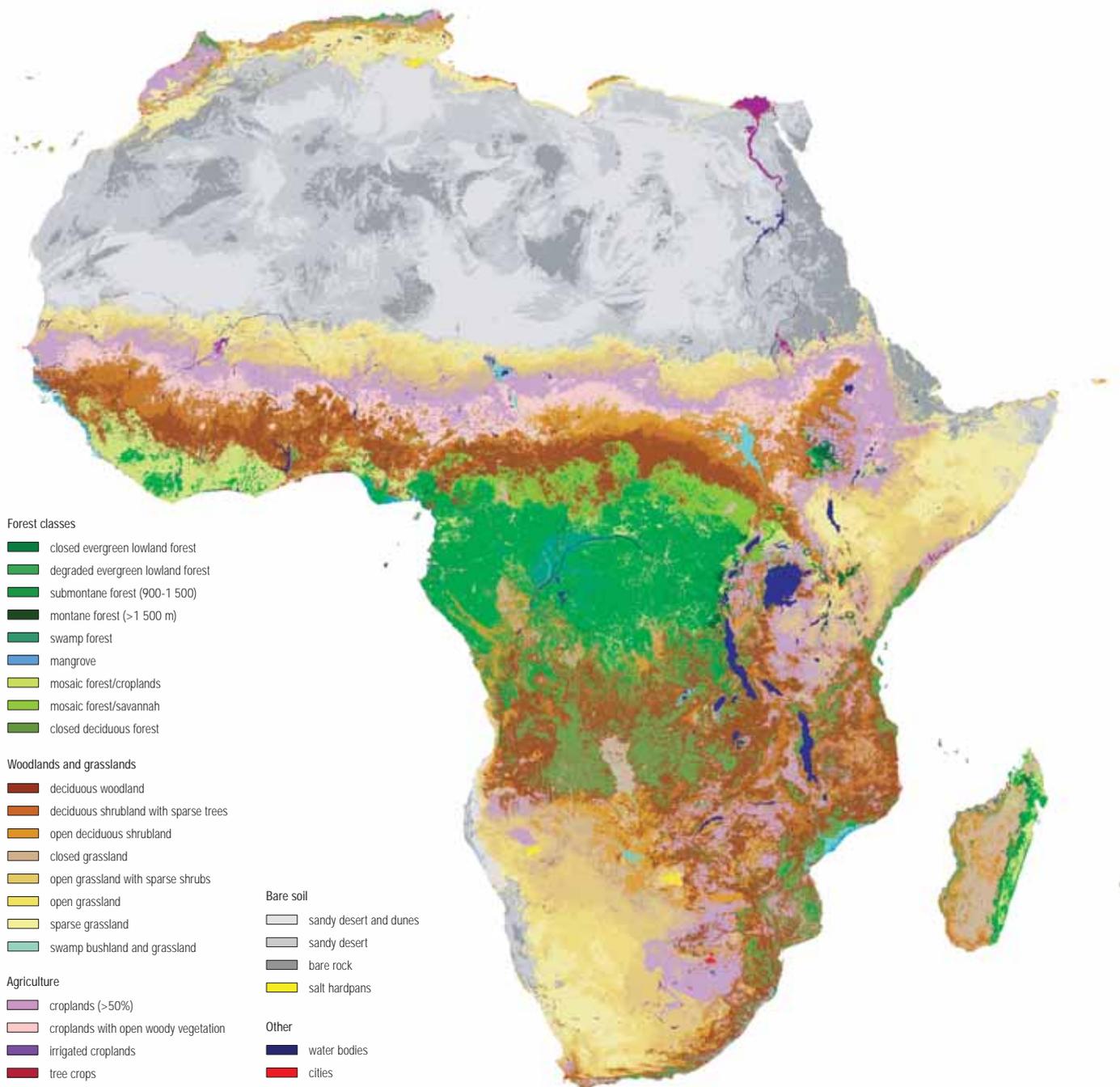
1999). Forests and woodlands also contribute to the long-term social and economic development goals of New Partnership for Africa's Development (NEPAD) and can play an important role in addressing the Millennium Development Goals (MDGs) and meeting its targets. They provide energy, food, timber and non-timber forest products (NTFPs) and are important contributors to wealth and health at the household, community, national, sub-regional, regional or even global level. The MDGs and their targets, as well as progress towards them, are shown in Annex 1.

Forests and woodlands are also key components of the environment and provide essential services that are critical to combating land degradation and climate change, as well as to conserving wetlands, coastal areas and freshwater systems. In this regard, the NEPAD programme on forests and woodlands is critical to the success of the other NEPAD programmes, including those on combating land degradation and climate change, and on conserving wetlands, coastal and freshwater resources.

ENDOWMENTS AND OPPORTUNITIES

Forests and woodlands provided a wide range of goods-and-services that create opportunities for development and improving human well-being. Some goods, such as wood for fuel and construction, are quite evident while others, such as water sources, are less obvious. The environmental functions of forests and woodlands include protecting catchment, purifying water and regulating river flows, which in turn ensure the supply of water for hydropower generation. Forests and woodlands also help prevent soil erosion (from water and wind) and thus are critical for agriculture and food production. They supply timber, wood for energy, construction materials and NTFPs including food and medicines. Other services include provision of shade,

Figure 1: Forest, woodlands and vegetation cover



Source: UNEP/DEWA/GRID 2005; data from ECJRC 2003

habitat functions, grazing, cultural (sacred groves, shade, peace trees and plants, meeting places, boundaries and training areas) and aesthetic values. The overall value of these goods-and-services is immense: it has been suggested that if the value of carbon sequestration is added to the above values, the local value of forests could easily support flourishing local livelihoods, while allowing forest-adjacent communities to maintain their security.

Manufacturing and value-added activities

In Central and Western Africa, the forest sector

contributes more than 60 per cent of GDP through export of timber products (FAO 2003b). Africa's wood production (including roundwood and fuelwood), this increased from 340 million m³ in 1980 to 699 million m³ in 2000 (FAO 2003b). However, trade is characterized by unprocessed products, primarily roundwood and sawn planks. This means that the full potential value of forest resources is not captured. A huge opportunity, therefore, exists in investing in value-adding and processing of wood products. The main existing value-added products are paper, furniture and sawn logs produced essentially by the established

private sector, and charcoal production and crafts by the informal sector.

Greater benefits can be realized in those countries with significant hardwood forests, particularly the Democratic Republic of the Congo (DRC), Congo, Gabon, and Cameroon, through more innovative institutional arrangements such as market-based price determination through tendering, improving tax collection through the privatization of tax revenue collection, or privatizing commercial functions (FAO 2005). A number of countries have now imposed restrictions on log exports to encourage domestic processing. Domestic processing, however, has to be supported by strict quality control if African processed wood products are to gain secure access to the international market. Additionally, products will require certification to show that they come from sustainably managed forests, given the growing environmental consciousness of global consumers.

Energy

In Eastern, Western and Southern Africa, more than 90 per cent of rural households depend on woodfuel, including fuelwood and charcoal, for their energy

requirements. The sustainability of this high dependence is questionable and, increasingly, African countries are looking at the energy opportunities offered by other resources, including solar and wind energy (see Chapter 2: *Atmosphere*) and hydropower (see Chapter 4: *Freshwater*).

Woodfuel supports lucrative local trade. Trade in charcoal is a major source of income for many households. For example, in Zambia, the charcoal industry generated about US\$30 million in 1998 alone, and in the same year about 60 000 Zambians directly depended on charcoal production for the bulk of their income (Kalumiana 2000).

As charcoal becomes an important tradable commodity, there is an opportunity for governments to recognize and regularize charcoal production by putting in place long-term plans for sustainable production, while at the same time creating a supportive legal and economic framework for micro- and small and medium enterprises (SMEs) development. Increasing efficiency and ensuring that the development of this sector does not accelerate deforestation requires appropriate policy interventions. There is ongoing research to develop more efficient charcoal production methods



Wood carving provides valuable income for many rural families. Wooden sculpture for sale on the roadside, Kenya.

Source: V. Rabesahala

using improved kilns in a number of countries in Eastern and Southern Africa. There is also research on charcoal briquettes production using wastes such as farm refuse, sawdust and woodchips (Kalumiana 2000). These initiatives can be supported through active private sector involvement.

Urban markets for wood products are already attracting investment from the private sector and this interest is growing in many countries. There are

additional opportunities for medium- and long-term investment. Commercial plantations for fuelwood and construction timber are big business in South Africa, Zimbabwe, Ethiopia, Kenya, Zambia and many Sahelian countries like Burkina Faso, Chad and Mali.

Non-timber forest products

In addition to the mainstream timber products, like timber and woodfuel, forests and woodlands support other activities including ecotourism, the crafts industry, the traditional medicine sector, the pharmaceutical industry and bushmeat trade. These too are significant in enhancing household incomes. For example, it was estimated that 2.9 million people (530 000 households), lived within 5 km of closed canopy forest in Kenya in 1995, and depended on forests to provide timber and NTFPs. The woodcarving industry in Kenya, for example, supported over 80 000 people with approximately 400 000 dependants, and was worth US\$8.21 million (Waithaka and Mwathe 2003). There is scope for building on the potential of these resources to contribute to livelihoods and development through, for example, increased partnerships and improved opportunities for local people to engage in these activities.

The contribution of forests and woodlands to national economies through production of gums and resins, medicinal plants, honey and beeswax, and bushmeat, though not quantified, is quite considerable. Table 1 shows some of the main NTFPs traded in Africa. Sudan, for instance, is the biggest producer of gums and resins in the world, commanding over 80 per cent of global production (Karamoja Data Centre undated) The potential for increased production of gums and resins in Sudan as well as the neighbouring states of Kenya, Chad, Eritrea, Ethiopia and Central Africa Republic is huge.

Another emerging NTFP export sector is medicinal plants. In 2003, the annual export trade in medicinal plants in South Africa was estimated at about US\$60 million, while in Zambia annual exports were valued at about US\$4.4 million (FAO 2003a). Medicinal plants are a growing major foreign exchange earner in Egypt, Morocco and Cameroon, with annual earnings of US\$12.4, 12.8 and 2.9 million, respectively (FAO 2002). Northern Africa has one of the richest, oldest and most diverse uses of medicinal plants in the region.

Medicinal plants are also an important commodity in local markets as many people still rely on traditional medicine for their primary health care. In Ethiopia, for instance, 600 plant species are documented as being used in traditional medicine (FAO 2002). This important

Box 1: Making the shea butter trade work for women in Burkina Faso

Vitellaria paradoxa (shea) – known in the local Dioula language as *karate*, meaning life – generally grows wild, and needs little attention. The tree has traditional medicinal value: it is used in childhood ailments and minor scrapes and cuts, and the shell of the nuts can be used to repel mosquitoes. Above all, the fruity part of the nut, when crushed, yields a vegetable oil that can be used in cooking, soap-making and skin and hair care. It is this that makes it a valuable trade commodity. Harvesting the nuts and making the butter have traditionally been women's work and now with new approaches to market it is giving women better opportunities, primarily through improved incomes.

Shea butter trees grow in the semi-arid Sahel region of west Africa, and Burkina Faso has the largest concentration of them. In 2000, the country generated the equivalent of US\$7 million out of the export of shea butter and unprocessed shea kernels. Shea products are the third most important export after cotton and livestock.

The Burkinabe rural women producers of the valuable emollient shea butter are making a direct link to global markets using this non-timber forest product. In the third "Shea Trade Fair," which took place in Ouagadougou, Burkina Faso, from 20 to 23 February 2001, producers and traders marketed their shea butter products directly to international companies who use it in high quality skin and hair products as well as in pastries and chocolates. These women have managed to double their earnings by developing ties to companies in Europe and the US, and selling directly on the international market. Because of renewed interest in natural and biological products, shea butter is being progressively introduced into industrial markets traditionally occupied by palm oil, cocoa or coconut oil.

Sources: UNIFEM 2001 and Harsch 2001

Table 1: Trade in non-timber forest products

Sub-region	Main NTFP	Selected national statistical data available
Northern Africa	Cork, medicinal plants, aromatic plants, fodder	Algeria: Annual <i>Quercus suber</i> (cork) production of 6 000 tonnes exploited from 460 000 ha of cork forests Morocco: Annual export of 6 850 tonnes of medicinal plants worth US\$12.85 million in 1992-1995 Egypt: Annual export of 11 250 tonnes of medicinal plants worth US\$12.35 million in 1992-1995 Tunisia: Annual production of 10 000 tonnes of <i>Pinus halepensis</i> seeds
Eastern Africa	Exudates, medicinal plants, bee products	Eritrea: Export of 49 tonnes of <i>Acacia senegal</i> (gum arabic) and 543 tonnes of <i>Boswellia papyrifera</i> (olibanum) in 1997 Ethiopia: Annual honey production of 20 000 tonnes in 1976-1983 and annual production of gum arabic of 375 tonnes in 1988-1994 Tanzania: Export of 756 tonnes of <i>Cinchona spp.</i> bark worth US\$258 000 in 1991
Western Indian Ocean islands	Edible plants, medicinal plants, ornamental plants, living animals	Madagascar: Export of 300 tonnes of <i>Prunus africana</i> bark worth US\$1.4 million in 1993
Southern Africa	Edible plants, medicinal plants, bee products, fodder	Namibia: Annual export of 600 tonnes of <i>Harpagophytum procumbens</i> (devil's claw) worth US\$1.5-2 million in 1998 Zambia: Honey production of 90 tonnes and beeswax production of 29 tonnes worth US\$170 000 and US\$74 000, respectively, in 1992
Central Africa	Edible plants, medicinal plants, bushmeat, rattan	Cameroon: Annual export of 600 tonnes of <i>Gnetum spp.</i> leaves worth US\$2.9 million Rwanda: Production of 23 000 tonnes of honey in 1998
Western Africa	Edible plants, medicinal plants, bushmeat, fodder	Burkina Faso: Annual export of 14 200 tonnes of <i>Vitellaria paradoxa</i> (shea butter) worth US\$2.4 million in 1984-1990 Guinea: Annual use of more than 100 million <i>Lophira lanceolata</i> (chewing sticks) Liberia: Annual use of 100 000 tonnes of bushmeat for subsistence purposes

Source: FAO 2002

role is underlined by the high ratio of traditional healers to western-trained medical doctors, estimated to be 92:1 in Ghana and 149:1 in Nigeria (FAO 2002).

As research advances, the role of medicinal plants in the pharmaceutical industries is increasing exponentially. Some of the opportunities and challenges associated with this sector are highlighted in Chapter 1: *The Human Dimension*. The natural stock may not be able to sustain the demand, especially if poorly managed. There is an opportunity for investing in the growing of medicinal plants to supply the growing demand. The Swiss Agency for Development and Cooperation (SDC) and IUCN – the World Conservation Union (IUCN) are working with farmers in Northern Africa to promote the conservation of endangered and economically useful medicinal and aromatic plants, indigenous knowledge, and the equitable participation of people in the management and conservation of these plants (IUCN 2005). In Southern Africa, there is also an

increase in the use of medicinal plants; this may be related to harsh economic circumstances, high population growth and the prevalence of incurable diseases, such as HIV/AIDS.

Markets for environmental services

Forests provide a wide array of environmental resources, some of which can be successfully commercialized, increasing financial benefits. Environmental services from forests also have non-use values. Chapter 1: *The Human Dimension* provides an overview of the value of environmental goods-and-services and their role in supporting livelihoods.

Forests play an important role in carbon sequestration, and by investing in forest development and conservation countries can benefit from carbon trading. A number of corporate institutions in Europe are already benefiting from carbon trading by investing in tree planting in some parts of Africa. Carbon trading also offers opportunities for indigenous companies and in particular SMEs. The market



Medicinal plants market near Mathare, Nairobi, Kenya.

Source: C. Lambrechts/ UNEP

for environmental services from forests is growing rapidly around the world, often facilitated by national and regional policies as well as international conventions and agreements (Scherr and others 2004). Certain segments of society that are able and willing to pay for these services are creating opportunities for the forest owners. Markets for carbon sequestration have been adopted in Uganda, Tanzania, Malawi and Madagascar (Landell-Mills and Porras 2002).

The increasing demand for nature-based recreation has induced a dynamic private sector involvement in the management of game reserves and parks in Kenya, Namibia, South Africa and Madagascar.

Many nature-based tourism and ecotourism activities revolve around forests, establishing a strong cause-and-effect relationship between ecotourism development and forest use. Ecotourism provides a means by which people can use forests and wildlife, without extracting resources

Box 2: Some of the non-timber values of forests and woodlands in Africa

Africa is a source of internationally traded NTFPs particularly medicinal plants and spices. The most important internationally traded species include *Thymus spp.*, *Laurus nobilis*, *Rosmarinus officinalis* (Northern Africa), *Prunus africana* (Eastern, Southern and Central Africa), *Warburgia salutaris* (Eastern and Southern Africa) and *Harpagophytum procumbens* and *Harpagophytum zeyheri* (Southern Africa) (FAO 2000).

Local benefits from NTFPs are also important. They provide important foodstuffs, in particular during the "hungry season" and in marginalized areas. Important edible plants include fruits (eg *Irvingia gabonensis*, *Elaeis guineensis*), nuts (eg *Vitellaria paradoxa*), seeds (eg *Cola acuminata*), vegetables (*Gnetum africanum*), bark

(eg *Garcinia sp.*), roots (eg *Dioscorea sp.*) and spices (eg *Piper guineense*). Mushrooms such as *Cantharellus spp.* and *Boletus spp.* are also collected, particularly in Eastern and Southern Africa.

In Uganda the consumption of NTFPs, including medicines, wild foods (such as bamboo shoots and honey), shea butter, resins such as gum arabic, curios, and weaving materials has been estimated to be worth some US\$1.4 per capita at the household level and US\$0.7 per capita for commercial products (NEMA 1996). At current population levels and at 1998 prices, this equates to a total value of some US\$44 million/year.



The rain forest of Nosy Mangabe, Madagascar, has historically been used for cultural purposes. Here, coffins are sheltered by the roots of ancient trees.

Source: R. Butler/WildMadagascar

or degrading the environment, and draw income from it. This non-extractive aspect presents a strong incentive to protect the resource. However, the capacity of ecotourism to generate income and employment for surrounding communities depends on how well it is managed (FAO 2005), and in particular on the systems set up for planning and benefit sharing.

Strengthening local institutions for forest management and developing information, through research on multiple uses of forests and new products of potential commercial value, creates investment opportunities for both the scientific community and the private sector.

CHALLENGES FACED IN REALIZING OPPORTUNITIES FOR DEVELOPMENT

The endowment value of forests and woodlands in Africa is enormous, and can be used to promote a wide range of livelihood opportunities, including increased income and

enhanced livelihood security. However, as forests and woodlands are declining, primarily as a result of increased woodfuel collection, clearing of forests for agriculture, illegal and poorly regulated timber extraction, conflicts, increasing urbanization and industrialization (FAO 2002), these opportunities are diminishing. Between 1990 and 2000, Africa's forests and woodlands receded faster than the global average; deforestation in Africa took place at an average of 0.8 per cent, as compared to the world average of 0.2 per cent (FAO 2005).

Policy, legal, institutional, technical and economic constraints have undermined wider adoption of sustainable forest management as well as limited opportunities for development.

One major constraint is that Africa has not been able to take advantage of its wealth of raw materials and traditional knowledge to invest in processing (Katerere and Mohamed-Katerere 2005). This continues to undermine opportunities for employment and income generation (FAO 2003a). With increasing private sector involvement, including foreign-based companies, there is a good opportunity for governments to foster viable partnerships with the communities and civil societies in the protection of traditional rights of forest-adjacent communities, and equitable sharing of benefits from forest resources to promote livelihood security and ensure sustainable use of forest and woodland resources. This is consistent with obligations under the Convention on Biological Diversity (CBD). Additionally, it is essential for there to be increased investment in the development of micro- and SMEs if people are to have the opportunity to move away from subsistence-based livelihoods (Katerere and Mohamed-Katerere 2005).

Market development

The opportunities for local people to participate directly in the market are hampered by poor infrastructure, poor access to financial and other support, as well as inadequate opportunity to develop micro- and SMEs. If opportunities for new and existing business are to be increased these factors requires urgent attention, as discussed in Chapter 1: *The Human Dimension*.

One missed opportunity is NTFPs. The full range of benefits available from the commercialization of NTFPs has not been realized. One challenge is that the returns to producer communities are often very low. This is a result of a combination of factors including low product price, high producer dependency on market intermediaries, the lack of technical and financial support, non-supportive legal and regulatory framework, and the poor relationship between final product price and production cost (Katerere and



Processing timber in a sawmill.

Source: P. Reidar/CIFOR

Mohamed-Katerere 2005). This is demonstrated in relation to *Harpagophytum* species, and in particular *Harpagophytum procumbens* (devil's claw), which forms the basis of trade in Southern Africa (Box 3).

The successful marketing of NTFPs remains a challenge and in particular the high cost of product promotion, the high availability of substitutes, the lack of access to market information, the lack of contact with final consumers, the lack of financial instruments, the lack of technical support,

inadequate community organization, lack of market value, poor quality control, lack of attractive product presentation, lack of management capacity and poor understanding of consumer demands and needs (Marshall and others 2003). Low investment in production processes undermines efficiency and results in higher product costs, making the final products uncompetitive globally.

Additional constraints to developing pro-poor markets include insecure tenure and the free availability

Box 3: Poor returns to communities in commercialization of some NTFPs

Trade in *Harpagophytum* species, and in particular *Harpagophytum procumbens* (devil's claw), a traditional medicinal plant, supports a US\$100 million industry, but most benefits accrue to processing and transformation actors along the marketing chain and only a very low proportion to domestic producers. Harvesters of devil's claw, in Namibia, that sell to intermediaries who then sell to the exporter, receive only 0.36 per cent of the retail price; those in non-governmental organizations (NGO) facilitated marketing chain receive 0.64 per cent, while those with direct contact with a local exporter receive the most at 0.85 per cent (Wynberg 2004). This pattern is set to continue in the absence of direct investment in community skills and opportunities.

Source: Katerere and Mohamed-Katerere 2005

The African Union (AU) has adopted a model law which seeks to control harvesting, ensure fairer distribution of benefits and recognize local intellectual property rights. Building on this and developing supporting national legislation could create new opportunities for improved benefit sharing. International regulatory regimes, such as those imposed by the Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES), often do not make adequate provision for local variation in species numbers, thus potentially placing unfair restrictions on certain communities. Under CITES, devil's claw is listed as endangered. However, there is no local scarcity in Namibia. Global certification also places an added cost on poor communities.

Moroccan women cleaning argan tree nuts for medicinal oil production.

Source: Y. Katerere



of genetic resources in gene banks. Table 2 sets out some of the impacts of markets on household assets.

Weak management, monitoring and evaluation systems

Weak institutions have paved way for large-scale illegal logging (FAO 2003a) in many countries. Throughout Africa, forestry departments are experiencing acute shortage of staff and equipments. Forestry education has also declined over the past two decades; the situation is made worse by declining donor investments (FAO and others 2005).

Political instability and budget problems have also forced many institutions to close for long periods – one consequence of this is that there is an acute shortage of trained forestry practitioners. A report by the Food and Agriculture Organization of the United Nations (FAO) and IUCN shows a particularly worrying situation in Central Africa, which has the richest forests in the region (FAO, RIFFEAC and UICN 2003). The DRC, for example, has only 100 professional foresters to manage forests covering an area three times the size of France. Congo's faculty of forestry was ransacked in 1997/98 and only reopened in 2002. The Central African Republic's faculty was also pillaged (FAO, RIFFEAC and UICN 2003).

Conflict and war

Another challenge for forest management is conflict and war. In many conflict areas, forest management has been suspended and illegal loggers, even if not directly involved in the conflicts, have at times devastated forest resources. Post-conflict periods do not necessarily lead to more sustainable systems. There may, for example, be an increased demand for wood during post-conflict reconstruction which can worsen the situation. Conflict around forest and other natural resources is discussed in Chapter 12: *Environment for Peace and Regional Cooperation*.

Agricultural pressures

Although 5 per cent of Africa's forests are designated as protected areas, the management accorded to the areas is not commensurate with their conservation status. Encroachment, illegal logging, grazing and poaching of wild animals persist in these areas (FAO 2003a). Agricultural expansion and overgrazing are also an increasing problem and major causes of the loss of woody vegetation cover, especially in Eastern, Southern and Western Africa (FAO 2003a). Given the high dependence on agriculture, there is growing pressure to increase the area under agriculture to meet the food requirements of the growing population at the

Table 2: Impacts of markets for key assets held by poor households**Potential benefits****Natural assets**

- Forest conservation due to new market opportunities and better management.
- Increased value of natural assets where markets regularize land tenure.
- Positive spin-offs for other natural assets eg soil fertility, water-flows and quality, air quality due to reduced forest fires and forest loss.

Physical assets

- Improved infrastructure development including transport, market infrastructure, research, and health care.

Human assets

- Training for enterprise development, marketing, project and environmental management, negotiation skills.
- Improved health through more varied diets, improved water supply (quantity and quality) and air quality, investment in health clinics, increased disposable income for medical treatment.

Social assets

- Increased tenure security where markets promote rights formalization.
- Increased community management and organizational capacity.
- Protection of forest-based cultural heritage.

Political assets

- Increased participation due to improved organization capacity and contacts in the private and public sector.

Financial assets

- Income from sales of environmental services.
- Income from secondary employment (eg NTFPs, fuelwood, timber, ecotourism, transport).
- Improved security and stability of income due to diversification.

Potential costs**Natural assets**

- Lost access and use rights due to increased competition for resources.
- Lost use values (eg Timber and NTFPs) where new harvesting regulations are imposed.
- Negative spin-offs for other natural assets eg worsened water quality due to replacement of natural forests for fast-growing plantations for carbon sequestration.

Physical assets

- Dismantling of local infrastructure eg roads, to ensure sustained environmental services supply.
- Greater inequality as infrastructural investment is targeted at certain market participants.

Human assets

- Inappropriate education diverts spending away from broader skills development.
- Poor people capture few educational and skills development opportunities as offered only menial jobs.
- Reduced health where poor people are excluded from collecting NTFPs for domestic consumption and from lost disposable income.

Social assets

- Reduced tenure security where markets displace people who lack formal property rights.
- Less cooperation between stakeholders due to increased divisions between those who gain and lose.
- Threats to cultural heritage where markets and commercialization undermine local values.

Political assets

- Loss of political representation where markets lead to increased competition for resources and exclusion of poor people from forest areas.

Financial assets

- High transaction and opportunity costs of bringing services to market exclude poor suppliers.
- Reduced forest-derived income as new restrictions imposed.
- Poor people excluded from new markets through lack of necessary skills and assets.
- Reduced security where contract design is inflexible and unable to respond to changes.



Dry season forest fire, Zimbabwe.

Source: P. Frost/CIFOR

expense of forests. The ongoing land reforms in Southern Africa have seen movement of commercial farmers from Zimbabwe and South Africa to Mozambique and Zambia, and countries outside the Southern African Development Community (SADC) region. This development could potentially reduce forest cover in the recipient countries. Newly-settled farmers also tend to open up new land for crop cultivation. Some of the challenges associated with increased agricultural demand are considered in Chapter 3: *Land*.

Fire

Bush fires are another threat to forests and woodlands, causing enormous destruction to both flora and fauna. The total global area burned annually between 2002 and 2003 was in the range of 300 to 400 million ha, and about half of this was in Africa (FAO 2005).

The combination of the above pressures on forests has resulted in the decline in both the quality and quantity of forest and woodland resources. Between 1990 and 2000, Africa lost about 52 million ha of forest, accounting for about 56 per cent of the global reduction in forest cover (FAO 2003b). Southern

Africa accounted for about 31 per cent of the forest loss on the continent. Three countries, namely Sudan, Zambia and the DRC, accounted for almost 44 per cent of Africa's deforestation (FAO 2003b). Deforestation is particularly rampant outside protected areas, especially where regulatory and enforcement frameworks are inadequate. In many rural areas, there has been a breakdown in traditional community arrangements and this has, in the face of no alternative regulatory system, contributed to poor management.

STRATEGIES TO IMPROVE OPPORTUNITIES

Improved regional collaboration and harmonization of approaches

Africa recognizes the immense value of its forests and has mainstreamed forests in its development agenda, the NEPAD. The NEPAD Environment Action Plan (NEPAD-EAP) locates forests and woodlands in Programme Area 6: Transboundary conservation or management of natural resources, which emphasizes the protection and sustainable management of Africa's forest resources through:

- Strengthening national plans and programmes for forest management, inventory and monitoring. This

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includes improving the participation of stakeholders, such as communities and the private sector, in new approaches and initiatives as well as the promotion of the wide range of roles played by forests. Also included here are measures to improve and integrate mapping and knowledge (scientific as well as traditional knowledge) and to strengthen monitoring and assessment.

- Maintaining protected areas by, among other measures, improving capacities, forming collaborative management partnerships with other countries, and restoring ecosystems; and
- Strengthening forest law and governance, by encouraging the sharing of information on trade in illegally harvested forest products, improving participation in international fora and international agreements, and more effective implementation of measures to reduce corruption.

The NEPAD-EAP recognizes that forests and woodlands are an important crosscutting issue critical to the success of the other NEPAD programmes, including combating land degradation and climate change, and conserving wetlands, and coastal and freshwater resources. Special attention, therefore, needs to be given to enhancing the quality of forest resources at the sub-regional and national levels and to maximizing the benefits that can be derived from forests and woodlands.

In the recent past, most countries have developed policies that can support and influence sustainable use of forest and woodland resources, including national environment action plans and national sustainable development strategies. These policies aim at sound sustainable development by reconciling economic development and conservation of resources, and they provide a good basis for the proper management of natural resources. Their effective implementation is among the best opportunities African countries have to conserve their woodland resources and maximize benefits for their citizens.

Other measures to reduce the loss of forests include integrated land-use planning; conservation and sustainable use of natural and planted forests; community involvement in all aspects of forest management; developing markets for a wider range of forest goods-and-services, including carbon sequestration and watershed protection services; and independent third-party certification of products from sustainably managed forests. Chapter 12: *Environment for Peace and Regional Cooperation* considers how improved cooperation in forest management has improved opportunities for conserving forest resources and enhancing peace.

Box 4: Kenya's Green Belt Movement

Kenya's GBM has focused on environmental conservation and community empowerment for at least thirty years. The movement's sustained efforts in these areas have been rewarded by the awarding of the Nobel Prize to its founder, Professor Wangari Maathai, in 2004. Its major achievements include the creation of over 600 community networks across Kenya that care for 6 000 tree nurseries. Over the years, these networks, along with individuals, have participated in planting more than 30 million trees on private and public land, protected reserves, sites with cultural significance, and in urban centres. This has resulted in the transformation of many landscapes (forests, steep slopes and other degraded areas) and in the increased protection and restoration of habitats for local biodiversity.

Additionally, Kenyans' attitudes toward the environment have also been transformed: awareness of the impacts of ecological decline has increased, along with public interest in defending the environment, including forests and public parks and open spaces. Tree planting also provides an entry point for the GBM's other initiatives, including civic and environmental education, capacity-building and advocacy. During the review process for Kenya's new constitution, GBM held civic and environmental education seminars and conducted tree-planting activities to support the process and encourage a peaceful transition. Over 250 000 peace trees were planted.

Source: GBM 2006



Professor Wangari Maathai, Nobel Peace Prize winner, 2004.

Source: Associated Press

Forestation and reforestation

Some countries have adopted aggressive programmes of forestation and reforestation, with demonstrated results in the short run. As a result of these efforts, the annual planting rate in Africa overall is estimated at 194 000 ha or about 4.4 per cent of the global planting rate (FAO 2003a)

In the Western Indian Ocean (WIO) island states, for example, vegetation cover is changing considerably through the development of agroforestry plantations. The Seychelles has extensive coconut plantations as well as a relatively large planted estate of *Casuarina* and *Albizia* species (UNEP 2005a). Both Cape Verde (9.3 per cent) and Gambia (1.0 per cent) show increases in forest cover (FAO 2005). Similarly, there is a positive trend in Northern Africa, with Egypt experiencing a



Young forest plantation on Mount Kilimanjaro, Tanzania.

Source: C. Lambrechts/UNEP

growth of 3.3 per cent, Libya 1.4 per cent and Tunisia 0.2 per cent (FAO 2005).

As natural forest areas shrink, the concern to conserve the remaining areas for environmental services has resulted in many countries setting them aside as protected areas, thus making them largely unavailable for commercial exploitation. This has led to a push to expand the plantation areas, especially in South Africa, Swaziland and Zimbabwe. Swaziland has experienced a growth of 1.2 per cent. There is also increased private planting in Eastern and Western Africa. Some countries, like Uganda, are actively seeking the involvement of the private sector in plantation development, including establishing a loan scheme by the National Forestry Authority for tree farmers and offering leases on its own reserve land to encourage private plantations development. Nevertheless, Uganda's forest cover continues to decline at a rate of 2 per cent per year.

Community empowerment

Improving the opportunities available to local users will have benefits at the local level, with potentially positive spin-offs at the national, sub-regional and regional level. The importance of community and public involvement in the management of forests has been recognized and promoted across Africa, with many countries adopting new laws and policies to support this (Katerere and Mohamed-Katerere 2005). There is increased community involvement in several sectors including forest management, ecotourism, advocacy, public education, and forestation and reforestation. Governments are also increasingly recognizing the value

local users bring to resource management as their primary custodians.

Non-governmental organizations, such as the Green Belt Movement (GBM) in Kenya, have played an important role in promoting such approaches, as shown in Box 4.

Human resource capacity

Human resources development, particularly in terms of professional training, has not been sufficient to meet the needs associated with sustainable management and enhancing development opportunities.

Investment in forest-related education is an important challenge. From 1993 to 2002, the number of forestry bachelor degrees awarded has been increasing steadily, but the number of post-graduate degrees has declined significantly (FAO, RIFFEAC and UICN 2003). Certificate-level forestry training has practically disappeared. International partnerships can play a key role in addressing this problem. One option is to increase the opportunity for African students to study in developed countries.

Agroforestry

While forests are valued for their timber, fruits and medicinal values, the opportunity presented by agroforestry to communities in the region is not well known. Agroforestry technologies that can be readily adopted include planting of nitrogen-fixing trees, the domestication of indigenous fruit trees, medicinal trees, live fences, and woodlots for timber and fuelwood. Regional cooperation, including through sharing experiences and lessons on effective resource management, may improve opportunities. The strengthening of the East African Community, for instance, is a good opportunity for improved cooperation between Uganda, Kenya, Tanzania, Rwanda and Burundi.

Economic and development opportunities

The extent and quality of forests and woodland varies from one sub-region to the other as does their socioeconomic significance. The sub-regional analysis discusses the various issues related to sustainable management of the forests and woodlands at this level and the various strategies being put in place to optimize benefits and ensure sustainability. A multilevel strategy for harnessing opportunities, which brings in multiple actors and focuses on improving opportunities for local users, increasing investment in value-adding activities, and utilizing the opportunities for environmental service markets, is essential (Katerere and Mohamed-Katerere 2005).

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There are several possible levels of economic activities involving local communities, including in small-scale income-generating, cooperative projects, and large-scale partnership projects with the private sector. Effective local level management of natural resources requires that local people have clear, unambiguous proprietary rights to the resources they manage (UNEP 2005a). For communities to take advantage of emerging opportunities, a policy and legislative framework is required that protects the communities' rights to forest resources, promotes access to markets, ensures proximity to markets, improves local expertise, gives access to information, improves institutional capacity to manage resources, adds value to products and services, increases the negotiation capacity of local people, and promotes partnership (FAO 2005).

The proportion of logs domestically processed in Africa increased slightly from 80 per cent in 2003 to 82 per cent in 2004. This reflects increasing populations, growing economies and the emphasis on producing and exporting value-added products in this region (ITTO 2004). South Africa accounts for about 42 per cent of Africa's share of value-added wood industries. Other African countries' share in processing is considerably lower. According to FAO's Global Forest Resources Assessment 2005, the wood industry's gross added value stems from wood processing rather than wood availability (FAO 2006). Ultimately, it is the improvement of and access to technology that will enhance the value-adding, manufacturing and marketing performance of the wood industry. The World Summit on Sustainable Development (WSSD) in its Johannesburg Plan of Implementation prioritized investment in industry as critical to meeting sustainable development goals.

If the existence of large forest areas is neither an essential nor a sufficient condition for the promotion of dynamic forest industries in Africa, it most certainly is for the expansion of schemes such as the Clean Development Mechanism (CDM) that focus on the carbon sequestration value of forests. This market has been evolving quickly (Landell-Mills and Porras 2002), but Africa has not seized the opportunities available through it (Katerere and Mohamed-Katerere). Forestation and reforestation schemes can be an important component of carbon trade as envisaged under the Kyoto Protocol. In order to maximize the benefits from CDM-related activities, African nations must ensure that more land is available for forestation and reforestation, and that forest conservation and sustainable management activities are pursued. Increasing the availability of forests for carbon sequestration also implies that more carbon market traders will come into play, boost competition, thus motivating countries to sustain management and conservation activities.

SUB-REGIONAL OVERVIEW

CENTRAL AFRICA OVERVIEW OF RESOURCES

Forests in Central Africa cover an estimated area of 240 million ha; these are mainly dense tropical rain forest (FAO 2005). The sub-region is dominated by the Congo basin forest ecosystem, which is the second largest forest in the world, second only to the Amazon forest. The ecosystem comprises 200 million ha, about 18 per cent of the world's tropical forests, and hosts about 400 mammalian species and more than 10 000 plant species (Maathai 2005).

Table 3: Forest cover as percentage of total land area

Country	Total land area ('000 ha)	Total forest area in 2000 ('000 ha)	% of land area in 2000
Cameroon	46 540	23 858	51.0
Central African Republic	62 297	22 907	36.8
Chad	125 920	12 692	10.0
Congo	34 150	22 060	64.6
DRC	226 705	135 207	59.6
Equatorial Guinea	2 805	1 752	62.5
Gabon	25 767	21 826	84.7
São Tomé and Príncipe	95	27	28.3

Source: FAO 2005

As shown in Table 3, most of the countries have considerable forest cover, with Gabon being most forested with 84.7 per cent of its total land area under forest cover. Chad is the least forested, with only 10 per cent of the land under forest. All the countries, with the exception of São Tomé and Príncipe, are experiencing a gradual decline in the area of their forest cover.

ENDOWMENTS AND OPPORTUNITIES

Forests play a major role in the economies of Cameroon, the Central African Republic, Congo, the Democratic Republic of the Congo, Equatorial Guinea and Gabon, and in the livelihoods of local people.

The forest sector contributes, on average, between 5 and 13 per cent of the GDP of these countries (FAO 2002). Up to 60 per cent of export earnings for Gabon are from timber products, while for the Central African Republic it is about 50 per cent (FAO 2002). Gabon is the biggest exporter of industrial roundwood, exporting nearly 97 per cent of its total production (FAO 2005). Export of medicinal plants is a major foreign exchange earner in Cameroon, with annual earnings of 2.9 million dollars (FAO 2002).

Forests and woodlands also play an important role in climate modification, catchment protection and regulation of hydrological networks, and biodiversity.

For the local communities, forests and woodlands have multiple uses, which vary extensively with the type of forest, and the community. These range from construction materials, foods, energy, medicines, catchment protection, soil protection, shade, habitat for wildlife and bees, grazing as well as cultural values (including sacred groves, shade, peace trees and plants, meeting places and training areas). Forests play a very important role as carbon sinks, and the

Congo basin with its dense forest cover can benefit from carbon trading.

CHALLENGES FACED IN REALIZING OPPORTUNITIES FOR DEVELOPMENT

Forests and woodlands are declining, mainly due to overharvesting and bush fires, agricultural expansion and overgrazing.

User rights in the forests are allocated by governments through administrative or competitive processes (FAO 2005). In Gabon, for example, there are 221 concessions over 11.9 million ha or 56 per cent of the forest area (Global Forest Watch 2000). Cameroon has allocated 81 per cent of its forests to concessions (White and Martin 2002). Although the allocation process takes advantage of market forces, sometimes monitoring and enforcement of regulations in the permit areas by the governments is inadequate, leading to illegal practices such as felling of protected species, wrong classification of logs, felling undersized trees and transportation or removal of more logs than permitted (UNEP 2004).

Central Africa has an estimated population of close to 80 million inhabitants, of which 65 million currently live in or near the forest (FAO 2003a). Local communities use bush fires as a technique for agriculture and hunting. Through monitoring, the Global Fire Monitoring Centre (GFMC) has detected an increasing number of fire events in Central Africa, which indicates fire is systematically being employed in land-use change (FAO 2005). Central Africa has experienced several prolonged conflicts, which has had various implications for the management of forest resources. Some of the challenges associated with conflict and forest management are discussed in Chapter 12: *Environment for Peace and Regional Cooperation*.

Table 4: Production and consumption of industrial roundwood in Central Africa 2002

Country	Production (‘000 cubic metres)	Consumption (‘000 cubic metres)	Export (‘000 cubic metres)
Cameroon	1 270	1 051	219
Central African Republic	1 058	958	100
Chad	761	761	-
Congo	1 251	692	559
DRC	3 653	3 651	2
Equatorial Guinea	364	515	0
Gabon	2 584	84	2 500
São Tomé and Príncipe	9	9	0

Source: FAO 2005



For forest dwellers in Cameroon, timber and non-timber resources are valued as construction materials.

Source: C.Dounias/CIFOR

STRATEGIES TO IMPROVE OPPORTUNITIES

For sustainable forest harvesting to support livelihoods and human well-being, the Central African countries have put in place measures to ensure sustainability of the resource use. Among these are strengthening forest law and governance by:

- Encouraging sharing of information on trade in illegally harvested forest products;
- Participating in international fora and international agreements; and
- Implementing measures to cut corruption.

Strengthening cooperation to harmonize forest legislation and harvesting are also important. The Central Africa Forestry Commission (COMIFAC) presents a good opportunity for all the countries to share experiences and lessons on effective resource management through:

- Creating projects and programmes to evolve forest and environment management, with demonstrated results in the short run;
- Creating monitoring and enforcement systems;
- Providing support to the local forestry and environment NGO's;
- Sensitizing the local populations in the sustainable use of forest resources and employing them in all forest programmes; and

- Enforcing partnerships at the international level.

EASTERN AFRICA

Forests and woodlands are widespread and include high altitude forest, medium altitude moist evergreen forest and semi-deciduous forests. Most of the larger tracts of forests are gazetted as forest reserves, but there are also extensive patches of forests and woodlands outside the gazetted forest estate that are under the management of local communities or private landowners. Forests, particularly those in the Eastern Arc and the Albertine rift, are rich in biological diversity (UNEP 2002).

Forests and woodlands provide substantive livelihoods for many people. They provide both direct economic benefits (energy, food, timber and non-timber products) and indirect benefits through the provision of ecological services (water catchment, controlling erosion and moderation of local climate). Woodfuel and timber are among the most important forest products, with woodfuel being the main source of energy and timber being extensively used in the construction industry (FAO 2003a). Annually, about 173 million m³ of woodfuel and about 5.2 million m³ of industrial roundwood is produced, most of which is consumed within the sub-region (FAO 2005).

As forest-based supplies of timber and NTFPs decline, trees outside forests have become more

Table 5: Forest area and area change in the Eastern Africa countries as of 2000

Country	Total land area (‘000 ha)	Total forest area (‘000 ha)	% of land area	Annual change ‘000 ha (1990-2000)	Annual rate of change % (1990-2000)
Burundi	2 568	94	3.7	-15	-9.0
Djibouti	2 317	6	0.3	not available	not available
Eritrea	11 759	1 585	13.5	-5	-0.3
Ethiopia	11 430	4 593	4.2	-40	-0.8
Kenya	56 915	17 096	30	-93	-0.5
Rwanda	2 466	307	12.4	-15	-3.9
Somalia	62 734	7 515	12.0	-77	-1.0
Uganda	19 964	4 190	21.0	-91	-0.2

Source: FAO 2005

important. In fact, increasing demand has led to substantial tree planting of woodlots and, in some countries, including Kenya, Rwanda and Burundi, home gardens and woodlots have become important sources of wood and NTFPs (FAO 2003a).

OVERVIEW OF RESOURCES

Eastern Africa has rather limited forest and woodland cover amounting to approximately 13 per cent (UNEP 2002). Forest and woodland cover varies considerably, as shown in Table 5. Kenya is the most forested country

with about 30 per cent of its land area under forest, followed by Uganda with 21 per cent. Djibouti has the least forest cover with about 6 000 ha or only 0.3 per cent of the land area under forests (FAO 2005).

It is estimated that the change in forest cover in Eastern Africa is 0.51 per cent per year. There is, however, considerable variation between countries, with Burundi experiencing a decline of 9 per cent compared with 2 per cent in Uganda (FAO 2005). At the current deforestation rates, and if sustainable forest management practices are not promptly adopted, forests and woodlands may degrade rapidly by 2020 (FAO 2003a). There is, however, no reliable data on the extent of forests and woodlands that are sustainably managed (FAO 2003a). In some countries, such as Eritrea, forests are not protected, which makes them even more vulnerable to degradation (MoLWE Department of Environment 1995, MoLWE Department of Environment 2000).

ENDOWMENTS AND OPPORTUNITIES

Forests and woodlands are a vital resource. Their effective utilization is important and should be based on the equitable sharing of benefits, costs and knowledge. Forests are a source of wealth that can be realized through sustainable harvesting of timber and non-timber products, tourism and ecotourism, and carbon trading. Forests also provide catchment protection, in addition to being reservoirs for biodiversity. The forest watershed catchment value for Uganda, for example, has been calculated to be US\$13.2 million per year (Moyini and others 2002). There is potential to enhance community benefits through joint forest management. Joint forest management and forest user groups increase community participation and help achieve economic,



Forest degradation in the Mau escarpment, Kenya.

social and environmental goals that governments sometimes have difficulties meeting (FAO 2005).

Valuation studies have been undertaken in various countries (Shechambo 2002, Emerton 2001). Though data is fragmented, the overall picture is that the resource endowment value for forests and woodlands is a big contribution to GDP (NEMA 1998, Moyini and others 2002, EPA 2003). Wood, for example, contributes directly to national economies as a source of energy supply (FAO 2005). Currently woodfuel prices range from US\$1 to US\$10 per cubic metre in developing countries (Broadhead and others 2001). The market prices of woodfuel can be used as a rough estimate of the value of woodfuel production, and with the total production of 173 million m³ of woodfuel its value ranges from US\$173 million to US\$1 700 million per year (FAO 2005). There are other positive externalities associated with wood energy, for example, the employment generated by wood energy production (FAO 2005). The negative externality is the environmental cost of woodfuel harvesting in terms of forest loss and degradation (FAO 2005).

CHALLENGES FACED IN REALIZING OPPORTUNITIES FOR DEVELOPMENT

Forests and woodlands are the main source of fuel for the majority of the households and while this is an opportunity it is also directly linked to the main threats: deforestation and declining forest quality. Throughout the sub-region, the rate of offtake from the forest is more than the natural regeneration capacity. There is very little investment in forestation and reforestation.

Chronic lack of resources and low public investment remains problematic in the forest sector (FAO 2005). Mismanagement, inadequate or non-existent inventory, and poor monitoring hinder the effective use of the

opportunities offered by forests and woodlands. Poor governance, including limited opportunity for community involvement and mismanaged decentralization, along with the undervaluation of the total contribution of forests and woodlands to livelihoods, contribute to unsustainable practices.

NORTHERN AFRICA

Northern Africa is characterized by desert conditions, limited water resources and an arid climate. Forests are not common in most of the six countries, except along the coast of the western Mediterranean Sea and in the tropical zone of southern Sudan.

OVERVIEW OF RESOURCES

The total forest area in Northern Africa is about 67 million ha and constitutes 8.3 per cent of the total land area, which is about 10.4 per cent of the total African forest cover (FAO 2005). Closed forests occur on the coast of the western Mediterranean countries, in the Atlas Mountains and in southern Sudan. Other wooded areas occur as natural desert vegetation in sandy valleys (*wadis*) and depressions. Coastal and inland high mountains also support woody plants. Mangroves or tidal forests occupy small areas of the Red Sea coasts. Wetlands, with their hydrophilous reeds, and cultivated trees are important tree resources and provide various goods-and-services including timber, NTFPs, grazing and desertification control (AOAD 1998, Hegazy 1999). The distribution of forests and the rate of forest cover change are shown in Table 6.

Forests have changed in both nature and extent over the last 30 years: closed forests and open forests used to cover a significant part of total land area. Available statistics indicate that the area of natural forests was reduced by about 53.3 per cent during the period

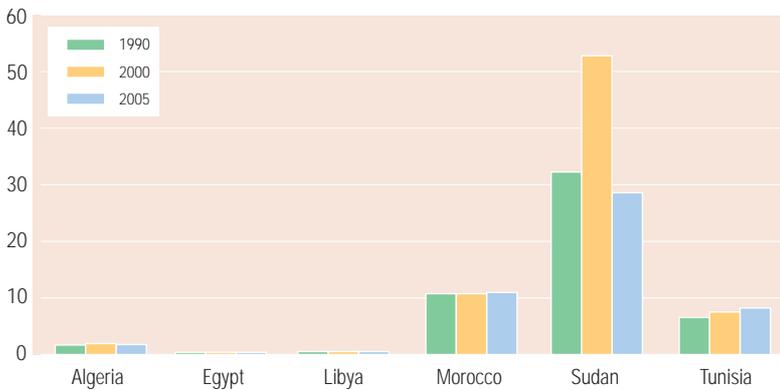
Table 6: Forest cover as percentage of total land area in Northern Africa

Country	Total land area (‘000 ha)	Forest area 2000		Forest cover change 1990-2000	
		Total forest (‘000 ha)	Percentage of land area (‘000 ha)	Annual change	Annual rate of change
Algeria	238 174	2 145	0.9	27	1.3
Egypt	99 545	72	0.1	2	3.3
Libya	175 954	358	0.2	5	1.4
Morocco	44 630	3 025	6.8	-1	not available
Sudan	237 600	61 627	25.9	-959	-1.4
Tunisia	16 362	510	3.1	1	0.2
Total	812 265	67 737	8.3	-925	0.8

Source: Adapted from FAO 2005

Figure 2: Forest as a percentage of land 1990-2005

percentage of total land area



Source: FAO 2006

1972-1992 (FAO 1999). However, Northern Africa has begun to increase forest cover over the last decade, primarily through tree planting, with Egypt having the highest increase of 3.3 per cent, followed by Algeria at 1.3 per cent (FAO 2005). From 1990 to 2000, a total of 1 693 000 ha of trees was planted. This amounts to 27 per cent of the total forest cover in the sub-region (FAO 2002 and FAO 2005).

OPPORTUNITIES PROVIDED BY FORESTS AND WOODLANDS

Natural forests in Northern Africa are important for protecting the environment and in particular in dune stabilization.

Due to their size, however, they have not been able to support any considerable commercial function. The total share of forests to GDP is very low except in Sudan, where

Box 5: Reasons for planting trees in Northern Africa

In general, forest plantation has been carried out for various purposes: sand dune fixation (eg Morocco and Egypt); rehabilitation of degraded steppe areas (eg Algeria); range rehabilitation and improvement, and watershed management (eg Morocco and Tunisia); and protection of agricultural areas (eg Libya, Egypt and Morocco). However, forest plantation efforts have not been able to keep up with the loss of natural forests.

Sources: FAO 1997

it is about 13 per cent (FAO 1999). Where forests exist, fuelwood and charcoal are the major forest products. Production of industrial wood is very limited, implying that most demand for industrial roundwood and processed wood has to be met by imports (FAO 1999).

CHALLENGES FACED IN REALIZING OPPORTUNITIES FOR DEVELOPMENT

Over the past few decades, forests have been subjected to various pressures including land-clearing for human settlements and agricultural activities (Gilani 1997, Thirgood 1981, AOAD 1998). Livestock overgrazing, overcollection of fuelwood and charcoal production, urban sprawl, illicit felling, and frequent natural and man-made fires in the Mediterranean and tropical areas of the region have exterminated most of the natural forests and have degraded soils.



Tree planting is used to stabilize dunes, N'Takat, Mauritania.

Source: H. Wagner/IFAD

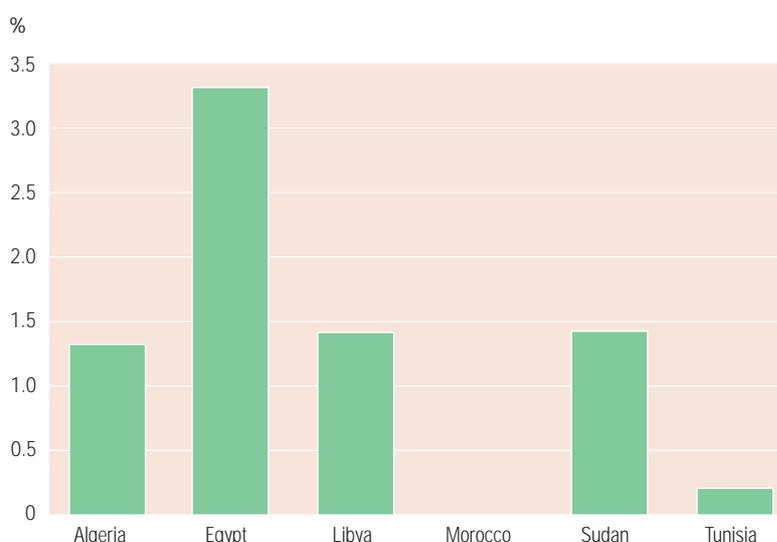
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Although the annual average loss of forest is low at slightly less than 1 per cent (FAO 1999), forest losses estimated at 44 000 ha per year have been attributed to fires alone. In some countries, deforestation due to production of charcoal has increased eight to ten times more than the forest's production capacity. Another major pressure on some of the forests is the increasing demand for gum arabic, particularly in Sudan (CAMRE/UNEP/ACSAD 1996, Abuzeid 1995).

In Morocco, Algeria and Tunisia, the reduction of forests has resulted in a reduced influence on regulating water and maintaining soil. As a result, flooding, erosion, desertification and silted dams are on the increase. Forests and other woody vegetative cover in upland and sloping land serve important environmental functions in land stabilization, erosion control and regulation of hydrologic flow (FAO 1997). Recently, road construction, quarrying and mining industries, building dams and construction of irrigation canals have contributed to the deterioration of forest ecosystems by reducing forest areas and destroying habitats, thus affecting forest biodiversity.

Other factors contributing to the decline of the forest resources include ambiguity of ownership, lack of technical personnel and lack of financial resources and appropriate technology, coupled with the underlying market and policy failures of forest resource pricing, and trade policies. Although forest legislation has been in place in most countries since the nineteenth century, its weaknesses and lack of enforcement had limited its effectiveness in protecting forests and wildlife resources (FAO 1999).

Figure 3: Annual change rate in forests 2000



Source: UNEP 2005b, data FAO 2002

STRATEGIES TO IMPROVE OPPORTUNITIES

The extent of concerns about forest deterioration is reflected in the launch of substantial forestation and reforestation programmes and the various measures taken recently to protect and increase forest areas. Forest lands are being demarcated in all the countries, and new forest reserves have been declared in some countries like Sudan as a result of mounting awareness and interest in conservation. Managing forests on a sustainable basis is being pursued in a regional context. The Egyptian government, for example, through the Ministry of Agriculture and Land Reclamation (MANR),



Plantations are an important source of timber in Northern Africa. *Pinus spp.* plantations in the Atlas Mountains, Morocco.

Source: J.C. Mohamed-Katerere

has successfully developed and implemented a programme for safer use of treated wastewater to plant trees in the Sarabium area, in the Governorate of Ismailia, next to the wastewater plant that treats 90 000 m³ per day. The planted area is almost 210 ha. This initiative could help reduce Egypt's dependence on timber imports (EEAA 2002).

Forest plantations in the region represent the main way of extending forests and wooded areas. In 2000, Morocco had large eucalyptus (214 000 ha) and coniferous (235 000 ha) plantations. The total plantation area was 534 000 ha, the second largest plantation after Algeria (718 000 ha) (FAO 2002). Tunisia had a total plantation area of 202 000 ha in 2000. Egypt does not have natural forests, but has planted about 34 000 ha of trees (Riad 2000).

SOUTHERN AFRICA

Southern Africa has a range of forest and woodland types that provide key goods-and-services and are a valuable source of export earnings and revenue as well as for local livelihoods.

These forests and woodland types include tropical rain forests found in parts of Angola and the Congo basin; afro-montane forests found in pockets in the high altitude and high rainfall areas of Malawi, Mozambique, Tanzania, Zambia and Zimbabwe; mangrove forests found on the coastline of Angola, Mozambique, Tanzania and South Africa; Zambezi teak forests found in the western parts of Zimbabwe and Zambia, extending into northern Botswana, north-eastern Namibia and parts of south-eastern Angola; Miombo woodlands found north of the Limpopo River; Mopane

woodlands found in the dry and low-lying parts of Angola, Botswana, Mozambique, South Africa, Zambia and Zimbabwe; and the Cape Floristic Centre forests found along the south-western coastline and located entirely within South Africa (McCullum 2000).

OVERVIEW OF RESOURCES

Forests and woodlands cover about 221.94 million ha or 32.5 per cent of the total land area (FAO 2005). As shown in Table 7 there is considerable variation in vegetation cover across countries. Lesotho, Namibia and South Africa are the least forested countries with less than 30 per cent forest cover. At 56 per cent vegetation cover, Angola is the most densely forested country in the sub-region (UNEP 2002).

Of the total forested area in the region, 2.5 million ha was under forest plantations in 2001 (UNEP 2002). This represents a 9 per cent growth in plantations when compared with the 2.3 million ha of plantations in 1992 (Chenje and Johnson 1994). Lesotho has experienced considerable growth in the extent of its forests, doubling the area under forest plantation from 7 000 ha in 2000 to 14 000 ha in 2003 (FAO 2003a). As Table 7 shows, South Africa has the largest extent of forest plantations followed by Swaziland, Zimbabwe, Angola, Tanzania and Malawi.

However, the total land under forests declined from 1990 to 2000. Over this period, South Africa experienced a deforestation rate of 0.1 per cent per year, Angola, Mozambique and Tanzania 0.2 per cent, Botswana and Namibia 0.9 per cent, Swaziland 1.2 per cent, Zimbabwe 1.5 per cent, and Zambia and Malawi 2.4 per cent (FAO 2005).

Table 7: Forest and woodland cover in Southern Africa 2000

Country	Total land area ('000 ha)	Forest cover in 2000 ('000 ha)	Land area (%)	Total forest plantation ('000 ha)
Angola	124 670	69 756	56.0	141
Botswana	56 673	12 427	21.9	1
Lesotho	3 035	14	0.5	14
Malawi	9 408	2 562	27.2	112
Mozambique	79 409	30 601	39.0	50
Namibia	82 329	8 040	9.8	not available
South Africa	122 704	8 917	7.3	1 554
Swaziland	1 720	522	30.3	161
Tanzania	88 359	38 811	43.9	135
Zambia	74 339	31 246	42.0	75
Zimbabwe	38 667	19 040	49.2	141

Source: FAO 2005

Table 8: Forest timber-based industry in Southern Africa*

Product	Production 2000	Consumption 2000	Share of global production (%)	Lead Southern African producers
Industrial roundwood (million m ³)	23.97	23.61	34.9	South Africa, Swaziland and Zimbabwe
Sawn timber (million m ³)	2.22	2.47	28.9	South Africa, Swaziland and Zimbabwe
Wood-based panels (million m ³)	0.603	0.597	29.3	South Africa, Malawi and
Zambia Plywood (million m ³)	0.070	0.071	10.2	South Africa, Mozambique and Angola
Fibreboard (million m ³)	0.150	0.154	65.2	South Africa
Wood pulp (tonnes)	2.351	1.464	87.5	South Africa, Swaziland and Zimbabwe
Paper and paperboard (t)	2.125	1.892	72.9	South Africa and Zimbabwe
Newsprint (t)	0.345	0.201	93.8	South Africa and Zimbabwe
Printing and writing paper (t)	0.515	0.672	78.3	South Africa

*excludes Tanzania

Source: FAO 2003b

ENDOWMENTS AND OPPORTUNITIES

Forests and woodlands provide essential materials for local consumption, trade and export. The significance of the timber industry is shown in Table 8.

Other functions of forests and woodlands include environmental and cultural services. Forests and woodlands are often important sacred and burial sites. With the exception of South Africa, fuelwood is the primary source of energy. Fuelwood consumption continues to increase; in 2000 total fuelwood consumption was estimated at 178 million m³. About 87 per cent of the roundwood production in the region

is used as fuelwood (FAO 2003d). The situation is likely to continue since fuelwood remains the most reliable, affordable and accessible source of energy for poor households. However, as discussed in Chapter 2: *Atmosphere*, several countries are investing in the development of renewable solar and wind energy.

In addition to timber, wood-processing and paper production, forests and woodlands provide a wide range of goods-and-services for subsistence and trade including medicinal plants, fruits, exudates, bee products, insects, roots, thatch grass, forage and mushrooms. As a result of expanding international trade



Boys selling wild mushrooms collected in Miombo woodlands, Zimbabwe.

Source: Y. Katerere



Growing vegetables on a patch of cleared forest, Nigeria. The forest will be allowed to regenerate.

Source: M. Edwards/Still Pictures

in medicinal plants and indigenous fruit, it is important to develop a legal regime for intellectual and property rights which recognizes and respects local people's interests, and ensures equitable benefit sharing.

THREATS TO THE OPPORTUNITIES

Some countries in Southern Africa have very fast-growing populations, and face the challenge of needing to increase food supplies to meet demand for food (UNEP 2002). Population change is shown in Table 9.

This has necessitated the opening up of large areas of forests and woodlands for agricultural production. Between 1990 and 2000, forest cover fell from 380 to 357 million ha. The increase in urbanization and the pressure on land in peri-urban areas for cultivation also present new challenges.

Fire plays an important role in determining the distribution and composition of some vegetation types. It is responsible for the widespread occurrence of grasslands in Southern Africa. Observations from Mbeya, Tanzania, indicate that burning encourages growth of grass and prevents regeneration of woody plants (Chenje 2000).

STRATEGIES TO IMPROVE OPPORTUNITIES

Many countries have made major investments in rural forestation programmes with a bias in indigenous species and agroforestry. Further, in attempting to reduce deforestation caused by the overharvesting of commercial indigenous timber, Botswana and Zambia have restricted logging of timber for commercial purposes while Zimbabwe has imposed a ban on the export of unprocessed indigenous timber.

All SADC Member States signed the SADC Forestry Protocol, and three countries had ratified it by 2004 (SADC 2002). The specific objectives of the Protocol include the promotion of the development, conservation, sustainable management and utilization of all types of forests and trees; the promotion of trade in forest products in order to alleviate poverty and generate economic opportunities; and the achievement of the effective protection of the environment and the safeguard of the interests of both present and future generations (SADC 2002).

Table 9: Population density and rate of population change in Southern Africa

Country	Total land area ('000 ha)	Total population '000 (in 2003)	Density per sq. km in 2003	Annual rate of population change 2000-2005 (%)	Rural population 2003 (%)
Angola	124 670	13 625	10.9	3.1	64.3
Botswana	56 673	1 785	3.1	0.8	48.4
Lesotho	3 053	1 802	59.4	0.2	82.1
Malawi	9 409	12 105	128.7	2.0	83.7
Mozambique	78 409	18 863	24.1	1.7	64.4
Namibia	82 329	1 987	2.4	1.4	67.6
South Africa	121 758	45 026	37.0	0.6	43.1
Swaziland	1 721	1 077	62.6	0.8	76.5
Tanzania	88 359	36 977	41.8	1.9	64.6
Zambia	74 339	10 812	14.5	1.2	64.3
Zimbabwe	38 685	12 891	33.3	0.5	65.1

Source: FAO 2005

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There is also growing pressure to certify the origin of wood products to show that they are obtained from sustainably managed areas as a response to growing awareness of the negative environmental and social impacts of deforestation. Certification has only been done in some exotic timber plantations where considerable value addition is done to timber products. The entire 974 000 ha of certified plantations in Africa are, however, mostly found in Southern Africa (FAO 2003b), with the highest proportions being in South Africa followed by Swaziland and then Zimbabwe.

Many governments acknowledge the potential value and opportunity that forests and woodlands bring to improving livelihoods, particularly in rural areas, and are increasingly recognizing that secure tenure is an important aspect of this. Several countries have initiated reforms to support local communities, including the empowerment of local bodies and communities to manage communal resources through a process of decentralization and devolution of administrative powers and responsibilities.

FUTURE CHALLENGES AND RECOMMENDATIONS

The people of Southern Africa will continue to be highly dependent on forests and woodlands for the foreseeable future. Despite their aspirations, many people may even become more dependent on natural resources as poverty and population increase. The region is therefore challenged to realize the multiple benefits accruing from forests and woodlands, in addition to crop production which converts forests to cultivable land (Chenje 2000). The multiple uses of forests include commercial timber

production. Certification can serve as a check on management practices. However, the process of certification is expensive, and this challenges the region to add value to forest and woodland products and increase their revenue.

The commercialization of NTFPs raises the issue of benefit sharing at the community, national and international levels. Legislation that regulates access to forest resources by outside parties is poorly developed. This deficiency may result in biopiracy, especially of medicinal plants, which are highly profitable on the global market and about which traditional healers have a lot of knowledge.

It must be noted that existing information on forests and woodlands is often outdated and incomplete. This is partly because most of it is obtained from secondary sources. For instance, no forestry inventory has been done in Angola since independence in 1975 (Chenje 2000). Therefore, an important challenge is to develop and update its forest and woodlands database, and to develop effective monitoring and evaluation systems.

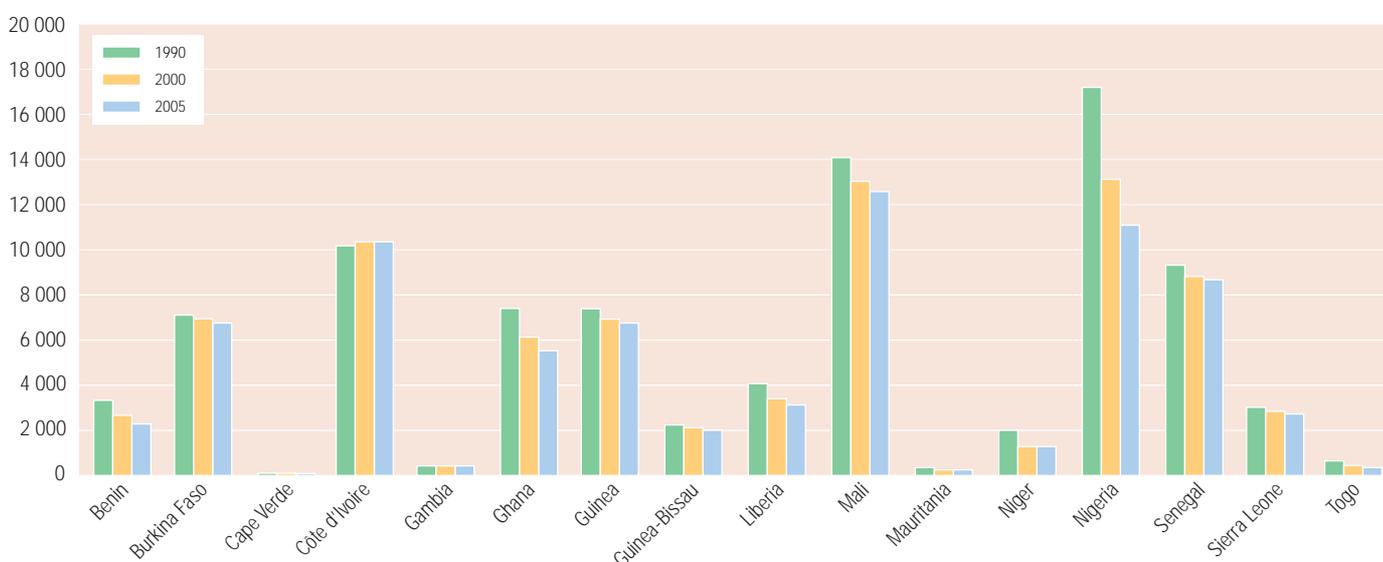
WESTERN AFRICA

INVENTORY OF FORESTS RESOURCES

The total forest cover in Western Africa is about 115 million ha, representing 12 per cent of the total land area (FAO 2005). Forest cover varies considerably from one country to another, as shown in Figure 4. Guinea-Bissau is the most forested with 60.5 per cent forest cover, while Mauritania is the least forested with only 0.3 per cent (FAO 2005)

Figure 4: Forest cover in Western Africa 1990-2000

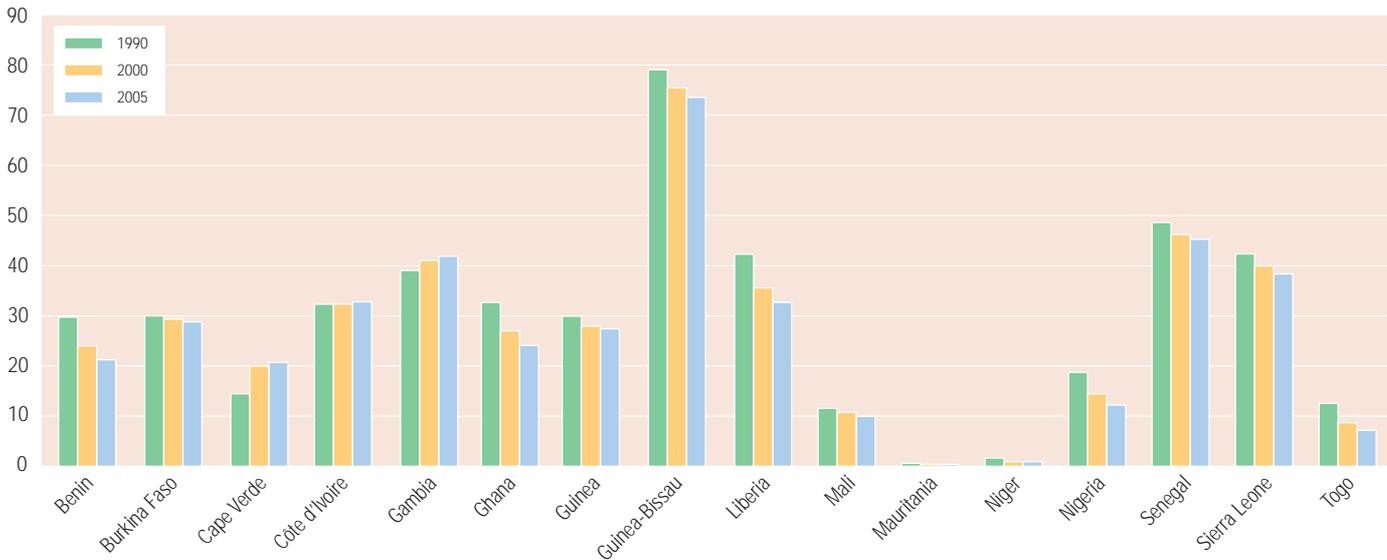
area (1 000 hectares)



Source: UNEP 2006, data FAO 2005

Figure 5: Percentage of forest area

percentage of total land area



Source: UNEP 2006, data FAO 2005

The Guinea Forest of Western Africa, which extends from the coastline of Guinea to the borders of Cameroon, is important from a biodiversity perspective. It is recognized by Conservation International as one of the world's biodiversity hotspots and encompasses part of the UpperGuinea Forest Ecosystem: Guinea, eastern Sierra Leone, Liberia, Côte d'Ivoire, Ghana and western Togo (CEPF 2000). It also encompasses the Lower Guinea Forest Ecosystem, including western Nigeria, south-western Cameroon, the islands of Bioko and Pagalu (Equatorial Guinea), as well as São Tomé and Príncipe (CEPF 2000). The extent of this area is shown in Figure 6. The area is under considerable pressure from logging industries and farming or hunting activities. Only 15 per cent of its original vegetation

(approximately 141 000 km² of closed canopy forest cover) is left, and is, moreover, highly fragmented (CEPF 2000). The largest remaining portion is in Liberia, where civil conflicts disrupted conservation activities.

Deforestation varies across the region. In terms of land area, Nigeria and Côte d'Ivoire have by far the highest annual rate of forest loss, at nearly 663 000 ha.

Statistical data on forest plantations is unreliable due to lack of inventory and frequent forest fires, lack of maintenance and uncontrolled land clearance for cultivation. However, countries like Côte d'Ivoire, Benin and Nigeria have made some efforts in the establishment of industrial plantations (UNEP/NESDA 2004). In the Sahelian zone, such plantations are not established on an industrial basis and are less important, except in Senegal where plantations are created to stop desertification, which is an important ecological problem (FAO 2002).

Figure 6: Extent of the Guinea forest hotspot



Source: Conservation International undated

ENDOWMENTS AND OPPORTUNITIES

In several countries, especially in the Sahel, more than 90 per cent of wood consumed is used as fuelwood, mostly for domestic energy requirements (UNEP/NESDA 2004). In Mali and Burkina Faso, for example 93 and 96 per cent respectively of wood is used for fuel (UNEP/NESDA 2004). In Gambia, 97.8 per cent of all household energy comes from wood energy (NEA 2002). Nigeria and Côte d'Ivoire are the leading roundwood producers in the sub-region (FAO 2003c). For example, roundwood production in 2000 in Côte d'Ivoire amounted to about 3.4 million m³ and in Nigeria to 9.4 million m³. The timber industry represents an important source of GNP.

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A 12 year-old ULIMO fighter in the forest, Monrovia.

Source: D.Browne/ILO

Western Africa's forests present a good potential for carbon sequestration. With the CDM, a monetary value can be given to environmental benefits coming from activities aimed at reducing carbon emissions.

CHALLENGES FACED IN REALIZING OPPORTUNITIES FOR DEVELOPMENT

Forest resources are threatened by a combination of factors, including agricultural expansion, increased collection of fuelwood, overgrazing, fast urbanization, industrialization, drought, civil wars and bush fires, which result in changes in forest cover (UNEP/NESDA 2004). Rapid deforestation is an issue of major concern, given the scope of degradation, which started in the 1970s. According to FAO (2001), close to

12 million ha of forests were lost in Western Africa from 1990 to 2000. The other concern is rapid loss of unique flora and fauna. As the forests disappear, the populations of wild animals and plants also reduce.

Recurrent civil strife has had considerable impact on the forest resources. In Liberia and Sierra Leone, for example, timber was illegally exploited during the civil conflict to finance the war, resulting in the reduction of the two countries' forest cover from 38.1 per cent to 31.3 per cent during the 1990s (UNEP 2004). In addition, after the war, reconstruction efforts further pressured forest resources through the increased demand for construction timber.

In the Sahelian zone, deforestation is spiralling out of control largely as a result of the vagaries of the weather. The challenges associated with climate change are discussed more fully in Chapter 2: *Atmosphere*. The rate of woody biomass offtake outstrips the natural regeneration to the extent that wood is not really considered a renewable resource any more (AGRHMET 2002). The annual rate of forest loss in Niger, for example, which has the highest rate of deforestation, is about 100 000 ha against 5 000 ha of forest replanting (CNEDD-Niger 2002).

WESTERN INDIAN OCEAN ISLANDS

Most of the WIO islands have humid tropical climates which are conducive to forest growth. However, the extent of closed canopy forest on the islands is limited due to population pressure, frequent cyclones and recurrent droughts, particularly in Madagascar and Mauritius (UNEP 2002).

OVERVIEW OF RESOURCES

The major types of forests and woodlands on the islands include evergreen broadleaf rain forests, upper and lower montane forests, semi-evergreen moist forests,

Table 10: Forest cover in the Western Indian Ocean island countries

Country	Total land area ('000 ha)	Forest area in 2000		Forest cover change, 1990-2000	
		('000 ha) (excluding plantations)	% of total land area	Annual change ('000 ha)	% rate of change (%)
Comoros	186	8	4.3	not available	-4.3
Madagascar	58 154	11 727	20.2	-117	-0.9
Mauritius	202	16	7.9	not available	-0.6
Seychelles	45	30	66.7	not available	not available
Total	58 587	11 781	20.1		

Source: FAO 2005

mangroves and savannah woodlands. Forest cover in the island states ranges from 66.7 per cent in the Seychelles to 4.3 per cent in the Comoros (FAO 2005). Comoros has the highest rate of forest loss among the islands, which is largely attributed to charcoal making (UNEP 2004).

Forest cover ranges from 20 per cent in Madagascar, with 12 per cent woodland, to about 4 per cent in the Comoros, with 13 per cent woodland (UNEP 2002). Charcoal making has been blamed for extensive deforestation in the Comoros (UNEP 2004).

ENDOWMENTS AND OPPORTUNITIES

Most of the forests and woodlands on the Western Indian Ocean islands have a high animal and plant species endemism, making them some of the world's biodiversity hotspots. The Coco-de-Mer palm (*Lodoicea maldivica*) found on Praslin Island in the Seychelles is, for instance, endemic to this environment. The two remaining forest tracts of approximately 10 km² on Anjouan island in the Comoros are home to the last surviving population of the Anjouan scops owl (*Otus capnodes*) and the Livingstone's fruit bat (*Pteropus livingstonii*) (UNEP 2004).

The forests and woodlands are also a source of various medicinal and ornamental plants, fruits, honey, essential oils, meat, and animal fodder.

Fuelwood is a vital resource for local communities, especially in countries such as the Comoros. Fruit farming in plantations and orchards is well developed in Madagascar, in terms of the volume and range of produce from fruit trees. This is less so in the other countries in the sub-region, but new developments are taking place in market gardening to open up new domestic and foreign



Banana production is a vibrant economic activity in Madagascar.

Source: D. Tsialonina

Table 11: Trade in forest products

Countries	Imports US\$ m	Exports US\$ m	Net trade US\$ m
Comoros	249	0	-249
Madagascar	2 436	4 177	+1 741
Mauritius	6 868	2 345	-4 523
Seychelles	12	0	-12
Total	9 565	6 522	-3 043

Source: FAOSTAT 2005

trade across the sub-region. The produce includes fresh and dried fruit, fruit juice and tinned fruit. The intensity of commitment to fruit growing per thousand population varies between the countries, with the Comoros having 16 ha of fruit trees per 1000 people, Madagascar 11 ha, Seychelles 5 ha, and Mauritius 1 ha. While trees bearing fruit have a growing potential for the future, the coconut industry is active in all countries in the region, and Madagascar also has a continuing commitment to coffee growing on a large scale.

There are also plans to establish national parks in the Karthala Mountain (2 361 metres high) on Grande Comore to strengthen the conservation status of the area. This will promote specialist ecotourism, and may help combat soil erosion and desertification of the island. In the above respect, the Comoros has identified, mapped and is promoting 21 nature walks on the islands including 4 forest walks: La Forêt de la Grille, La Forêt Humide de Moheli, La Forêt Humide d'Anjouan, and Les Forêts Humides de Mayotte (Louette and others 2004). The Seychelles has also opened a "green" hotline, for rapid public reporting of environmental contraventions, including the illegal felling of trees.

Although commercial timber production is now limited in most of the islands, Madagascar and Mauritius continue to enjoy a thriving export trade in industrial wood products. This trade is worth US\$4 200 million in Madagascar and US\$9 500 million in Mauritius. Table 11 shows the significance of trade.

CHALLENGES FACED IN REALIZING OPPORTUNITIES FOR DEVELOPMENT

The WIO region experienced considerable deforestation in the 1990s. Forest area reduced from 13 million ha in 1990 to 11.9 million in 2002. The greatest loss in forest cover occurred in Madagascar, which contributed 99 per cent of the total loss. The greatest percentage loss within countries, however,

occurred in the Comoros with a reduction from 12 000 ha to 7 000 ha, a loss of 41 per cent.

Two important causes of deforestation are frequent cyclones and droughts. During droughts, the risk of fire is also high. The major concern regarding forests is the high rate of deforestation and its environmental consequences such as soil erosion, desertification, and loss of ecosystem processes such as regulation of soil and water quality. In some countries, forests and woodlands are subjected to severe stress as a result of agricultural encroachment.

STRATEGIES TO IMPROVE OPPORTUNITIES

In view of the pressures on forests and woodlands in the WIO islands, a number of measures have been put in place to mitigate deforestation. They include promoting the integrated management of forests and woodlands through the establishment of Conservation Management Areas in Mauritius which are zones that have lately been infested with alien plant species. In pursuance of the desire to implement sustainable management of forests and forest resources, two countries, Mauritius and the Seychelles have joined the Dry Zone Africa process which aims at establishing criteria and indicators for sustainable forest management.

In addition to the above programmes, some countries, including the Comoros, have established programmes for the reforestation of previously logged areas. However, the speed and extent of reforestation has been slow. Through its FAO Plan of Action, the FAO also intends to achieve sustainable management of the forest resources in the Small Island Developing States (SIDS) by establishing a holistic and integrated approach to the use of forest resources; promoting the rehabilitation and conservation of forest lands; enhancing coastal protection; promoting agroforestry systems; strengthening integrated planning; and developing ecotourism (FAO 2004).

CONCLUSION

Forest and woodland resources in Africa continue to play a major role in the livelihoods of many communities, and in development more generally. The role played by forests and woodlands as sources of energy, food products and medicinal plants, as well as for the protection of catchment and water quality, is a major contribution to many national economies. These opportunities are under threat from changes in the state and integrity of the forests.

Low investment in the forest sector, increasing population pressure, weak public sector institutions responsible for forestry resources management, deforestation and declining forest quality are jeopardizing the environmental services and community benefits. Reduced access to forest products has a number of implications, including increased shortages of woodfuel, and it impacts negatively on the nutrition status of many.

Government action will, therefore, need to address a number of key concerns, including actively engaging the private sector and civil society in forestry and woodland resources management, and reviewing the legal and institutional capacities of the public sector institutions responsible for forestry resources. Governments will also need to undertake comprehensive inventory and valuation of forests and woodlands, and to introduce mechanisms which encourage sustainable utilization of forest and woodland resources, including issuing concessions on standing volumes rather than harvested volumes.

Specifically, African governments will need to put in place strong policies and find resources to enforce them. Conservation and sustainable use and management of Africa's forests and woodlands are necessary as the basis for the promotion, development and growth of other sectors. In this regard, it is important that African states implement various aspects of the CBD by developing and implementing national biodiversity strategic action plans, nature reserves and protected areas systems. The accomplishment of set targets on biological diversity are of particular importance to the well-being and livelihood needs of Africa's people.

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