

Forestry Outlook Studies in Africa (FOSA)



Malawi



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Please note that the views expressed in this paper reflect those of the authors and should not be attributed to any of the institutions.

This paper has been minimally edited for clarity and style.

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Summary

Economic and social activities are the main determinants of demand for forests goods and services (FAO, 2000). The population of Malawi is estimated at 10 million, with a declining growth rate at 2 % due mostly to AIDS pandemic that is affecting mostly the productive age groups. The growth rate will decline further in the next two decades due to the combination of AIDS pandemic and impact of family planning and reproductive health campaigns.

Malawi remains one of the poorest countries in the World with per capita income of US\$ 220. Over 60 percent of Malawi's population live below the poverty line. Most of the households cultivate between 0.5 and one hectare. 40 % of the population are illiterate. With an economy that is dependent upon agriculture and the rate of population growth more than three times the growth rate of the economy, the economic future is not bright.

The combination of increasing population and poor economic status will exert a heavy pressure on natural resources including forest and tree resources. The pressure will originate from increasing demand for more land for food production and wood fuel energy.

Demands on forest and tree resources are increasing in intensity and diversity over time as population increase and some portion of the population become affluent. Some of the main demands from forests and tree resources are forest services, non-timber forest products, wood energy, and industrial forest products.

Forest services

These include eco-tourism, watershed protection, carbon sequestration and biodiversity conservation. Achieving sustainable financing to manage forests for non-marketed services is a major challenge.

Non-timber forest products (NTFP)

Increasing attention is now being focused on NTFP as sources of alternative or complementary sources of income. The major constraints remain inadequate information on utilisation, management and marketing of NTFPs. Some of the common NTFP are Cane furniture, ornamental flowers, mushrooms, firewood and fruit juices.

Wood energy

A recent household survey showed that about 94% of the people in the country are using wood fuel for energy. This represents an increase trend in wood dependence from the original 90% of the population. At the same time use of electricity has declined from 4 % to 2% of the population. With increasing population and no alternative in sight, wood fuel demand will increase over time.

Industrial wood products

The total annual sustainable yield from all industrial plantations is estimated at 575,000 m³, available over the next two decades. If more planting is done, sustainable yield could be increased. Current total consumption by both formal and informal sector is however only 33 %. There is therefore untapped potential.

Sustainable wood production is being threatened by forest fires and poor management due mainly to inadequate financial resources. The wood industry has expressed concern about the future if no corrective action is taken now. The decision has already been taken by Government to involve private sector in effective management of industrial plantations through various modes of partnerships.

The driving forces

Factors that will shape forestry sector will include economic growth, population growth, land use change especially deforestation, changes in social dimensions, wood energy demand and the evolution of policies within and outside forestry sector.

The coming years will also see increasing concern over degradation of the environment resulting from pollution, climate change and water degradation.

Critical to the future of forests is the rate of growth of agriculture sector together with settlements that are associated with it. With increasing population, low level of technology and a subsistence rural economy, forests will more likely be cleared to increase crop production.

The energy sector is closely related to forestry sector. Wood fuels provide 94 % of energy in the country and there are no viable alternatives in site. The increasing demand for wood fuel will affect the forestry sector.

It is important to recognise the potential role that technology could play and affect the forestry sector. Technological changes could improve wood processing efficiency and reduce waste, other forms of energy could become available thereby reduce pressure on wood fuels or new products could replace wood products.

The forestry sector will also experience increasing influence from national, regional and international policies that are guiding forest development world-wide. Increasing globalisation, concern for climate change and interest in preserving biodiversity are the global themes that will play an important role in shaping forestry sector in Malawi.

By far, the two key determinants of the future of forestry appear to be the developments that will take place in agriculture and energy sector.

Policies and institutions

The forest policy of 1996 is a departure from the traditional forest approach, which emphasised forest protection to the present policy that emphasises multi-stakeholder participation including local communities. The new policy also recognises the role of the private sector not only in utilisation of forest but also in the management of the resource. Through the National Forest Programme (NFP) Malawi Government through a highly consultative process with all stakeholders has identified the key themes affecting forestry in Malawi, identified priority actions to be undertaken and also identified key roles and responsibilities of various stakeholders (NFP, 2000).

The changes in policy have also included institutional change. Traditionally, forestry institutions have concentrated on government forestry departments and agencies. Since many

parties external to forestry department have significant influence on the sector, institutional change has to be examined from a broader perspective although Forestry Department remains the institution with vested interest in drawing attention to the needs and potentials of the sector.

There are two key institutional changes that are underway as the result of the change in forest policy namely industrial plantations management by the private sector and community management of forest and tree resources.

Forest services outlook

The key factors that will determine the outlook for forest services will include recognition and appreciation of commercial potential for non-timber goods and services, development of effective valuation methods for pricing forest services, balancing the provision of commercial benefits with social and environmental services, mobilisation of investment in favour of forest-provided services and main streaming non-timber forest products.

Outlook for NTFP

NTFP are both socially and economically important for people living near natural forests. Over 20 NTFP have been identified in Malawi, the major ones being fuelwood, fruits and mushrooms.

The outlook of NTFP will be determined by several key developments some of which are increasing commercialisation of NTFP at local, national and international level, a shift from local consumption of NTFP to marketing of NTFP as key alternative source of income, mainstreaming of NTFP in sustainable forests management planning and research in the sustainable management of NTFP.

Outlook for timber plantation forests wood-based products

The wood processing industry consumes sawlogs and peeler logs. At present, there is sustainable wood supply for the next two decades at the present level of consumption. The present consumption rate is using up only 33% of the sustainable supply. The potential for more wood can be archived by restocking the current plantations and implementing effective forest management. The potential for external market is however clouded by the dominance of the South African forests industry in the region.

For long-term local supply of sawlogs, there is need to resume planting in timber plantation now and maintain the momentum annually. Alongside replanting, there is need to identify sustainable source of finances to manage properly forest plantations.

The forecaste for peeler logs is rather uncertain because there hasn't been any significant planting over the last decade. Since the plantation rotation is 25 to 30 years, there will be no peer logs in year 2020. If planting resumed today, peer logs could be ready for harvesting no earlier than 2025. There will therefore be need for restructuring the wood industry to adapt to low diameter tree sizes and to produce panel products like particleboards or chipboards in place of plywood.

Outlook for the area of forest and tree resources

Area of natural forests over the years has remained unchanged, with the exception of forest reserves that have continued to grow in number. Over the years there has been no significant change caused by pressure for crop production and settlements.

There is indication that pressure for land will increase over the next two decades due to increasing population. This pressure will originate from people living in the neighbourhood of forests as indicated by growing number of cases of encroachment for settlement and crop production.

There hasn't been significant expansion of plantation forests for both industrial and fuelwood and poles plantations. In the case of poles and fuelwood plantations, they have actually reduced in area, especially the plantations that were handed over to local councils to manage.

There is no indication that plantation forestry will increase in area in the medium term. For timber plantation, the current wood is under-utilised and poorly managed. In the medium term, the prudent course of action is to bring the existing plantation under proper management and develop a market for wood products.

For poles and fuelwood plantation of significant area, there will be problems to get land that isn't being earmarked for crop production. With current wood prices set low by government, no investor would be attracted to invest in forestry.

The future of forest lands will be determined by the ability of planners to provide adequate benefits from forests to the communities than they can get from clearing forests for crop production. Collaborative forest management is being used to promote communities participation in sustainable forest management by sharing costs and benefits. This approach has promising prospects for meeting both local needs and global interests of biodiversity conservation and mitigation of climate change. There is also potential for communities to make income from collaborative ecotourism whereby tour operators and local communities can work out mechanisms for sharing responsibilities and benefits.

There have always been trees outside forests around homesteads and in farms supplying multiple products and good. With increasing agroforestry practices using tree species as a means of improving soil fertility, there will be increase in number of trees on the farm. The key factors that will drive the planting of more trees on farm are a conducive pricing policy and increasing pressure for wood fuel.

Regional implications of forest outlook for Malawi

The changes that will take place in Malawi have implications on collaborative choices and cooperation at regional level. National policies will be influenced by regional and global factors. Malawi being the coordinator of forestry sector, there will be need for Malawi not only take into account international opinion in forestry policy formulation but also to provide leadership in the SADC region.

The areas that will require particular attention on international, regional and sub-regional level are developing and refining trade regimes, establishing mutually acceptable criteria and indicators for sustainable forest management, watershed management, networking and information sharing and collaboration in Forests Research, Education *and* Training.

Part I

Forestry Sector context and background

1.0 Introduction

The objective of this study was to collect, review and interpret existing information on status of the forestry sector and to present a possible path of development for the sector through to the year 2000. The study therefore endeavoured to:

- appreciate both internal and external factors affecting the forestry sector
- understand the role of forests and trees in people's livelihoods through forest industry, small scale forest industry and subsistence level activities.
- consider productive, protective and social functions of forests in the context of sustainable forest management
- address policy implications and institutional development requirements for sustainable forest management

The approach adopted aims at providing insight into likely implications of developments within and outside the sector in order to facilitate decision-making processes in the sector.

2.0 Social economic background of the study

Economic activities and population are the main determinants of demand for forests goods and services (FAO, 2000). Over the period of 1931 to 1987, the population of Malawi increased from 1.5 million to 7.8 million, an increase of about 4.2 times over a period of 58 years. The fastest population increase rate was experienced over 1926 - 1931 period where the rate peaked 4.5 %. The lowest growth rate was experienced over the Second World War years when it sharply declined to 1.9 %.

Currently population rate of growth shows a declining trend from 3.3 % to of 2 %, the rate that was last known during the Second World War. Ironically, the cause for the growth rate decline in both cases is the same: death through war then and due to AIDS pandemic today (Ndawala, 2000).

Malawi is a poor landlocked country with a population of 10 million (NSO, 2000), which is largely rural. Agriculture still dominates the economy, accounting for 36 percent of GDP and almost all of the country's exports. Over 80 percent of the labour force remains engaged in the agriculture sector.

Since independence in 1964, the economy experienced rapid growth in gross domestic product and the volume of exports expanded rapidly. Malawi achieved a growth rate of 6 percent a year through to 1978. The performance of the economy slackened during 1979-1981 largely due to external shocks and deteriorating terms of trade.

Resulting from structural adjustments programme and a number of policy interventions, some positive growth was archived particularly in 1982 and 1995. Despite the attainment of positive rates of growth, the incidence of poverty remains very high.

The extent of poverty indicates that over 60 percent of Malawi's population live below the poverty line. Per capita income was estimated at US \$220 in 1999. Income distribution is highly inequitable and population density is high so that 32.3 percent of smallholder households cultivate between 0.5 and one hectare and 24 percent of households are female headed two fifths of the population are illiterate. Illiteracy among women is at 69 percent.

Part II Forestry Sector status and trends

3.0 Forest resources

Altitude in Malawi ranges from 50 meters above sea level (Lower Shire) to 3000 meters on Mulanje Mountain in the South and 2600 meters on the Nyika in the north of the country. With slopes varying from steep escarpment to plains, there are a wide variety of vegetation formations in the country. The interaction of slope, soil, geology and climatic variables has resulted in at least 19 distinct vegetation communities. Population pressure has however modified biotic communities resulting in woodlands/trees interspaced with agriculture crops. Most of natural forests are Miombo woodland type, with typically low annual growth rates estimated at 1 – 2 m³ per hectare per year. Most of the forests have low commercial value.

3.1 Forest extent

Malawi was endowed with vast Miombo woodlands. This natural resource has been subject to considerable reduction in area mainly due human activities to the present state. Table 1 shows the forest resource extent.

Table 1 : National forest extent, for both indigenous and plantation forests and woodlands.

FOREST CATERGORY	AREA(HA)	% OF TOTAL FOREST AREA
Forest Reserves	870,052	17
National Parks & Game Reserves	981,479	19
Government Plantations	90,000	2
Private Plantation	20,000	0
Customary land	1,988,255	63
GRAND TOTAL	3,949,786	100

Source : Forestry Department

Forest resources have been subjected to deforestation. Table 2 shows deforestation between 1972 and 1992, as determine by comparing Landsat MSS (1972) and Landsat TM (1992).

Table 2 : Deforestation between 1972 and 1993 for both indigenous and plantation forests of Malawi.

REGION	1972 FOREST EXTENT (Ha)	1992 FOREST EXTENT (Ha)	TOTAL FOREST LOST (Ha)	RATE OF DEFORESTATION (Ha/YEAR)
NORTH	1,507,266	470,238	1,037,028	51,851 (3.4 %)
CENTRAL	1,488,110	777,217	710,893	35,545 (2.4 %)
SOUTH	1,404,510	650,860	753,650	37,683 (2.7 %)
TOTAL	4,399,886	1,898,315	2,501,571	125,043 (2.8 %)

Source : Forestry Department

It can be seen that although the Northern Malawi has a low population (11 % as compared to 39% for Central and 50 % for the South of Malawi), deforestation rate has been the highest at 3.4 %..

Forest distribution in Districts is uneven. Table 3 show that Thyolo district is the least forested in the country, followed by Chiradzulu and Dowa Districts with 4% forest cover. On the other extreme end of the spectrum is Karonga District with 69 % forest cover followed by Nkhatabay.

Table 3 : Forest cover percentage by District.

District	Forest Area (%)	District	Forest Area (%)
Chitipa	38	Dedza	22
Karonga	69	Ntchewu	10
Kumphu	44	Mangochi	38
Mzimba	25	Machinga	16
Nkhatabay	58	Zomba	7
Kasungu	28	Mwanza	31
Nkhotakota	52	Blantyre	30
Ntchisi	13	Chiradzulu	4
Mchinji	9	Mulanje	12
Lilongwe	16	Chikwawa	33
Dowa	4	Thyolo	2
Salima	7	Nsanje	34

Malawi forests can be divided into two main categories namely natural and plantation forests as follows:

3.1.1 Natural forests

Natural forests represent the remainder of the Miombo forests that once covered almost the whole country.

Forest Reserves are managed by Forestry Department and cover an estimated 0.87 million hectares, comprising 17 % of forest cover in Malawi. There are 82 Forest Reserves scattered all over the country. Most of them are on hills and mountains protecting these fragile areas from environmental degradation through erosion but also protects important water catchment areas.

Wildlife forest reserves are managed by Department of National Parks and Wildlife and comprise an estimated 0.98 million hectares which is 19 % of total land area. There are 5 National Parks and 4 Game Reserves, distributed throughout the country.

Customary land forests are owned traditionally by the smallholders and cover 3.1 million ha, which is about 63 % of forest area in Malawi, comprising of 22 % of undisturbed forest and 41 % of disturbed forest with 20 to 70 % of cultivated land.

3.1.2 Plantation Forests

Government plantation under Forestry Department has established 0.09 million ha, covering about 1.8 % of total forest area. 85 % of the of timber forests consist of softwood (mainly Pinus patula). The main hardwood species planted mostly for poles and fuel wood is Eucalyptus species.

Private plantations are mostly owned by tea and tobacco estates and cover 0.02 million ha making up about 0.4 % of forest area. There is also 0.02 million hectares of smallholder woodlots.

3.1.3 Trees on Farm

Trees outside forest represent an important variable in the energy equation of smallholders. These trees are either planted or grow naturally in the gardens, around homes and occasionally along linear features, like roads. Many smallholders live far from the nearest forest, yet when you travel around the country side, you see many trees scattered throughout the crop field, along streams, along garden boundaries and even a larger concentration of mainly fruit trees around the houses. Dead branches, twigs and pruning from these trees are used as fuel wood. Woody biomass in these area is very low, ranges from 0 m³ to 12 m³ per hectare. Although the amount of wood that can be harvested from this source is small per unit area, the over role volume is significant because smallholder farming covers over 4.5 million ha (49 % of total land area of Malawi).

Of interest is the fact that these are open grown trees experiencing little competition for nutrients and sunlight hence their large canopy enables them to grow at a relatively higher rate than trees grown in a stand.

The basic problem in forestry is that the population is concentrated in Southern and Central Regions of the country (90 % of the total population) while half the forest resource is in the Northern Region. The forestry resource is under threat due primarily to increasing population. In the Central and Southern Regions there is a substantial gap between fuel wood supply and demand from customary land, the deficit being met from forest reserves. At the same time, demand for wood products, mainly fuel wood is increasing due to population growth from urbanisation. It is estimated that about 70 % of the demand originates from urban and rural households (10 % urban and 60 % rural households) and 30 % from tobacco and tea estates. The population pressure also results in more land clearing for agriculture, which further accelerates deforestation.

Forest resource in Forest Reserves and National Parks and Game Reserves is generally not available for exploitation. Their function is to conserve the environment and biodiversity and also to provide refuge for wildlife. Forest Reserves, managed by Forestry department are mostly located in water catchment areas and fragile areas. If the forest resource on customary land that is most accessible to the rural majority of Malawi and naturally is a very important resource that caters for the wood and non-wood needs of the rural population but also for the urban people, especially for customary land forests that are close to urban centres.

Forest Reserves, National Parks and Game Reserves have been encroached by both subsistence farmers and commercial farmers for both crop production and settlements (Table 3). Over the last 20 years, National Parks 1 % was encroached at 54 locations, in Game Reserves, 4.8 % was encroached at 30 locations and in Forest Reserves 2.6 % was encroached at a record 571 locations. The over all effect of these encroachments is still low and insignificant. In general, National Parks and Game Reserves have been better protected than Forest Reserves. It is important to notice from the low encroachment level, that forest protection by gazettment has been very effective.

Table 4: Encroachment in Forest Reserves, National Parks and Game Reserves.

CATEGORY	EXTENT (Ha)	EXTENT AFFECTED (Ha)	% OF AFFECTED AREA	NO. OF AREAS AFFECTED
National Parks	613,756	5,871	0.96	54
Game Reserves	367,723	17,908	4.87	30
Forest Reserves	870,052	23,012	2.64	571
TOTAL	1,851,531	46,791	8.47	655

Source : Forestry Department

Some natural forests are located within leased land owned by estate owners involved in commercial farming. An estimated 12 % of all leased land and freehold land are under natural woodland, forest and plantation. These natural forests are effectively unmanaged with the result that their productivity is low.

The problems of deforestation arise from poverty, population growth, infrastructure development and economic activities. It has been noted that among the top 5 causes of deforestation and forest degradation are (Chipompha, 1997) uncontrolled tree felling for fuelwood for curing tobacco in the smallholder and estate sectors, opening up of new gardens and farming areas, firewood for commercial purposes, infrastructure development and shifting cultivation.

4.0 Demands made upon forests

Forests play an important role in providing basic human needs such as fuelwood, food, fodder, pharmaceuticals, employment, income and foreign exchange, hence contributing to socio-economic development. As an integral component of the biosphere, forests help to stabilise

natural systems such as carbon cycle, contribute to biological diversity, provide habitat for fauna and flora. Forests also help in maintaining air, water and soil quality, influence biochemical processes, regulate run-off and groundwater, control soil erosion, reduce downstream sedimentation and incidence of flash flooding. Forests are therefore also very important in providing watershed protection and enhancing water resources.

Forests are becoming focal points for national and international interests. These interests often compete with each other. Demands made upon forests are increasing and becoming more complex.

4.1 Forest services

Forest provides a wide range of non-consumptive services. These services include ecological, economic social and cultural services. The diversity of goods and services demanded from forests mean that management solutions are often complex. For much of the rural communities, these services make considerable contribution towards the rural livelihood.

Both natural and man-made forests play an important role in providing basic human needs such as fuel, food, fodder, pharmaceuticals, employment, income and foreign exchange, hence contributing to socio-economic development. As an integral component of the biosphere, forests help to stabilise natural systems such as biological diversity, provide habitat for fauna and flora. Apart from these, forests also help in maintaining air, water and soil quality, influence biochemical processes, regulate run-off and groundwater, control soil erosion, reduce downstream sedimentation and incidence of flash flooding. Forests are therefore very important in providing watershed protection and enhancing water resources.

Forest services can be categorised into two namely those for which a formal market exists (such as clean water, ecotourism and hunting) and those functions that are mostly intangible and sold through markets such as cultural or spiritual values.

4.1.1 Social-cultural roles and nature-based ecotourism

The common cultural value of trees in Malawi is associated with traditional burial grounds scattered all over the country. These wooded areas are also used for cultural practises such as secret societies. Every village has elaborate rules and regulation regarding care, use and maintenance of tree cover. The survival of such woodland remnants under increasing fuelwood pressure is evidence of the effectiveness of traditional institution to deal with woodland management issues.

More and more, forests are serving as destination for ecotourism and recreation. Ecotourism is a growing industry in Malawi with increasing potential because of the diversity of forest vegetation type that are present. There is concern about the amount of benefits that accrue to the local communities. In one community in Monkey Bay, tour operators are dealing with this problem by sharing responsibilities and benefits with local communities. In this arrangement, communities manage forest resources and provide security for tourists while tour operators attract tourist and provide accommodation and various services. Such arrangement has the potential of ensuring that local communities and local environments benefit from revenue brought in by ecotourism.

4.1.2 Agriculture services of trees and forest

Benefits to crop production resulting from tree-crop interaction are a major non-marketed benefit that trees offer to humanity. Trees support agriculture production by replenishing degraded lands, recycling nutrients, maintaining soil structures, contributing to water cycles and protecting watersheds.

Trees and forests provide food for both wildlife and domestic animals. In some forest reserves, controlled grazing is practiced under license in order to control grazing and prevent overgrazing. Grazing provides mutual benefits for trees and animals. Grazing forests reduces the risk of forest fire while at the same, animal manure provide nutrients to trees.

4.1.3 Carbon sequestration

One of the roles of forests that are gaining ground is the potential for forests as carbon sinks. This potential offers opportunity for developing countries to get economic return from forests through carbon trading. It is estimated that developing countries could get more money from carbon trading than they get from development assistance (FAO, 1998). The driving force behind carbon trading is that for developing countries that are sources of carbon dioxide, carbon reduction through actions within the country is more expensive than reducing carbon emissions in developing countries (FAO, 1998).

Although the opportunity for carbon offset is available, there is no project either being developed or being implemented at the moment in the country. The potential however is there for conserving existing carbon sinks in protected areas and increasing protected areas through further development of protected areas. There is also potential for planting more trees especially in agricultural lands under agroforestry crop production system.

4.1.4 Conservation of wildlife habitat and biological diversity values

There are two main objectives for maintaining protected area is to provide habitat for wildlife and to conserve biological resources. To meet this needs, a wide range of ecosystems ranging from wetlands to woodlands have been protected in national parks and wildlife reserves. National parks and game reserves comprise an estimated 0.98 million hectares, which is 19 % of total land area, which is higher than the global average of 6 % (FAO, 1998). There are 5 National Parks and 4 Game Reserves located through out the country.

With increasing population, it will be difficult in future to increase the area of protected forests for wildlife management due to pressure for agriculture production and food security.

Wildlife reserve areas are a home for some endemic species and great biodiversity. The overall biodiversity resources place the country in a position to benefit from recent upsurge in biodiversity prospecting. So far, Malawi has not benefited from this potential source of revenue. There is potential to benefit from private sector opportunity to capture revenues from biodiversity while respecting the principles of the Convention on Biological Diversity. Sales of seeds and prospecting rights in forests that may yield valuable drugs of pharmaceutical value are some of the promising ways of tapping on biodiversity potential. The challenge will remain how to ensure that the benefits of biodiversity accrue to the people who originally allowed Government to establish protected areas.

Equally challenging is how to benefit from biological biodiversity while ensuring the sustainability of the resource.

4.2 Non-wood forest products (NWFP)

Increasing attention is now being focused on NWFP as sources of alternative or complementary sources of income. The major constraints remain inadequate information on utilisation, management and marketing of NWFPs. Some of the common NTFP are as follows:

4.2.1 Cane furniture Production and Other Crafts Products

Forests are source of non-timber forest products (NTFPs). These include edible mushroom, thatching grass, game, fruits, honey, insects, etc. Most of NTFPs are consumed or traded locally by households. These skip the national accounts though they constitute valuable resources and have a commercial value. Some of these products have potential on the international markets as well. These products are Cane furniture, mats, tables, chairs, toys and baskets). It is estimated that 26, 162 tonnes of cane furniture and other craft products are produced annually.

4.1.2 Ornamentals (flowers)

Table 8. Ornamentals and their value

Production Area/City	Quantities (Plants/ Ornamentals)	Value in MK
Tropex Nursery	2,800	1,120,000
Lilongwe City Assembly Nursery	5,800	1,080,000
Blantyre City Assembly Nursery	6,900	1,380,000
Nzuzu City Assembly Nursery	3,200	480,000
Zomba Municipal Assembly Nursery	2,150	322,500
Lusangadzi Nursery (Mzuzu)	1,890	567,000
Smallholder Enterprises (Production)	7,770	2,331,000
Total	30,510	7,280,500

Forests are also a source of ornamental flowers, plants, shrubs and leaves of commercial value. Some of these NTFPs are already being exported to other countries such as America, Western Europe, South Africa and Zimbabwe. The commercial production of flowers is mainly common in most of the major cities and holiday resorts, for instance Tropex at Club Makokola in Mangochi, all the city assemblies and small-scale enterprises. Some ornamentals are also sold on the domestic market quantities and values of ornamentals are shown on table 8.

4.2.3 Fruit Juice Processing

One way of promoting sustainable management of indigenous trees is to make them a source of revenue without destroying them. Fruit juice production in Mwanza District is one success story. From fruits that are produced annually, fruit juice is being produced by a community which is benefiting financially from this venture and therefore is an incentive for communities to protect this sustainable source of income.

Kamwamba Fruit Juice Processing Company (Project) in Mwanza District, produces more than 10 000 Cartons of value added juices per annum from indigenous fruits as indicated in the table 8 below. The revenue raised is used to contribute towards the welfare of local communities in the surrounding areas. These communities are also involved in rearing of guinea fowls and production honey for commercial production. These as well are part of forestry contribution towards the GDP/GNP

Table 9. Summary of Fruit Juice Produced and Revenue Raised by local Communities from (Malambe)/ *Adansonia digitata* and (Bwemba) /*Tamarindus indica* for the Period 1998 – 2000

Year	Production	Sales
1998/99	14 177 (212,655kg)	MK186 077.00
1999/00	8 450 (126,750kg)	MK195 425.00

4.2.4 Mushrooms

Miombo woodlands, which are a dominant woodlands through Malawi are a home for over 30 edible mushrooms (Ngulube,2000). Mushrooms are an important source of food and income for rural communities, throughout the country. These are collected before the first crops mature in the rain season. The habitat for mushrooms is however threatened by deforestation and establishment of exotic species.

Mushrooms are one of the most important NTFP coming close to fuelwood collection. The majority of mushrooms are collected in the months of February and March every year. Mushroom collection is mainly done by women and sold along the main roads. Estimates from Machinga showed that as much as US\$ 100 worth of mushroom can be sold on one selling point during the one rain season (Ngulube, 2000).

The potential for revenue collection from miombo woodlands is high and revenues play important role in food security of the people in the proximity of forests. Future prospects for mushroom collection and marketing is bright although there is the ever-present threat of deforestation and growing of exotic trees that interfere with mushroom habitat.

4.2.5 Bamboos, palms, reeds and grass

A variety of products are derived from bamboos (*Oxytenanthera abyssinica*), palms (*Raphia farifera*) and reeds (*Phragmites mauritania*). Bamboos are used for weaving baskets, granaries, chairs, beds, mats and shelves. Reeds are used for making mats, fence making, granary making, making doors and baskets. *Raphia farifera* is used for making chairs, tables, shelves and toys. All these products have a commercial value and provide supplementary income for communities. In many cases, there are middle people who buy these products at wholesale price and bring them either to the urban markets or to tourist attraction centre to sale.

Grass is an important NTFP used for thatching and fencing homesteads and gardens. Grass may come from forest or it may be obtained from fallows. Grass is also a commercial entity for both rural communities and urban dwellers who use it mostly for fencing.

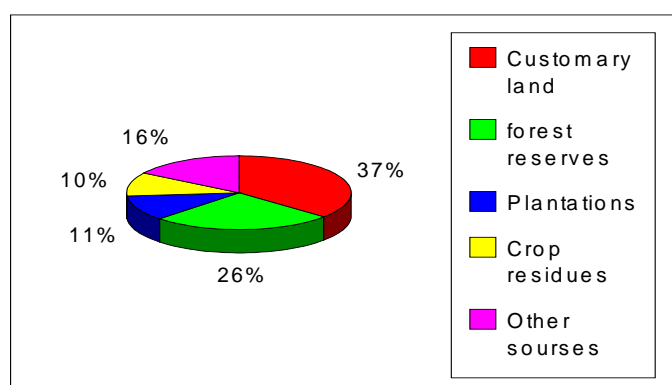
5.0 Woodfuels and energy

A recent household survey showed that about 94% of the people in the country are using woodfuel for energy. This represents an increase trend in wood dependence from the original 90% population.

5.1 woodfuel supply and demand

Both production and consumption of woodfuels occur in informal sector where records are not properly kept. Data on production and consumption is therefore based on surveys.

Fig 1 : Sources of fuelwood for biomass energy

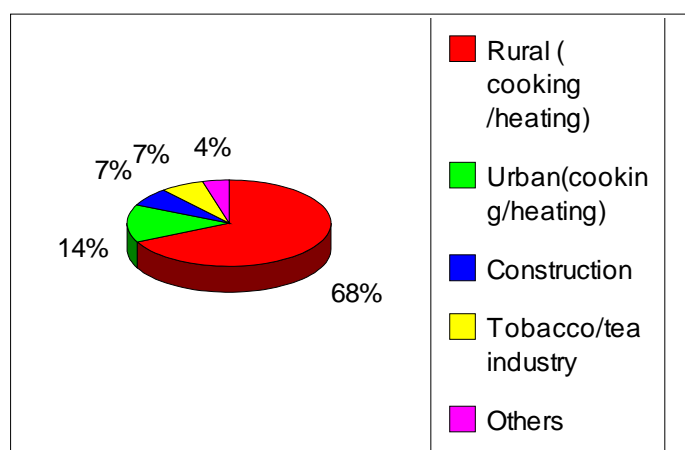


Source : (Ministry of Energy and Mining)

Biomass provides most of the total energy needs. The majority of wood energy users are found in the rural areas where almost 90 % of the population live and biomass is the only energy source available. Over 50 % of the wood energy comes from customary forests and woodlands, 36 % from forest reserves, 15 % from plantations, 14 % from crop residues and 22 % from other sources of biomass.

It is estimated that 2/3 of the of total wood consumption represents rural demand for fuelwood for cooking and heating. The balance is composed of urban wood fuels for cooking and industrial requirements, building poles construction, tobacco and tea curing and building requirements and other miscellaneous uses.

Fig 2 : Wood consumption patterns



Various studies have shown that the national trend of fuelwood consumption over time is increasing. Over the period of 7 years (1983 - 1990), wood consumption increased from 8.5 million tons to about 12 million tons per year, an increase of about 41 % (source) Within the same period, wood demand for tobacco industry increased by about 29 % (source)

Considering all the major wood consumers, wood demand is about 8.5 million m³/year Sustainable wood supply is 5.2 million ha (Kainja, 1993). This calculation excludes National Parks and Game Reserves. The districts with the highest wood deficit are Mulanje, Thyolo, Blantyre, Mangochi, Machinga and Zomba in the South, Kasungu, Lilongwe and Dowa in the Centre. The Mozambican refugee influx also had an impact in all refugee-impacted districts of Nsanje, Chikwawa, Dedza, Mwanza and Ntcheu. Despite the national wood shortage, Nkhata Bay, Karonga and Chitipa in the North, have adequate supply of wood to meet their requirements (Gawamadzi, 2000)

5.1.1 Woodfuel supply-demand balance sheet

Malawi's forests both natural and planted provide about 94 percent of the country's fuelwood and poles for industrial and domestic uses. This is equivalent to 3.7 million m² of wood against 14.5 million m² currently demanded implying a wood deficit of 10.8million m². The Central and Southern regions have the critical fuelwood and pole shortage than the Northern region.

Consumption of wood is positively related to population growth in less developed countries, where fuelwood is the major source of fuel. In urban and semi-urban areas, high tariff of electricity by ESCOM and price hike in electrical appliances is another contributing factor, as many people cannot afford to use electric power, hence there is lack of appropriate alternatives technologies to substitute firewood and charcoal. Only 2% of the population is now using electricity (NSO, 2000). The is a decline from 4% and corresponds to the increase in woodfuel dependence.

5.1.2 Prospects for narrowing the wood energy gap.

The fuelwood and poles deficit would go out of control if nothing is done to reverse the trend. Meanwhile, there are policies and legislations, which are in place or are being reviewed to address the wood plight and other environmental degradation in the country. These tools are, the Forestry Policy and Act, National Environmental Policy and Act, decentralization policy,

Government policy on poverty alleviation, sustainable agriculture, macroeconomic adjustments and others. The latest addition and positive development to address the issue is Government adoption of National Forestry Programme (NFP) whose main aim is to operationally the National Forestry Policy. The major goal of the policy is to promote sustainable management of forest goods and services for improved and equitable livelihood.

There are also existing indigenous knowledge, technologies and plans in the rural and urban communities, which if fully exploited and utilized, can help to narrow down the gap. The government has also prepared a Cabinet Paper on measures to combat deforestation and desertification. In this Paper cabinet is requested to approve that management of natural resources be given the highest priority in allocation of recourses. Politicians are also invited to actively support management of natural resources.

On the regional and international scene there are international initiatives to address forest issues at policy level. The Intergovernmental Panel on Forests (IPF) / Intergovernmental Forum on Forests (IFF) is mandated to pursue a consensus and formulate options for further action in order to combat deforestation, and forest degradation and to promote the management and conservation and sustainable development of all types of forests. There is also a protocol on the Conservation, Sustainable Management and Sustainable Development of Forests and Forests Lands in the Southern African Development Community (SADC) Region, which aims at promoting forest resources and forest, lands sustainable management to meet social, economic, ecological and spiritual needs of present and future generations

5.1.3 Tree Planting initiatives

The role of raising and planting seedlings is in the hands of communities and private estates. Forestry Department and NGOs have a role of a facilitator. Before the implementation of the current policy, the Department did most of the forestry activities. Meanwhile, there are more than 20 NGOs involved in forestry extension particularly in community mobilization and training. As a result of complementary effort with the Department, rural communities have formed more than 4000 Village Natural Resources Management Committee (VNRMC) who are actively involved in management and development of community based forest resources. Considering that there are 25,000 villages in the country, there is still more work to be done to reach the whole country.

6.0 Industrial wood

The total annual sustainable yield from all industrial plantations is estimated at 575,000 m³, available over the next two decades. If more planting is done, sustainable yield could be increased. Current total consumption by both formal and informal sector is only 33 %. There is therefore untapped potential.

Sustainable wood production is being threatened by forest fires and poor management due mainly to inadequate financial resources. The wood industry has expressed concern about the future if no corrective action is taken now. The decision has already been made by Government to involve private sector in effective management of industrial plantations through various modes of partnerships.

6.1 Formal Primary Processing

The primary wood processing industry in Malawi is essentially a saw milling industry with some complementary production of value added products such as furniture, plywood, block boards and matches. In addition, a substantial volume of firewood is collected for domestic purposes. The formal processing sector requires an annual log intake of 120 000 m³. Conversion efficiency is about 50 %.

Primary production of value added products comprise veneers, plywood and block boards, furniture and laminated beams. ITL are the manufacturers of hardwood beams for the export market (RSA and Zimbabwe) and local construction industry.

Table 3 : Wood Industries and their Approximate Intake

Region	Company
South (Intake ~ 41 000)	Wood Industries Cooperation (WICO) Chinese Timbers Shire Limited International Timbers Limited Bilal Steel & Wood Works
Central (Intake ~ 20 000)	WICO Saydreni Timbers Lizulu Timbers Timberland
North (Intake ~ 34 000)	RAIPLY Select Sawmill, WICO Shaka Timbers Nzeru za Bambo Lunyangwe Timbers Mzimba Sawmill Nzuzu Forest Company

Table 4 final primary processing output

Final Product	Annual Production	Value (1 000US\$)
Sawn timber	31 000	2 200
Furniture	10 000	1 500
Value added products	15 000	2 000
Poles	8 000	800
Total	64 000	5 500

Other secondary manufacturing of timber product comprises mainly furniture for local market. These are mainly located near the major urban centres of Blantyre, Lilongwe and Mzuzu. Some prominent furniture and furniture component manufacturers include Mapanga Furniture, Vision Furniture, SMK, Sunder Furniture, Capital Furniture, and Wudsteel.

The production wood processing industry is geared towards the supply of low-cost products of the local market. An estimate of current export volumes is 6500 m³. Most of the products are exported within the Southern Africa Development Community (SADC) region.

The total annual value of value added wood products is estimated at US\$ 4 million, representing an output of about ½ % of the GDP of Malawi. About 2500 people are employed by the formal sector of which 15 % associated with harvesting.

6.2 Informal Pitsawying

An important feature of the saw milling sector of Malawi is the preponderance of informal or pit sawing operations. These operations are spread amongst all industrial plantations. There are also numerous pit sawyers on both private and customary land forests, who depend on forests and trees for their livelihoods. It is estimated that the pit sawyers and mobile saw millers produce more than 17,580 m³ of sawn wood annually out of 80,000 m³ log intake (DFID, 2000) The value of the output is estimated at US \$1.5 million.

There is an increasing trend in the number of pitsawying over the years. This trend is going to continue to increase because of potential pit sawing that can be done both in plantations and on farm. The demand for timber is on the increase in response to increasing population and demand for timber products. For example, there is a growing construction industry, growing furniture demand and growing demand for coffins in the light of AIDS pandemic.

The role of pit sawing must be considered when developing future policies on wood processing in the country.

7.0 Forest Trade

The primary wood processing industry in Malawi is essentially sawmill industry with complimentary production of value added products such as furniture, plywood, block board and matches (DFID, 2000). Malawi consumes much of the sawn wood timber that is produced followed by wood panels, some of which are exported

The processing industry as it exists today consumes mainly softwood logs and peeler logs. The annual output of processing is about US\$ 10 million with total exports is estimated at US\$ 0.6 million every year, within the SADC region.

Total mechanical wood products are estimated at US\$ 4 million from formal sector and US\$ 1.5 million form informal sector.

Imports are fined to paper and paperboard, wood products that aren't manufactured locally. The total value of paper imports is estimated at US\$ 60 million per year.

8.0 People and forests

Forest development revolves around people. Their interaction with forests both as managers and users determines how the forest recourse will look like in the future. The people intimately related to forests are the hunter-gatherer populations for whom forests offer food, shelter and fuelwood. The relationship between people and forests can be dependency/consumption oriented or management oriented.

There are three main people-forest relationships that can be identified namely people who live outside forests, people who engage in forest-based activities and people who are urban dwellers requiring wood products especially woodfuel.

People relate to forests positively, negatively or indifferently. People may be benefiting from forests through jobs or commercial activities therefore relate positively or they may damage forest for various reasons or they maybe indifferent. For example one could be selling charcoal from unsustainable sources thereby degrade the basis for his own income and survival. The relationship between people and forests or trees are far from being simple and often can be very complex in nature.

The demands made of forests are diverse resulting often in conflicting demands leading to land use and forest utilisation conflicts.

Community forest concept is gaining ground in many parts of the country. Originally promoted by Government, communities are slowly understanding the concept and organising themselves to participate in the future of the resource. The emergence of NGO's is offering mostly financial resources while Government remains the major custodian of forest technical skills. Besides, there is growing realisation that trees outside forests will play an increasing role as the source of various products and services. The role of trees outside forest will increase as people adopt agroforestry technologies that aim to improve unit area food production and at the same time increase wood production. Although there is a limit on how many trees one can plant on limited landholding, the aggregate impact will be large because the area involved is large and the tree grow faster than plantation trees due to the open nature of their environment and limited competition for nutrients and light.

8.1 Forests and urban people

The urban population in Malawi constitutes 14 % of the population. The trend of urban migration over the years has declined from 6% to 4.7% due to the development of growth centres in rural areas (NSO, 2000). This is a low urbanisation rate compared for example with Zambia which is at about 50%.

The original interest in urban forests was landscape architecture and horticulture for aesthetical purposes. The demands of urban settlers require that trees and forest play a broader role in meeting a diversity of needs beyond landscape architecture. Due to increasing number of poor people in urban centres currently at over 60%, there is growing need for urban trees and forests to provide wood products as well. These are products like woodfuel, charcoal and poles for construction.

The major reason why foresters may neglect urban forestry is that urban forests are a responsibility of Assemblies. There is therefore need for closer collaboration between foresters and Assemblies. Another constraint in urban areas is that many of the people are tenants with no rights on the land they live on. It is therefore difficult for them to look after trees when there is no guarantee that they will benefit from the tree.

While it is not possible to predict quantitatively what will happen to urban forestry, it is possible to foresee the effect of choices made. It can be expected that urbanisation will increase and with it the influx of rural poor people many of whom will be unable to purchase fuelwood and construction materials. These will put tremendous pressure on local forests and trees

resources resulting in degradation and clearing of tree and forest resources. As the immediate resources are depleted, fuelwood and charcoal will be transported from the peri-urban areas and beyond.

Urban forestry has unique problems. However, there are also opportunities for forestry development that needs to be exploited for the benefit of the urban people. Increasing urbanisation will result in increasing demand for poles, woodfuel and charcoal. Since most of these people have no land to grow their own trees, there are commercial opportunities for both Assemblies and communities in the peri-urban areas to grow trees for sale. Forests and trees growing near roadsides can be important for urban areas even if they are located a considerable distance from the urban area.

The future of urban forests and trees will depend upon urban planning that stays ahead of urban growth and the extent to which urban plans which are implemented incorporate forest and tree growing.

9.0 Policies and Institutions

The International environment within which Malawi manage forestry sector has under gone changes over the last two decades. The changes are still taking place. New themes that are now influencing forestry sector are privatisation, globalisation of economies, decentralisation and liberalisation of trade. Forestry has a tradition of having diverse stakeholders nationally and internationally. These stakeholders have become more visible and vocal and are demanding a greater role in shaping the forestry sector. Many of the international influences are associated with the United Nation Conference on Environment and Development (UNCED). Key post UNCED changes are confirmation of trends already toward people-oriented development and greater environmental responsibility in forestry development. UNCED has created a challenge for Governments to reconcile national priorities with global priorities, of industrial demands with community needs, of preservation with diversified management and forest use (FAO, 2000).

There have been changes including deregulation, devolution of political authority to local governments, expanding role of private sector and civil society. There have also been increasing awareness of environmental issues such as biodiversity, the threat of global climate change and the threat of desertification. Forestry sector is influenced also by policies of others sectors. For example policies on Energy, Agriculture, Land, Environment and Local Government The sector has consequently become multi-disiplinary in nature. All these factors have prepared a stage for change in both policies and institutions dealing with the forestry sector.

The forest policy of 1996 is a departure from the traditional forest approach which emphasised forest protection to the present policy that emphasis multi-stakeholder participation including local communities. The new policy also recognised the role of the private sector not only in utilisation of forest but also in the management of the resource. Through the National Forest Programme (NFP) Malawi Government through a highly consultative process with all stakeholders has identified the key themes affecting forestry in Malawi, identified priority actions to be undertaken and also identified key roles and responsibilities of various stakeholders (NFP, 2000).

The changes in policy have also included institutional change. Traditionally, forestry institutions have concentrated on government forestry departments and agencies. Since many parties external to forestry department have significant influence on the sector, institutional change has to be examined from a broader perspective although Forestry Department remains the institution with vested interest in drawing attention to the needs and potentials of the sector.

As a result of the change in Forest Policy, the focus of Forest Department has also changed. For example, planning has taken a prominent role in the preparation of NFP. In this process, orientation has shifted from being prescriptive to being more consultative. With the Local Government decentralisation policy, government role will be:

- to establish conditions conducive to forestry development through appropriate policies, laws and regulations,
- anticipate, identify and prioritise goals and,
- to promote their achievement and provide or develop support services such as forest training and forest research.

There are two key institutional changes that are underway as the result of the change in forest policy namely industrial plantations management and community management of forest and tree resources.

9.1 Industrial Plantation management

Industrial plantations has been dominated by government for decades. It is now accepted that economic activities in plantations can run more effectively if done by the private sector and that removal of government interventions can release the sector to be driven by profits. The commercial sector however is not oriented to non-commercial goods and services. There is therefore room for partnership with the private sector concentrating on production of marketed forest products while government concentrates on socially and environmentally oriented outputs.

Forest Department is currently consulting the private sector in order to encourage private sector participation in managing forest plantations. Plans are also underway to compile the necessary data on the status of the plantation and their potential.

9.2 Community management of forest and tree resources

There are two key meetings that are associated with the change in institutional approach to managing forest (FAO, 2000). These are World Forestry Congress of 1978 held in Indonesia under the theme “Forests for People” and the FAO World Conference on Agrarian Reform and Rural Development in 1979 adopted the “peasants charter”. The central perception in these new approaches is that people work better if they have a stake in the outcome and when they are involved in setting the agendas for their own lives. The two events ushered in the age of people’s participation in rural development.

The new forest policy incorporates these concepts and the forest extension services is undergoing changes to adopt people centred approaches and initiatives. Over 4000 out of 25,000 villages now have Village Natural Resource Management Committees have been established to oversee forest management in their areas. The establishment of VNRMC trend is on the increase.

A general concern in Forest Department is inadequate financing for carrying out Forest Department mandate effectively, inadequate implementation of policies and regulations, inappropriate institutional structure to undertake the new roles and responsibilities and lack of experience in operating under the new institutional arrangement. These deficiencies need to be addressed if Forestry Department is to play the new demanding role effectively.

Part III

The Forest outlook

10.0 Major driving forces and challenges for the future

The forestry sector will be shaped by a number of factors and developments in the coming years. Some of the key factors will include economic growth, population growth, land use change especially deforestation, changes in social dimensions and the evolution of policies within and outside forestry sector.

The coming years will also see increasing concern over degradation of the environment resulting from pollution, climate change and water degradation.

Critical to the future of forests is the rate of growth of agriculture sector together with settlements that are associated with it. With increasing population, low level of technology and a subsistence rural economy, forests will more likely be cleared to increase crop production.

The energy sector is closely related to forestry sector. Woodfuels provide 94 % of energy in the country and there are no viable alternatives in site. The increasing demand for woodfuel will affect the forestry sector.

It is important to recognise the potential role that technology could play and affect the forestry sector. Technological changes could improve wood processing efficiency and reduce waste, other forms of energy could become available thereby reduce pressure on wood fuels or new products could replace wood products.

The forestry sector will experience increasing influence from national, regional and international policies that are guiding forest development worldwide. Increasing globalisation, concern for climate change and interest in preserving biodiversity are the global themes that will play an important role in shaping forestry sector in Malawi.

By far, the two key determinants of the future of forestry appear to be the developments that will take place in agriculture and energy sector.

11.0 The outlook of forestry

This chapter provides an outlook of forests and trees in Malawi in the year 2020. It is recognised that there will always be uncertainties associated with the key factors that will affect supply and demand. For example, there is uncertainty about population growth rates, economic growth and technological development. The presented outlook is therefore an indicator of likely future trends. The outlook also provides a basis for dialogue on what choices to make now in order to achieve a desirable forestry outcome in the future.

11.1 Outlook for the demands placed on forests

11.1.1 Outlook for services of forests

There are two scenarios that will assist us look into the future of forests in the country. The first scenario would result if deforestation and forest degradation continued without collective measures. The result will be environmental hazards, erosion of biological biodiversity, deterioration of wildlife habitat and degradation of water quality and quantity.

The second possible scenario is more positive one marked by greater control of deforestation and forest degradation, with expanding forest area and planted trees outside forests. In this scenario, there would be greater regional and international cooperation and collaboration in the areas of shared water management, cross-border forest resources for global benefits such as biodiversity management and mitigation of climate change. Key factors that will determine the future of forests will include:

- Recognition and appreciation of commercial potential for non-timber goods and services and the dangers of ignoring environmental services. Creation of public and political awareness of social and environmental services will help ensure that forests are ascribed their true value.
- Development of effective valuation methods for pricing forest services in order to include benefits and costs of forest services in both policy decisions and investment analysis. Effectively capturing of the value of forest services in order to demonstrate their usefulness is a key challenge.
- Balancing the provision of commercial benefits with social and environmental services.
- Mobilisation of investment in favour of forest-provided services. The challenge is to develop a sustainable market for forest service where the beneficiaries share the cost of sustaining the services through for example contributions or a form of tax.
- Mainstreaming of forests services in the forests management policy and action plans.

11.1.2 Outlook for Non-Timber Forest Products

NTFP are both socially and economically important for people living near natural forests. Over 20 NTFP have been identified in Malawi, the major ones being fuelwood, fruits and mushrooms (FRIM, 2000). Some of the NTFP are consumed by the communities and do not enter the market, which makes quantification difficult. NTFP constitute a very significant source of income for communities living in the neighbourhood of both plantation and natural forests.

The outlook of NTFP will be determined by several key developments some of which are:

- Increasing commercialisation of NTFP resulting in large-scale exploitation and developing markets, locally, nationally and internationally.
- A shift from local consumption of NTFP to marketing of NTFP as key alternative source of income.
- Mainstreaming of NTFP in sustainable forests management planning.
- Research in the sustainable management of NTFP and development of appropriate strategies for implementation.

11.1.3 Outlook for timber plantation forests wood-based products

The wood processing industry consumes sawlogs and peeler logs. At present, there is sustainable wood supply for the next two decades at the present level of consumption. The present consumption rate is using up only 33% of the sustainable supply. The potential for more wood can be archived by restocking the current plantations and implementing effective forest management. The potential for external market is however clouded by the dominance of the South African forests industry in the region.

The quality of wood has been affected by management problems related to inadequate operational funds.

The forecaste for peeler logs is rather uncertain because there hasnot been any significant planting over the last decade. Since the plantation rotation is 25 to 30 years, there will be no peer logs in year 2000. If planting resumed today, peer logs could be ready for harvesting no earlier than 2025. There will therefore be need for restructuring the wood industry to adapt to low diameter tree and to panel products like particle boards or chipboards in place of plywood. Alternatively, with the liberalisation of trade and the SADC Trade Protocol, such products will more likely be imported from South Africa.

For long-term local supply of sawlogs, there is need to resume planting in timber plantation now and maintain the momentum annually. Alongside replanting, there is need to identify sustainable source of finances to manage forest plantations.

11.2 Outlook for forest resources and land use

11.2.1 Outlook for the area of natural resources

Area of natural forests over the years has remained unchanged, with the exception of forest reserves that have continued to grow in number. Over the years there has been no significant change caused by pressure for crop production and settlements.

There is indication that pressure for land will increase over the next two decades due to increasing population. This pressure will originate from people living in the neighbourhood of forests.

The future of forest lands will be determined by the ability of planners to provide adequate benefits from forests than they can get from clearing forests for crop production. Collaborative forest management is being used to promote communities to participate in sustainable forest management by sharing costs and benefits. This approach has promising prospects for meeting both local needs and global interests of biodiversity conservation and mitigation of climate change. There is also potential for communities to make income from collaborative ecotourism whereby tour operators and local communities work out mechanisms for sharing responsibilities and benefits.

Maintaining the balance between local demands and national or global interest will be the major challenge in the next two decades. Any policy decision made on the management of these resources must mainstream local community needs.

There are also some natural forests on customary land and on leasehold estates. Forests on customary land have been subjected to uncontrolled mining for sale as firewood or for opening

up of agriculture fields mainly to grow tobacco. Introduction of local institutions to manage forest resources is happening but the impact is not yet adequate to control destruction of forests. The capacity of local institutions needs to be built up quickly if customary land is to be saved.

On estate land, forests have been mostly preserved because the estates are getting trees from customary land for tobacco curing. Some have also grown their own trees although very few are self-sufficient in woodfuel. The challenge is provide incentives for estates to manage forests in such a way that it becomes a significant source of income. There is room for innovative partnerships with neighbouring communities whereby there will be sharing of costs and benefits.

With the tobacco industry threatened by anti-smoking lobby and falling tobacco prices, there is potential for the large estate area being turned into forest if there is adequate market potential for wood. In this connection government needs to review wood pricing policy. There is also need for aggressive extension targeting estate owners. For effectiveness, this must be preceded by consultative meetings between Forestry Department and estate owners to identify areas of cooperation and partnership that will make a positive impact and promote better management of forests on estates.

Wood prices set by Government have been administratively determined rather than set by supply and demand. The wood prices from the main wood producer underestimate the value of wood and therefore fail to reflect increasing scarcity of wood products. Low wood prices actually promote over-exploitation, inefficiency in wood processing and does not encourage tree planting and forests management by the public or private sector.

Rather than set wood prices, there is need to let supply and demand dictate wood prices. Regulation maybe necessary to curb excessive pricing tendencies often characteristic of monopolistic markets.

11.2.2 Outlook for the plantation area

There has not been significant expansion of plantation forests for both industrial and fuelwood and poles plantations. In the case of poles and fuelwood plantations, they have actually reduced in area, especially the plantations that were handed over to local councils to manage.

There is no indication that plantation forestry will increase in area in the medium term. For timber plantation, the current wood is under-utilised and poorly managed. In the medium term, the prudent course of action is to bring the existing plantation under proper management and develop a market for wood products.

For poles and fuelwood plantation of significant area, there will be problems to get land that is not being earmarked for crop production. With current wood prices set low by government, no investor would be attracted to invest in forestry.

Although the demand for wood fuel is high and increasing, wood is likely to come from farms and existing plantations. The key factor in increasing plantation is a conducive pricing policy that reflects the true cost of wood fuel. With wood fuel as the major source of energy now and in the next two decades, government must stop subsidising wood prices and let market forces set the right price for wood.

11.1.3 Outlook for trees outside forests

There have always been trees outside forests around homesteads and in farms supplying multiple products and good. With increasing agroforestry practices using tree species as a means of improving soil fertility, there will be increase in number of trees on the farm.

Annually Forestry Department through the extension services and National Tree Planting Week campaign are promoting tree planting and tree management for multiple purposes. Tree survival assessments show that up to 60% of the planted trees are surviving the first 2 years, which is the critical period for planted trees (Chirambo, 1999). Over 40 million tree seedlings are being planted every year.

The key factors that will drive the planting of more trees on farm are a conducive pricing policy and increasing pressure for woodfuel.

12. Implications of the forest outlook and choices

The Forestry sector has a tremendous potential to contribute to Malawi economy in many ways. Forestry Industry can become a major contributor to economic development through foreign trade and employment creation. Policies aimed at addressing social needs can help provide basic needs of rural communities and policies aimed at environmental services can reap ecological benefits. Achieving a balance among economic, social and environmental objectives is a complex process. Advancing the three objectives simultaneously requires calls for greater skill, technology, improved management approaches and institutional reform (FAO, 2000).

The dilemma facing the forestry sector is that while government is calling for forest conservation, the majority of the people are demanding more forest exploitation. There are also parties interested more in ecological goals alongside poor people who exploit forest for survival. The challenge for policy markers is to balance these opposing views and perspectives.

Policy choices now will influence the availability of goods and services in the future. Some policies lie within the forestry sector. Other policy choices however lie outside forestry sector although they have significant impact of forestry sector. There are still other policies that require joint decision making with related sectors. The implication of this is that there is need for greater co-ordination, consultation and collaboration with relevant sectors and various stakeholders.

In order to promote sustainable supply of forest goods and services in the future, the agenda for policy will have to include the following:

- Policy makers will need to review the effectiveness and practicality of policies affecting supply and demand of forest goods and services, forest resources pricing, access to forest goods and services and the contribution of forestry to the local and national development.
- Scientists and technologist need to develop affordable ways of process products from trees outside forests, increase efficiency of raw material conversion into finished products, and identify effective incentives to promote forest development towards sustainable development.

- Market specialists should work towards influencing consumption patterns towards products from diverse sources and small dimension trees from trees outside forests.
- Forestry planners to develop effective information systems to capture relevant data in support of informed decision-making and modelling.

Major options for promoting sustainable supply of forests goods and services in the future are:

- **Increasing plantation forest production:** There is potential for increasing forest production by either establishing more plantation or improving forest management in present plantation. The major problem forest plantation has been forest fire which have destroyed about 30 % of the plantation forest and inadequate resources for carrying out forest operations. In short term, the priority is to bring into proper management the existing forest plantations before new areas are put to more plantations.
- **Improve efficiency in forest harvesting and wood processing:** Significant gains can be made by improving harvesting and processing efficiency. This would increase the output out of the same raw materials. This would improve the profit margins and at the same time have environmental benefits if efficient use of raw materials leads to reduced harvesting. Current conversion rate is about 50 %. The main reason for lower conversion efficiency is related to technology that is geared to use large-diameter logs. Technology that can process small-diameter logs will have a dual benefit of increasing conversion rates and also widening the raw material base to include trees outside forests.
- **Encourage structural change in wood-processing industry:** The wood industry is presently geared towards production of sawn timber and plywood, which is heavily dependent on large-diameter logs. Large-diameter logs are declining and the industry will have to switch to substitute panel product that donot require large-diameter logs such as particleboard. This change is inevitable because the cheap large diameter trees will no longer be available while at the same time, there will be smaller diameter trees available both in forests plantation and outside forests. The dimension of trees outside forests create an opportunity for partnerships between local communities and private sector, a partnership that has the potential of enhancing income of local communities and also at the same promoting tree growing and making it financially viable, which is a powerful self-sustaining incentive for growing trees.
- **Increase the area of natural forest in protected areas:** There are potential areas that could be brought under forest management in the country. Although there is growing pressure for agricultural production, there are area which are environmentally fragile and areas that are not suitable for crop production that could be brought under forest management. Those areas unsuitable for crop production are often suitable for animal husbandry, with the forest environment providing necessary food for the animals. At present, there are about 100,000 hectares (Mgawamadzi, 2000) of areas already identified as potential for forest reserves. Over the years, there has been little progress towards bringing these areas under forest protection. One of the key factors has been financing of the process of bring an area under forest management. The process of consultation with local leaders, surveying and mapping of the area and demarcation of the boundary is long and costly. Creation of new natural forest areas should proceed with speed because with passage of time, consent from local leaders will became more difficult to obtain as pressure for land for crop production increases.

- Increase the potential for supplying forest products from non-forest areas: The current trend is the devolution of forest management responsibilities away from central government to local communities and private individuals. This has been done through forestry policy review and local government policy review. The benefits include availability of the resource close to the rural people and the potential for better management of resources knowing that they benefits will accrue to them. This will also diversify the sources of forest and tree resources and in turn might stimulate the development of small-scale rural enterprises and independent livelihoods. Government can promote this process through pricing policy that makes tree growing worthwhile, by restructuring forestry services, by developing conducive policies.

12.1 Implications of choices for the regional co-operation

The changes that will take place in Malawi have implications on collaborative choices and cooperation at regional level. National policies will be influenced by regional and global factors. Malawi being the coordinator of forestry sector, there will be need for Malawi not only take into account international opinion in forestry policy formulation but also to provide leadership in the SADC region.

The following areas will therefore require particular attention on international, regional and sub-regional level.

12.1.1 Developing and refining trade regimes

Trade will play a crucial role in boosting national economies for many SADC member states and also in alleviating environmental and social pressures. With calls for liberalisation, international forest products certification, establishment of common markets and trade protocols, SADC region will need to develop trade policies the seek to satisfy by the national aspirations without sacrificing the regional and international goals.

12.1.2 Sustainable forest management

Countries are already involved in the process of establishing mutually acceptable criteria and indicators for sustainable forest management. For countries with similar forest types, for example miombo woodlands, there is great scope for collaboration and information sharing under the SADC umbrella. Looking into issues of forest protection under high population density might provide valuable insights.

12.1.3 Watershed management

There are rivers within the SADC region that cross borders. Effective management of such rivers and their watershed might require joint action by concerned nations to ensure that policies are put in place in such a way that down stream countries can obtain water without unrealistic burdens on the upstream countries. A mechanism may be necessary to ensure that there is dialogue on policies, responsibility and benefit sharing.

12.1.4 Information sharing

Globalisation calls for market information and cooperation among regional countries in order to attract development aid or investment. Cooperation in the process of improving forestry and related sectors information is vital for the development of the region. Establishing effective information sharing mechanisms will remain an important part of policy agenda. The developments in Information Technology will greatly facilitate this process. The challenge however is for the member states to continuously collect, analyse and share information.

12.1.5 Education and training

It is not possible for one country to provide specialised training in every area, considering the diversity of specialisation in forestry sector. Establishment of centres of excellence within the region will provide an opportunity for cost effective allocation of training resources, promote information sharing and improve specialisation and networking.

At the moment there are several such centres already such as Forest Industry College in Zimbabwe, which is responsible for forest industrial training, Botswana College of Agriculture that has the responsibility of promoting extension training and University of Zimbabwe that is responsible for curriculum development.

12.1.6 Research

Considerable progress can be achieved in the region through collaboration in transfer of research and technology. There are a number of institutions within the region and beyond the region involved in forest research. Collaboration remains rather weak. Particular promising areas of research are in the area of technologies for assessing trees outside forests, urban forestry, management of selected species of importance, technologies for mainstreaming wood fuel as a commercial fuel, domestication and management of high potential NTFP.

13.0 Conclusion

There has been a net decline in forest lands over the last two decades especially on customary land. This trend is continuing at the rate of 1.6 % per year. The main causes of deforestation and forest degradation are uncontrolled tree felling for fuelwood for curing tobacco in the smallholder and estate sectors, opening up of new gardens and farming areas, firewood for commercial purposes, infrastructure development and shifting cultivation. Protected forests have overall been effective in conserving biodiversity, but there is growing pressure for cropland and wood fuel.

Demands on forest and tree resources are increasing in intensity and diversity over time as population increase and some portion of the population become affluent. Some of the main demands from forests and tree resources are forest services, non-timber forest products, wood energy, industrial forest products.

Malawi's forests and provide about 94 percent of the country's energy requirement for industrial and domestic uses. Currently there is a deficit of 10.8million m² and increasing. With wood fuels providing 94 % of energy in the country and no viable alternatives in site, the ever-

increasing demand for wood fuel will have a very profound effect on forestry sector. The impact may not necessarily be negative. The increasing demand for wood fuel could spur tree growing activities in the rural areas for sale, especially if the pricing policy was conducive to tree planting.

The forestry sector will experience increasing influence from national, regional and international policies that are guiding forest development worldwide. Increasing globalisation, concern for climate change and interest in preserving biodiversity are the global themes that will play an important role in shaping forestry sector in Malawi. Nationally, the key influences will include economic growth, population growth, land use change especially deforestation, changes in social dimensions and the evolution of policies within and outside forestry sector.

By far, the two key determinants of the future of forestry appear to be the developments that will take place in agriculture and energy sector.

The forest outlook for Malawi in the next decade has great potential to meet the social, economical and environmental needs of the country and the international community. The future of forest lands will be determined by the ability of planners to provide more benefits from forests than from clearing forests for crop production. Collaborative forest management has promising prospects for meeting both local needs and global interests of biodiversity conservation and mitigation of climate change.

The major role that technology could play and affect the forestry sector should be kept in mind. Technological changes could improve wood processing efficiency and reduce waste, other forms of energy could become available thereby reduce pressure on wood fuels, new products could replace wood products and there could be more innovative and efficient ways of producing food thereby releasing some land for other uses rather than crop production.

Maintaining the balance between local needs and international expectations, between development and environmental conservation will be the major challenge in the next two decades. Any policy decision made on the management of these resources will have mainstream stakeholders ever growing needs.