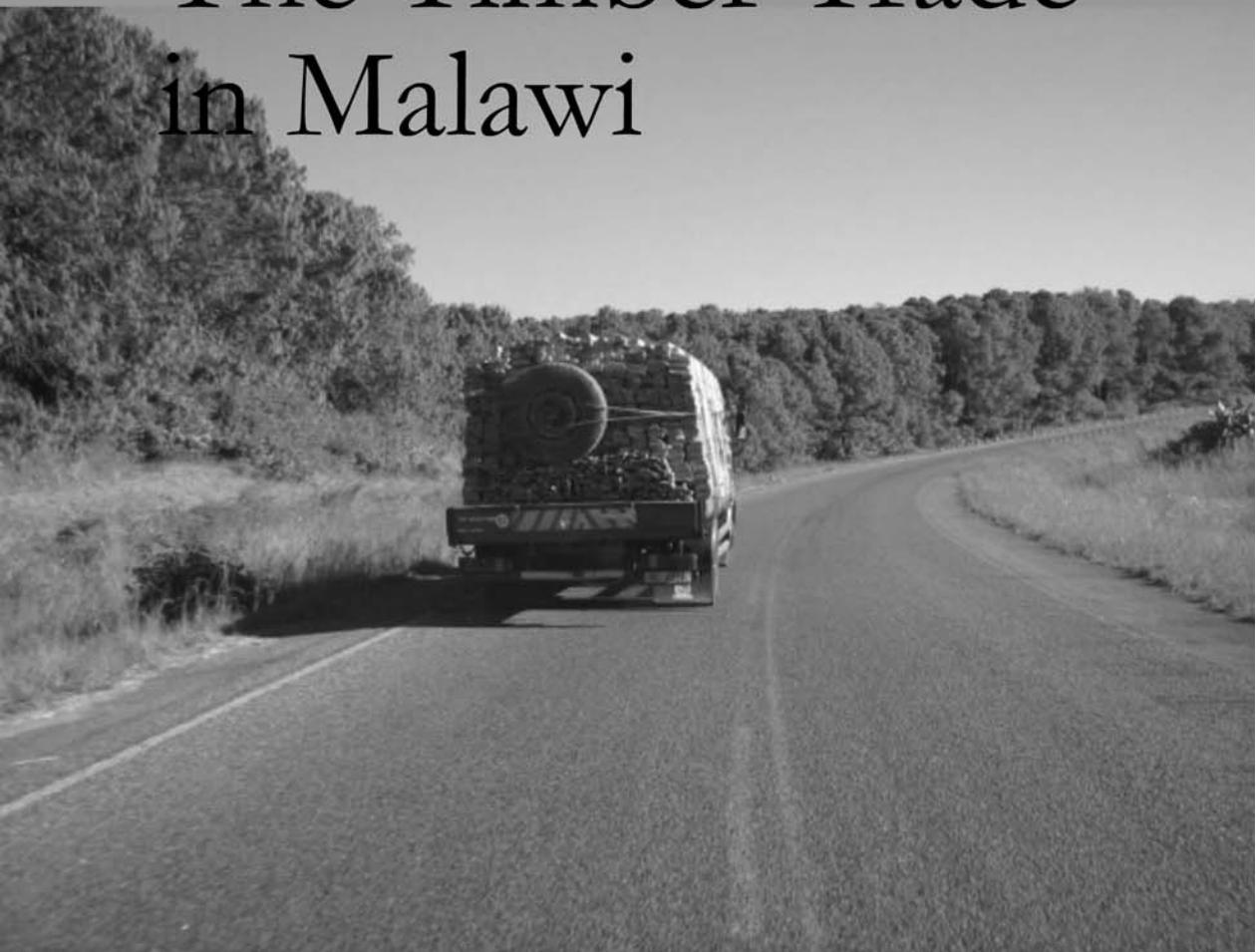


The Timber Trade in Malawi



Joel Luhanga

Southern Africa
Resource Watch



Resource Insight
Issue 7 May 2009

Resource Insight is published by the Southern Africa Resource Watch. Southern Africa Resource Watch (SARW) is a project of the Open Society Initiative for Southern Africa (OSISA).

ISSN: 1994-5604
Key title: Resource Insight

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Production: DS Print Media

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Introduction

The Forestry Department in Malawi, which is responsible for all forestry matters, was established in 1942. There are two turning points in Malawi's history, which have had a significant influence on the forestry sector. The first is 1964, when Malawi gained its independence from British colonial rule and was subsequently ruled under a single political party system. In terms of forestry, this is the year in which the government of Malawi started to invest heavily in the establishment of industrial forest plantations in all three regions of the country. The second significant year is 1994, when the second republic was established. With it, multi-party politics and many other government reforms, including decentralisation and privatisation were introduced. Both the politics and reforms have had fundamental effects on how forests and the timber trade are managed in Malawi

All the government plantations have been developed inside forest reserves and, like other forest types, plantations fulfil the important role of stabilising the environment, apart from supplying wood products. Sometimes these plantations are harmful to biodiversity and consume a great deal of water, thus impacting negatively on other ecosystems. Many of these plantations are now mature or over mature. In total, the government owns 73,000 hectares of timber plantations. About 68,000 hectares of these plantations are planted with pine trees, with a few pockets of cypress and cedar tree species. The remaining plantation areas are under eucalyptus (blue gum) aimed at providing fuel wood and poles. Plantations are a major source of energy for both domestic and industrial needs. Nearly 30% of wood-based energy in Malawi comes from plantations. The largest single unit is the 53 000 hectare Viphya Plantation that was planned to supply a kraft and pulp mill soon after independence in 1964.

Forest Policy

The National Forestry Policy of 1996 provides a framework for the conservation, management, protection and utilisation of forest resources in the country. The goal of the policy is to sustain the contribution of forest resources for the upliftment of the quality of life of people in the country.

The general objectives of the National Forestry Policy aim at:-

- allowing all citizens to have regulated and monitored access to some forest products;
- contributing towards improving the quality of life of the rural communities and providing a stable local economy, in order to reduce the degenerative impact on the environment that often accompanies poverty; and
- establishing appropriate incentives that will promote community based conservation and a sustainable utilization of the forest resources as a means of alleviating poverty, including farm trees and fostering the growing of trees by all sectors of the community in order to achieve self sufficiency in wood and forest derived products.

To implement this policy, a National Forestry Programme (NFP) was formulated and launched in 2001. The programme specifies strategies and priority actions to be pursued by government, the private sector, local communities, civil society as well as individuals in order to realise the forestry policy goal of ensuring wood self-sufficiency for all Malawians. It was developed through a wide consultative process with various stakeholders. The NFP also created a generally acceptable basis for interaction with international donors most of whom consider it as a starting point for their support of forestry sector development in the country. The programme further provides for the focussed implementation of activities related to the protection, management, utilisation and marketing of industrial forest plantations, upon which this paper dwells.

Policy affecting timber trade

In so far as the wood trade is concerned, the Malawi government pursued public sector reforms between 1994 and 1995. One of the objectives of the reform process was to reduce the role of government in the domestic market economy and inculcate fiscal discipline in public sector spending. In 1995 government carried out a strategic review of the ministry responsible for forestry matters. It decided that increased production of wood for industrial use was not its strategic objective. Instead it deemed that this role could best be performed by the private sector. The analysis showed that government would have saved up to MK27.4 million, using the 1996 salary and wage scale, had the Department of Forestry privatised the industrial plantations. The strategic review recommended that efforts be made to privatise all industrial forest plantations, but that the land be leased to private investors rather than sold outright, reflecting its socio-economic importance to the nation. It was further planned that the ministry responsible for forestry, now the Ministry of Energy and Mines, should be responsible for issuing contracts, enforcing the requirements of agreed management plans and monitoring the operations of the private sector. The ministry was to retain the right to revoke a lease if management guidelines were not followed. In spite of such detailed planning the recommendations have not been fully followed as exemplified below.

Although the private sector is encouraged to add value to timber and non-timber products and to manage plantations through contracts and lease agreements, the capacity to draw management plans for use by the private sector is rather limited due to the lack of expertise. Besides, the capacity to monitor felling, extraction and other forest operations is also relegated to poorly paid frontline staff, who are prone to being corrupted. These shortfalls have resulted in a rather chaotic allocation of felling plots to private saw millers, thus undermining forestry management principles. Debris from logging and sawing operations is left strewn all over, making access for

the purpose of tree planting extremely hazardous. In fact, instead of tree planting occurring in the same year as felling, it is postponed for several years, by which time the weeds are overgrown and profuse.

It appears that the current rapid felling rate has largely been dictated by market forces. Unfortunately these market forces appear to be exogenous to Malawi and the benefits of this practice appear to accrue more to foreigners than to indigenous Malawians. The Malawi Poverty Reduction Strategy Paper (2002) includes forestry development in the pro-poor growth sector that aims at economic growth for sustainable poverty reduction. The current buzzword in the forestry sector is “sustainable livelihoods”. However, when the indigenous/local people do not see any direct benefits, they conjecture all sorts of ways to express their frustration. One way in which this has been manifested is through the setting of forests fires and through illegal harvesting of trees. Fires reduce the value of wood as many stands have to be cut down before they are really mature.

The National Forest Policy (1996) and Forestry Act (1997), Part VI, Sections 35 to 36 provide for afforestation by non-governmental organisations and the communities in forest reserves, public land, customary land and private land according to a Forest Plantation Agreement. The Forest Policy also suggests separating commercially productive industrial plantations from Forestry Department protection and extension functions. It also recommends the subsequent setting up of a Treasury Fund for Industrial Plantations with a view to the privatisation of these industrial plantations. Although these policy guidelines are in place, Malawi lacks the impetus to implement its policies. To date there has been no attempt to involve non-governmental organisations in the planting of forest reserves. Foresters in the field always complain about the lack of funds to replant in areas, which have been over-cut yet there are NGOs with funds that can be sourced in order to replant the many hectares now overgrown with weeds. Communities are also a useful resource but they are only involved in co-management activities that revolve around bee-keeping, grazing, mushroom collection and harvesting grass in return for reporting malpractices. If communities contiguous to forest reserves were to really play a role, they would participate in tree planting, weeding and screening firebreaks. However these activities are not being carried out with the involvement of local communities, to the detriment of forest plantations.

Privatisation of government-owned industrial plantations

With the advent of multi-party politics and democratisation processes, government has decided to scale down investments in plantation forestry in order to introduce decentralisation and privatisation. The policy developments discussed earlier have resulted in an inadequate allocation of government funding to the Department of Forestry, especially for field operations. The wage bill alone takes up more than 80% of the budget. This has had a negative impact on the management and protection of timber plantations. The standard silvicultural operations necessary to produce prime timber have suffered as a consequence of scaling down on casual or seasonal labour to maintain the plantations. Arson has become rampant for many reasons, including the non-payment of terminal dues in 1995 when the labour force was drastically reduced, denying the Forestry Department its optimal labour force to maintain the forest estate. Before the retrenchment exercise, timber plantations employed over 6,000 local people. Currently, there are as few as 600 labourers to maintain the government forest estate.

Industrial plantations are labour intensive and hence they have significant potential to generate direct employment for many people. Private sawmills employ large numbers of people and create downstream cottage industries, which offer employment to small-scale entrepreneurs. There are more mobile sawmillers than fixed-plant millers in Malawi. Many of these are located in the Viphya plantations. As a consequence of the reduced labour force, it has become almost impossible to police what is happening in the large plantations. Any malpractices by the mobile sawmillers are left unchecked. The combination of poor pricing and malpractices in the field has made the Department of Forestry unable to make the mature plantations pay for themselves, or even to recover the cost of investment in order to plough this back into silvicultural operations.

For example, the cost of managing the whole forest estate in 1994/95 was about MK10 million (approximately SAR20), but revenues only amounted to MK4.4 million. The cost-benefit ratio has not changed over the years. Government collects approximately 50% of its plantation costs in revenues. Thus, forests have been heavily utilised to the extent of their depletion, especially in the central and southern parts of Malawi. The only significant plantations left in Malawi are the Viphyia plantations.

Following the government's failure to invest in the timber industry and the subsequent failure to put policy into practice, the government instituted a study that presented strategies for *Ownership and Management Options for Industrial Plantations* in 1995. These were not adopted because the advantages and disadvantages of the five options were not elucidated. A further study was conducted on privatising the management of its forests, the mechanisation of the forest industry, and improving pricing of timber products to economic levels. Logging concessions became the immediate feasible option.

In the early nineties the Department of Forestry entered into a number of logging concession agreements with various wood companies and timber processors, notably, the VIPLY Logging Concession Agreement of 1990 and the RAIPLY Logging Concession Agreement of 1999. There were also short-term co-management agreements with private companies such as the Wood Industries Company, Leopard Match Company and some mobile saw millers. Although these agreements have not been officially evaluated, there has been a lot of discontent by both forestry field workers and local communities who feel left out by the decision-making processes. The private companies appear to have inherited the resource and are owed wood by the Forestry Department when their maintenance costs are taken into account. A Strategy Paper (2003), *Options for the Privatisation of Malawi's Industrial Timber Plantations* was prepared and included a comprehensive analysis of the range of other options for private sector involvement in the management of state owned industrial forest plantations. The options that were considered include:

- public supply and operations (basically retaining the status quo)
- corporatisation and commercialisation (creating a parastatal to manage state forest plantations)
- management contracts and outsourcing

- concessions
- divestiture by sale of assets (full privatisation of plantations and land)

It was decided that ‘concessions’ were the best option for they allow government to define the rights and obligations of the private sector partner. This allows the concession to be tailored to the specific requirements of individual forests and local social needs, such as management of enclosed natural forests, watershed management, soil conservation, and access rights for people living around timber plantations. Concessions appear to have worked well in South Africa and elsewhere and are a relatively soft option for transferring opportunity and risk to the private sector. A phased approach was decided, with the first step being the adoption of an open market approach to transferring ownership of major timber plantations such as the Viphya, Dedza, Chongoni and Zomba Plantations. It is believed that experience gained from the initial phase would guide subsequent strategies for changing the ownership of the smaller plantations elsewhere in the country.

The approach taken by government appears to be a desperate move to give up industrial plantation management, as if the initial objective was merely timber production. Other reasons for plantation forestry include amenity, protection of fragile areas (mountain slopes) and watershed management. Abrogating management of plantations for this purpose to the private sector, whose main objective is profit maximization, is a major concern to local people who live around these areas. Some of them have predicted that fires will not cease as long as the plantations remain in the hands of the private sector. It should be noted that the timber estates were once customary land, which the very same people were requested to hand over to government and on which they participated in planting trees for government. The Forestry Department has a role to play in safeguarding the needs of the communities, albeit that these needs are met through downstream effects of upland forest management. Sustained flow of clean water is amongst the positive externalities that occur because of good forestry husbandry in the uplands, where most of the plantations are located. However, it can also be argued that alien timber consumes a great deal of water, leaving less for users further down the catchment. What we are seeing as positive might not always be the case.

Forest resources in Malawi

The major sources of timber in Malawi are plantations, which are mainly located in forests in the uplands of the country. These were established over a long period of time when it became apparent that the indigenous forest resources would not sustain the local and export need for timber. Forest reserves are managed for the purposes of protecting water catchments, provision of wood and non-wood forest products (e.g., bamboo, mushrooms, fruit, fibre, thatchgrass), and promotion of eco-tourism. Maintenance of these protected areas secures major rivers, which support the activities of water boards, irrigation schemes and hydroelectric power generation.

The Department of Forestry in Malawi is responsible for the management and protection of 88 gazetted forest reserves with a total area of 9,185 square kilometres and 21 proposed forest reserves covering an estimated area of 1,377 square kilometres. Currently, all plantations are managed for the production of timber. Table 1 shows the extent of timber plantations by region.

The northern part of Malawi is the least developed in terms of infrastructure and road network. However, it is blessed with abundant indigenous forests and plantation resources. The largest of these plantations, the Viphya, were established in the 1950s. With the shortage of timber being experienced in neighbouring countries, there is currently a very lucrative export trade in timber from this plantation.

The Viphya plantations have an estimated average mean annual increment (MAI) of 17 cubic metres per hectare. Apart from supplying timber, the plantations protect watersheds, act as a habitat for wildlife, and are a recreation area for tourists.

Table 1 Area of timber plantations in Malawi (hectares)

REGION OF MALAWI	PINE	EUCALYPTUS	OTHER SPECIES	TOTAL AREA PLANTED
NORTH	50,074	2,495	956	53,525
CENTRE	12,757	733	151	13,641
SOUTH	5,421	438	466	6,325
TOTAL	68,252	3,666	1,573	73,491

Source: Government of Malawi, Forestry Department

However, after independence the objective changed to pulp production. This resulted in an increase in planting between 1965 and 1969, and again between 1975 and 1979. The dominant timber species are *Pinus patula* and *Pinus kesiya*. The primary objective was to create a pulpwood resource that was to supply a bleached kraft mill that was to be located on the shores of Lake Malawi. There are also quite a few compartments that were planted with Eucalyptus. Management aims at normalising the plantations but, as pointed out earlier, replanting is not being carried out at the same pace as felling.

It does not take a forester to realize that the felling, conversion and selling of timber that is taking place along the M1 road in the Viphya plantations falls short of satisfying the requirements of good forestry husbandry. Stumps are cut way too high and debris is left strewn all over the place without regard for fires. The informal marketing transactions that are observed along the road benefit a few politicians and foreigners. Clearfelled areas are overgrown with weeds instead of a new tree crop. The Question is why are foresters not enforcing correct procedures.

Forest produce marketing

Forests provide goods, such as timber, firewood, medicines, and fruits, which are sold in markets. Forests in Malawi could also provide services such as ecotourism to generate substantial revenues for the country. Yet little has been done to encourage ecotourism, since the government favours the marketing of forest produce. A few people are able to appreciate the scenic beauty of the forests and the ambience they offer. The majority of people, however, see timber as the sole product in forests. It is no wonder that there is an apparent plunder of the Viphya plantations for timber.

In the 1960s, Malawi was eager to enter the world market as a pulp supplier. The prospects for markets were high and the price good. This is why a vigorous plantation programme for Pine softwoods was initiated with financial assistance from the British government. This never happened. In 1981, it was clear that following the rise in the world price of oil, the disruption of rail links to the Indian Ocean ports (by insurgents in Mozambique) and a glut of pulp on the world market, it was unlikely that construction of a large-scale pulp mill would be feasible for some years. Many studies that were carried out concluded that investment in a pulp mill was neither economically feasible nor environmentally sound. Some of the reasons advanced were that Malawi is landlocked and therefore could not sustain supply, especially at a time when land or lake transport costs had increased due to oil price hikes in the mid-1970s. Charcoal production for households and industries was tried in the 1980s but the low-density pines yielded more charcoal dust than coal pieces. The project was abandoned because the market did not respond positively to the product. Government then sought alternative products and considered the production of plywood, block board and sawn timber for both local consumption and export by Malawi-based industries.

Management of plantations for pulp is totally different from management for timber. On the one hand, to get a long fibre that is good for paper production, trees

destined for pulp are planted at shorter planting distances than trees intended for timber. A plantation for pulp production appears as if it is unmanaged (See plates below by J. Luhanga). Trees for pulp production need not be pruned as all branches and trunk are all fed into the pulp mill. On the other hand, trees for timber production are managed, pruned to reduce dead knots and thinned to improve size of logs.



Managed stand



Unmanaged plantation



Clearfelled and planted patch



Clearfelled patch – unplanted

In a recent interview with the Planning Officer for Viphya Plantations, Mr Nyondo, it was learnt that because of the lack of viable alternatives for plantation wood, in the form of pulp to supply a paper mill, the wood is now being sold for timber and firewood production at the rate of 500 hectares per year. The “waste” wood, whips, dead and dying trees are scavenged by local firewood vendors and ferried on trucks or bicycles in billet form to the urban centres.

The major timber producers in Malawi are the portable saw millers and fixed band-saw or circular-saw saw millers. Pine forms a major part of timber production in Malawi. The rest of tree species are consumed through firewood, transmission and

building poles. Annual wood consumption for timber and transmission poles is estimated at 1.5 million m³. Local consumption accounts for about 50% of this production. The rest is exported through informal channels, as the regulatory system both at source and at border posts is weak. Thus, it is almost impossible to get correct timber export quantities and the monetary gains from this trade. The export trade for timber in the northern part of Malawi has been heavily infiltrated by enterprising refugees from Somalia and traders from Tanzania.

The wood produced is ungraded when sold. It is almost always air-dried. There are few kiln-drying installations in the country. Raiply Industries located within Viphya plantations has had the monopoly of export kiln-dried timber, mainly to South Africa and Botswana. A local Malawian has just installed a kiln-drying plant in the city of Mzuzu, which is close to Viphya plantations. Exporters are able to load more kiln-dried timber on trucks than air-dried timber, because of the comparatively less relative humidity.

Except in the 20 000 hectares under concession agreement between the government Department of Forestry and Raiply, clear-cut areas are not being planted at



Air-seasoning of timber by the roadside



Mzuzu firewood vendor

the same rate as they are felled. Back-of-the-envelope calculations indicate that if other conditions are not changing, at the current rate of felling, the plantation will last at most for 10 years. It is very unlikely that current production trends will be reduced. Some concerned citizens of Mzuzu have objected to the plunder of Viphya by foreign competitors, but officials appear unable to deal with the situation or are simply turning a blind eye. Evidence shows that Malawi's timber is the cheapest in the region at MK800 (about US\$5) per cubic metre. According to plantation manager Mr John Ngalande, production costs per cubic metre are close to US\$20 but stumpage is only US\$5 per cubic metre. It should not come as a surprise that the plantation has been flooded with foreign buyers and sawyers who come from countries where stumpage costs are exorbitant. Nowhere in the world is plantation wood this cheap! Since foreigners have more money than the average Malawian, they are able to buy almost all the timber that is produced by portable sawmillers, even before it is treated or kiln-dried. Timber is exported in this form to neighbouring countries such as South Africa, Mozambique, Tanzania, and Kenya. In these countries the wood is further treated in order to add value and is re-exported at more lucrative prices to Iran, England, Italy and China. Competition by foreign traders has resulted in an escalation in the market price of timber locally.

Efforts by the Department of Forestry to raise the stumpage price to break-even levels have met with stiff resistance from authorities. It is believed that many politicians and policy makers are also part of the timber trade. The concern is, how much longer will the Viphya plantation last against this background of challenges?

Local demand

It is estimated that fuelwood consumption per capita in Malawi is 1m³. At current population levels it is estimated that 12 million cubic metres of wood is consumed annually. Plantations are increasingly becoming a major contributor to the demand for fuelwood and poles, surpassing what is produced in forests based on customary land. The Department of Forestry does not offer labour for harvesting. It is the buyer who bears all costs. This leeway of allowing buyers to cut trees themselves has led to abuse in harvesting. In areas where there are no long-term concession agreements, it has been observed that buyers cut much more than the amount of wood purchased. Furthermore, it has been observed that the foreign wood exporters have

unscrupulously obtained felling licenses. They are cutting wood without paying regard to sustaining the resource.

Considering that much of the forest reached maturity only 5 – 10 years ago, the forest is now decaying. Coupled with excess harvesting and, apparently, political interference in harvesting, the resource will last for less than 10 years before it is depleted.

Foreign demand

Raiply Industries alone gets orders from abroad in excess of 40 metric tonnes per month. However, it is not able to satisfy the demand. This is possibly the reason why foreign traders are taking advantage of Malawi's lax application of its laws in order to infiltrate the established harvest-licensing system. By engaging in harvesting, transporting and exporting, foreign traders have pushed locals out of the timber trade. This has not occurred without raising a few problems. Recently, the local politicians and wood vendors ganged up and declared an embargo on the issuing of harvesting licenses to foreign buyers. In spite of this, some Malawians still find ways, albeit corruptly, to assist foreign buyers in entering the local timber market.

Foreigners were chased out of the forest. Malawians who have inherited the machines have to pay a certain amount in timber to the foreigners. This is shrouded in secrecy.

Major Challenges to Forestry in Malawi

The major challenge facing forest management in relation to these plantations is the low annual budgetary resources that can facilitate the effective control, management, protection and utilisation of these resources. The retrenchment of over half the labour force in 1995, the reduction of operational budgets, and higher incidences of forest fires and forest produce theft, both by staff and local communities, all constitute factors, which have significantly contributed to forest degradation. Some of the challenges are discussed as follows;

Budget Ceilings

The annual budgetary allocation for operations has not been consistent with planned expenditure to the extent that only about 50% of the budget is approved and less than that is actually disbursed. Of the disbursed funds, almost 80% is for personal emoluments, leaving very little for operations.

Staff Turnover

The Department of Forestry has over the past three years been affected by a high rate of staff turnover, with some staff members opting for greener pastures outside the civil service. This problem is attributed largely to lack of training and resources to enable staff carry out their planned programmes. At the lower cadre levels, staff turnover is mainly attributed to low funding levels for forest operations.

Encroachment

High population growth, dependency on farming and extensive farming practices have led to a shortage of land in the communal areas. Excessive pressure is experienced in some of the major forest reserves due to farming encroachment and illegal exploitation of forest produce for timber and firewood. These practices are particularly serious in the densely populated districts and in forests close to urban areas.

The encroached areas in forests are usually on steep and fragile land that is all too often prone to landslides and flash flooding once disturbed. From aerial photographs, one can distinctly observe Malawi's boundary with its neighbours, the more open fields being on the Malawian side.

Illegal Charcoal Production

Charcoal production is a common and disturbing feature on customary land forests where unregulated production of charcoal is taking place on an unprecedented scale. While it is accepted that charcoal is a convenient form of energy for domestic use, when it is being produced from forest areas that cannot sustain the current production levels it creates a problem. The ultimate result includes degraded forest resources and a damaged environment. Alternative renewable sources are being explored but it is doubtful that they can replace charcoal, as the technologies are not affordable by the majority of users.



Roadside sales of charcoal

HIV/AIDS

The impact of HIV/AIDS in the forestry sector of Malawi cannot be underestimated. The forestry profession is basically male-dominated. Men are involved in felling trees, extraction, sawing and transportation to the roadside. Timber sawing using portable mills takes the men away from their wives for long periods of time. All this work involves heavy manual activity. The working men may indulge in sexual activities with commercial sex workers, which renders them vulnerable to sexually transmitted diseases, including HIV/AIDS. Fatalities arising from AIDS-related infections have reduced the number of skilled workers available for timber production.

Conclusion

Forestry makes a significant contribution to the socio-economy of Malawi. It has been estimated that forestry alone accounts for 2% of the Gross Domestic Product. Deforestation is a major concern. At 2.2% it is one of the highest in the SADC region. Timber and fuelwood plantations have largely been promoted and carried out by the government. There are very few plantations owned by the private sector although the demand for wood is high locally. The largest plantation in Malawi is the Viphya, which is owned by the government. Several options have been proposed for the utilization of this resource which extends to 50,000 hectares. About 20,000 hectares of this resource is under long-term concession with Riply. The concession agreement entails the granting of a felling license as well as full maintenance of the plantation by the concessionaire. The remaining areas are sold on a competitive bidding basis. In these areas, the buyer has no obligation to maintain the forest. It is in these areas that it is alleged that local Malawians have formed some alliances with foreign traders, mainly from Tanzania and Somalia, to unscrupulously obtain permits to defraud Malawi of export revenues. The current laws and regulations of the timber trade appear to be too weak to curb malpractice in the timber trade. This has caused some dissension between poor local traders and rich foreign traders. The low budgetary allocations by government to the Forestry Department has meant that there is little investment in forest management taking place in the plantations and, consequently, the rate of harvesting far exceeds that of replanting.

The result is a clear deterioration of Malawi's forest estate. Government should wake up to this reality and do something about its policies and practices in licensing timber production in its deteriorating plantations before it is too late. Government has a social responsibility to maintain forest estates for the many other functions that forests offer, including carbon sequestration, watershed management, ecotourism,

mushrooms, berries and wildlife. Forest managers bent on destroying such ecosystem stability should be dealt with severely.

Finally, maintaining forest estates should be the responsibility of all. There should be civic education to sensitize the private sector and contiguous communities on their roles to ensure that forests are maintained and utilized for the benefit of the country.

Annexes

Annex 1: People interviewed

Dr Dennis Kayambazinthu, Director of Forestry

Mr John Ngalande, Deputy Director of Forestry, Viphya Plantations Division

Mr Kenneth Nyasulu, (Former Director of Forestry)

Mr Nyondo, Planning Officer, Viphya Plantations

Mr William Mitembe, Planning Officer, Forestry Headquarters

Ms Tangu Tumeo, Marketing Officer, Riply Wood Industries

Mr D. Nyirenda (Select Sawmills)

Mr Potty (Mobile Sawmiller)

Mr Gift Cheluzgo (Mobile Sawmiller and wood exporter)

Annex 2: Production and marketing data

Production levels

Number of planks of size

2 x 6	=	50/day max 6 days/wk
2 x 4	=	100
2 x 3	=	20
1 x 6	=	20

Cost of timber production

Reserve price of timber per hectare		MK300,000
Cost of machine		MK250,000
Wood cutters/snedders carriers		MK40/tree
Machine operators (sawyers)		MK40 per crew per plank (18ft x 6in by 2in)
Extraction of timber to roadside		MK30 per plank (manually handled)
Estimated harvest per hectare		400 cubic metres
1 crew is composed of 5 people		
Total labour force on site (per mobile mill) is	22 (including watchmen)	
Fuel	=	MK200/litre for 18 litres per day
Supervision costs	=	MK300 = 5 hrs per day supervision
Maintenance of Machine	=	MK35,000 per quarter
Depreciation		5 years

Selling price of timber at local market

Cost of planks of sizes	2" x 6" =	MK450,
	2" x 4" =	MK300,
	2" x 3" =	MK150,
	1" x 6" =	MK150

Selling price of timber at foreign markets (Per plank)

Kenya	=	MK1,800
Mozambique	=	MK1,000 – MK1,600