SOCIO-ECONOMIC ASPECTS OF MIOMBO WOODLANDS IN MALAWI: THE CASE OF NON TIMBER FOREST PRODUCTS

[1]P. W. Chirwa, [2]L. Mwabumba and [2]M. R. Ngulube,
[1]Department of Forest & Wood Science, University of Stellenbosch, Stellenbosch
[2]Department of Forestry, Mzuzu University, Malawi

Abstract

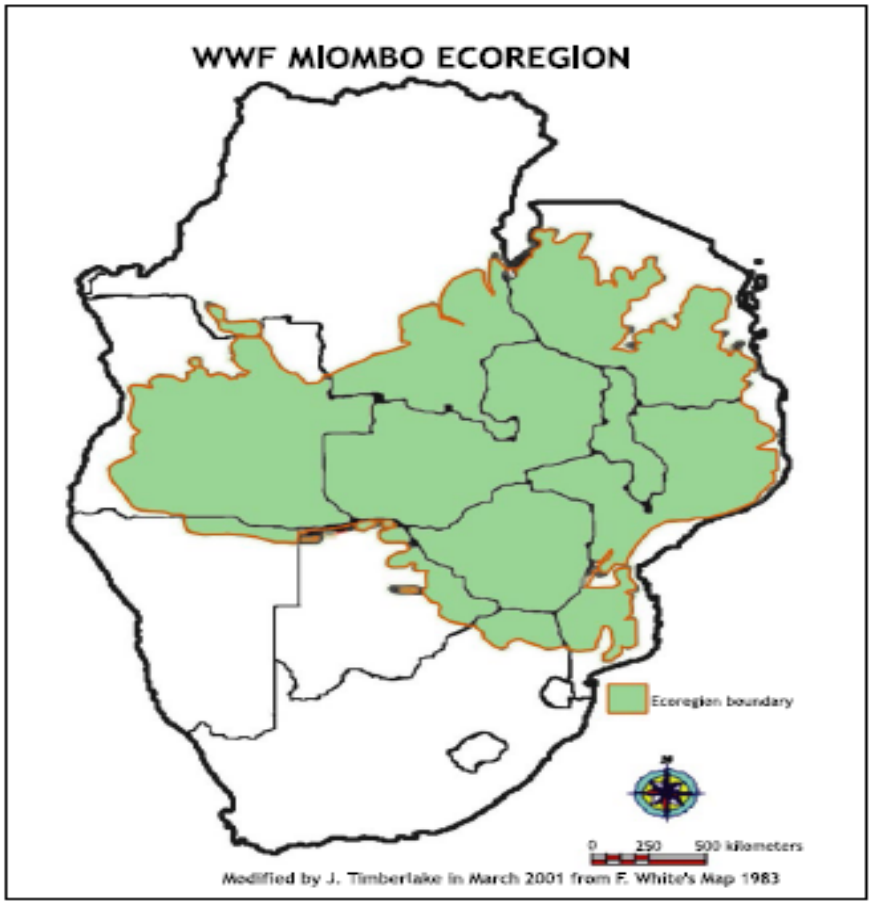
There is new and increasing emphasis on the contribution of non-timber forest products (NTFPs) on improving the livelihoods and sustainable management of forest ecosystems of the *Miombo* woodlands. This paper examines and reviews work that has been done in Malawi on the harvesting and marketing of non-timber forest products and attempts to link it to other emerging issues such as value addition and commercialization. Focusing on three study sites, the potential socio-economic contribution of NTFPs is explored based on the analyses of the supply and demand dynamics. It is clear that the focus on NTFPs derives from their high level of actual use and accessibility coupled with the fact that their harvesting has a relatively low impact on the environment. Thus, NTFPs can be developed as a means to improve livelihoods in an environmentally sound manner. However, research on the extension of appropriate models for small-scale producers is needed.

1. Introduction

The Miombo woodlands in the heart of southern Africa make up the largest continuous dry deciduous forest in the world. It extends across the continent from east to west, covering some 2.7 million square kilometres and crossing the countries of Angola, Democratic Republic of Congo, Malawi, Mozambique, Tanzania, Zambia and Zimbabwe (Figure 1). Approximately 39 million people live in and derive their livelihoods from areas covered by Miombo woodlands. Around 15 million urban inhabitants depend on products harvested from these trees, including food, firewood and charcoal as well as non-timber forest products such as fibre and medicines. In Malawi, the miombo woodlands, recognised for their floristic richness and the widespread occurrence of the tree genera *Brachystegia*, *Julbernardia* and *Isoberlinia* (Malaisse, 1978), forms the major vegetation type, covering large areas of the country. These woodlands have for a long time been a useful source of various forest products and services for the subsistence needs of rural communities (Ngulube 2000). The combined impact of widespread poverty, dependency on subsistence agriculture and wood-based energy has resulted in forest destruction, the deforestation rate being ranked among the highest in Africa (Hyde & Seve, 1993).

Forest Reserves, mostly on hills and mountains, are managed by the Forestry Department and cover an estimated 0.87 million hectares, comprising 17 % of forest cover in Malawi. There are also wildlife forest reserves that are managed by the Department of National Parks and Wildlife and comprise an estimated 0.98 million hectares which is 19 % of the total land area. Customary land forests are owned traditionally by the smallholders and cover 3.1 million ha, which is about 63 % of the forest area in Malawi, comprising of 22 % of undisturbed forest and 41 % of disturbed forest with 20 to 70 % of cultivated land (Bekele, 2001).

Production and utilization of forest products other than timber - collectively referred to as non-timber forest products (NTFP), has great potential in sustainable forest management in Malawi. Forests and trees contribute directly to food security through the provision of edible forest products such as fruits, nuts and berries, leaves, shoots, roots, mushrooms and animals (Falconer & Koppell, 1990; Taylor, 1996; Wilkie *et al*., 2002). Ethnobotanical and various studies undertaken in Malawi have already revealed long lists of such products, indicating their importance and how they are traditionally utilised (Maghembe & Seyani, 1991; Coote *et al*, 1993; Maliwichi, 1994; Mwanyambo, 1994; Minae *et al*, 1995). The current challenge in the Miombo, however, is to assess the resource and quantify the value of these products, and to transform their use from subsistence to commercial products through processing and marketing (commercialization) so that the local people also benefit. Additionally, as the *Miombo* woodlands continue to disappear, attempts to conserve the natural forest while raising the standard of living for some of its poorest rural people has led efforts on research work that aims to enhance the well-being of rural farmers, marketers and consumers through improved domestication, utilisation and commercialisation of indigenous fruit trees and their products.



Source: WWF-SARPO (2001)

Figure 1. The distribution of the Miombo ecoregion.

Studies reported here have been conducted by the Forestry Research Institute of Malawi (FRIM) in areas that are in transition to the Forest Reserves in order to identify characteristics that control supply and demand dynamics of smallholders' woodland and tree use. The results from these studies were meant to address the role of miombo woodland as a contributor of forest products and services to rural communities as well as determine the useful marginal values and potential for varying management to generate different products and services (Ngulube, 2000). Recent studies have looked at the use of the miombo woodlands as a coping strategy with the prevalence of HIV/AIDS in Malawi (Kayambazinthu *et al*., 2005) and bark harvesting from species associated with miombo as it relates to medicinal plants (G. Meke & R. Bwanali, pers com.). The areas and communities that have been extensively studied are around Chimaliro Forest Reserve (Kasungu District), Liwonde Forest Reserve (Machinga District) and Dedza District. This paper mostly highlights work that concentrated on harvesting and marketing of non-timber forest products (NTFPs) and links it to other emerging issues such as the importance of NTFPs and the prospect of value adding and domestication for purposes of commercialization for sustainable management of the miombo woodlands in Malawi.

2. Socio-economic aspects of the miombo

Economic activities and population densities are the main determinants of demand for forests goods and services (FAO, 2000). The current population of 10 million (Ndawala *et al*, 2000) in Malawi shows a declining trend rate from 3.3 % to 2 %, which has been attributed to the AIDS pandemic (Ndawala *et al.*, 2000). Natural forests represent the remainder of the Miombo forests that once covered almost the whole country. The results from Ngulube (2000) showed that the main non timber products from miombo woodlands included firewood, fruits, mushrooms and to a lesser extent reeds, edible insects, bamboos and curios (Figure 2). Mushroom accounted for over 75% of the products in Machinga district, while indigenous fruits

and firewood accounted for over 80% of the NTFPs in Dedza district (Figure 2). On the other hand, mushroom and firewood account for about 60% of the NTFPs in Kasungu district.

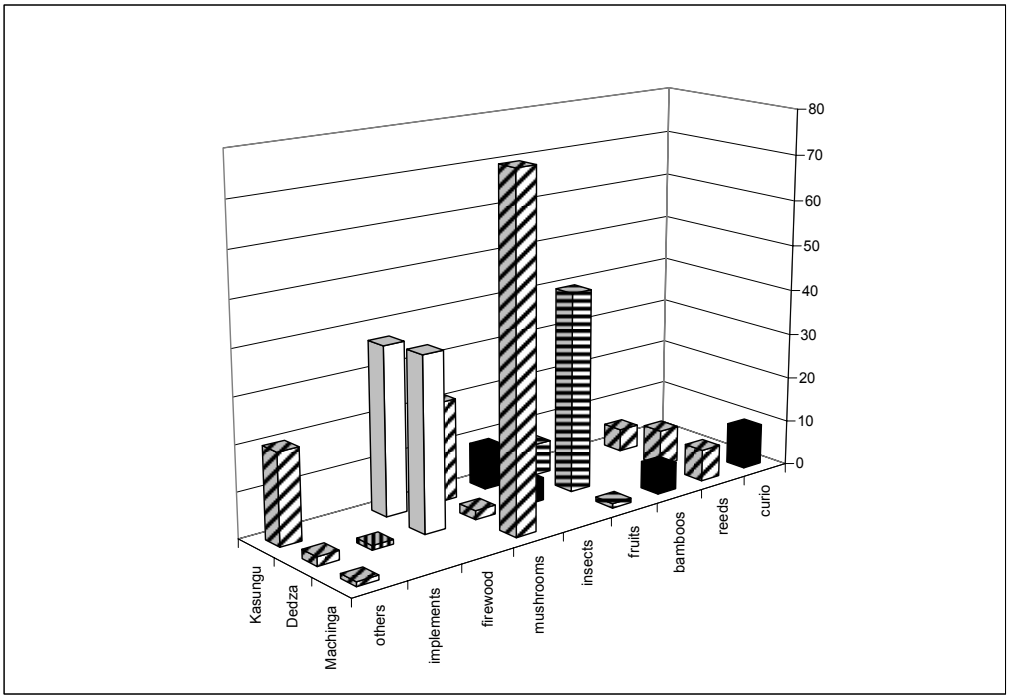


Figure 2. Major non timber forest products in Machinga, Dedza and Kasungu districts of Malawi.

2.1. Firewood and Charcoal

Bio-fuel is the main source of energy requirements for Malawi for both the rural and urban dwellers. 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. (Bekele, 2001). It is estimated that ⅔ of the of total wood consumption represents rural demand for fuelwood for cooking and heating, while the remaining ⅓ is composed of urban wood fuels for cooking, industrial requirements, building poles, construction, tobacco and tea curing, building requirements and other miscellaneous uses.

Firewood was ranked among the most important commodities in Dedza, and Kasungu, but among the least in Machinga (Figure 2). In Machinga, most of the woodlands on the customary land have been deforested due to the population pressure unlike in Dedza and Kasungu. Firewood collection in Machinga is mostly from the Forest Reserve which is very restricted. Thus, local communities get most of the fuelwood from the fast growing exotic species such as *Eucalyptus* and *Senna* species and in some cases *Gmelina arborea*. It is most likely that the results from the study area may have greatly underestimated the amount of firewood that is being removed from the forest as the main culprits involved seem to be organized businessmen from the urban areas of Zomba and Blantyre. Various sizes of wood, ranging from twigs to logs are used depending on the purpose. Dry wood of small dimensions is preferred for domestic needs, mostly because it is easier to collect and transport the wood from woodlands while firewood log diameters vary from 2 cm for kindling to large billets used for food preparation (Lowore *et al.*, 1995; Ngulube, 2000). Larger diameter wood is mostly used in brick burning and tobacco curing.

The study at Chimaliro revealed that there were more than 30 species that were listed as sources of firewood and that most important species included: *Brachystegia boehmii, B. floribunda, B. spiciformis*, *B utilis, Julbernardia paniculata* and *Pericopsis angolensis,* contributing more than 70% of the total amount of firewood collected (Fig. 3). In Dedza, *B. floribunda, B. spiciformis* and *Uapaca kirkiana* are the most utilized species for fuelwood (Ngulube, 2000). Similar findings were reported earlier by Abbot (1997). According to Abbot (1997), most of the firewood is collected from customary land and mainly based on the species available.

Firewood collection is mainly done by females throughout the year and the study revealed that at Chimaliro, more than 90% of the firewood is collected by females, whereas for Dedza and Machinga the collection is somehow gender balanced, albeit higher female involvement is still apparent (Ngulube, 2000). In an earlier study by Abbot (1997), it was revealed that the amount of fuelwood collected by different

household members varied and the contribution of the households' males is highly seasonal, their greatest contribution coming between July and October The women's collection shows two peaks, one in April-May and the other in August-September. As opposed to consumption, collection depends on available labour and these patterns can be related to the agricultural calendar. The study revealed that most of the wood collected by the male individuals was for cash income generation sold either by the road side or transported on bicycle carriers or ox-carts to the urban and peri-urban areas. It is mostly the middle men and the traders selling the firewood in cities that make hefty profit as they buy the wood from the roadside in large amounts and transport it by lorries to city markets. Large amounts of trees are harvested to sustain this business and men have a monopoly, hence their involvement in firewood harvesting in the study sites. Firewood collected by females is mostly used for domestic needs. Traditionally, firewood collection in Malawi is a female domain, and involvement of males is a recent phenomenon, and strongly justified as a source of income (Ngulube, 2000).

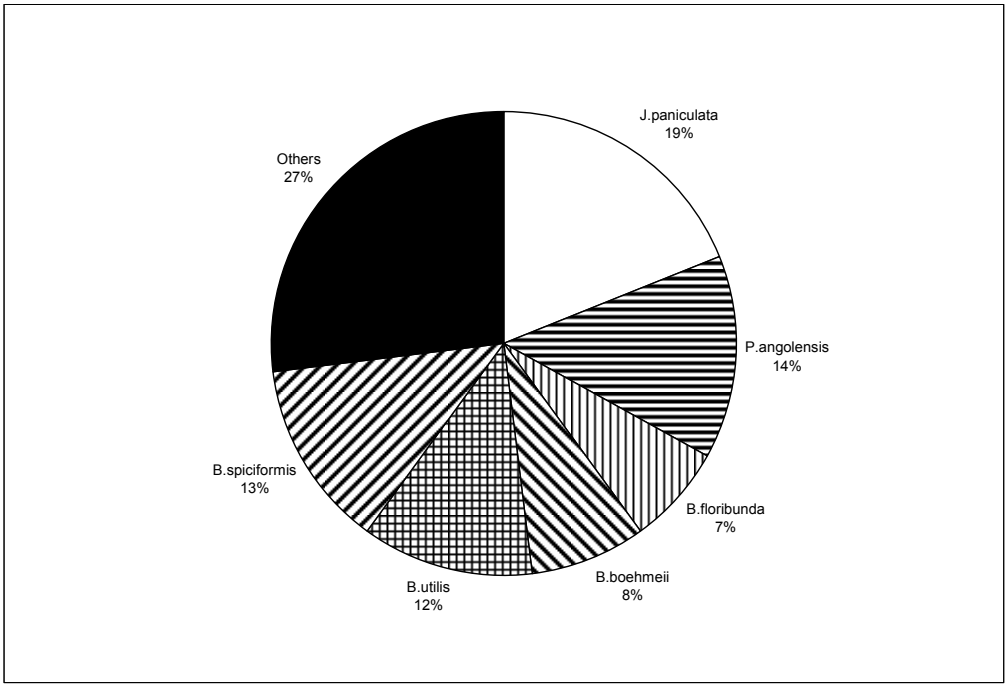


Figure 3. Major fuelwood species used in Kasungu district Malawi.

While charcoal is not listed as an important NTFP in the above study area accounting for less than 1% at Dedza, it is highly integrated into the cash economy and mostly sold in town centres and cities. Although the Forest Policy (1996) and Act (1997) prohibit charcoal production from indigenous woodlands and Ngulube (2000) attributed the scarcity of charcoal in the survey sites as most probably being a reflection of the law enforcement by forestry staff, charcoal production is currently extensively done merely 50 km away from the Machinga study site. Large amounts of trees are cut for charcoal production around Zomba/Malosa Forest. Reserve and this again is entirely an all male activity, females only being involved in marketing of the product. In most cases production is done illegally and the information can not be made available through a study like this one under discussion. In a recent report on charcoal production in Malawi, it was reported that only 4% of the 12 million Malawians have access to electricity; for the rest, heating water and cooking is usually done with firewood or charcoal (IRIN, 2005). In fact the director of Forestry in the same report pointed out that charcoal production is estimated to be worth around US $8 million annually and that the government reckons that 50 000 hectares of indigenous forest are cut down each year.

2.2 Indigenous fruits

The Miombo woodlands are known to have over 75 indigenous fruit trees (IFTs), which bear edible fruits. The fruits are rich in minerals and vitamins, sold for cash income and constitute important food sources during famines and or emergencies (Akinnifesi, *et a*l., 2004; Saka & Msonthi, 1994). Utilization and trade of fruits are integral components of local economies and culture and play important roles in household welfare. Appreciation of their value in Malawi is reflected in the prevalence of cultural-religious restrictions governing

their use and exploitation (Ngulube, 2000). During woodland clearing prior to cultivation or settlement, important fruit trees such as *Parinari curatellifolia*, *Strychnos cocculoides* and *Uapaca kirkiana*, are customarily left uncut and scattered around homesteads or crop fields. Peckam (1993) has reported similar cases for Tanzania, Zambia and Zimbabwe where *Parinari curatellifolia* and *Uapaca kirkiana* are left deliberately in cultivated fields.

In a study by Ngulube (2000), indigenous fruits ranked highest among the NTFP in Dedza with *Uapaca kirkiana* accounting for 92% of the fruits collected. However, their importance was dwarfed by the demand for firewood and/or mushrooms in Kasungu and Machinga (Figure 2). In Dedza and Kasungu, the most prominent fruits are *Parinari curatellifolia* and *Uapaca kirkiana* with *Parinari curatellifolia* accounting for 78% of the fruits collected at Chimaliro. Other species such as *Strychnos spinosa* and *Annona senegalensis*, although mentioned during the survey, the fruits are not collected in any significant amounts at all. Collection of indigenous fruits is done by both male and females. *Uapaca kirkiana* is the most sold in both cases (Chimaliro & Dedza) while *Parinari curatellifolia* is mostly used for domestic consumption with a limited amount being sold. The fruits of *P. curatellifolia* are also processed when collected and stored for future use. This may be a reflection of the shelf life of the fruits with *Uapaca kirkiana* being highly perishable when ripe and is either sold or consumed immediately during the fruiting season. On the other hand, *P. curatellifolia* fruit especially the hard nut can be stored for use at later date thereby acting as a means of spreading the food security in times of famine.

Malembo *et al.* (1998) identified 10 indigenous fruit trees of the Miombos with the help of local communities (Table 1). *Uapaca kirkiana* was the most valued followed by *P. curatellifolia.* This may be a reflection of abundance of the species as also reported by Ngulube (2000). Some of these species have now either been subjected to further studies in trying to domesticate them with the view to mass production and shorten the period to fruition; while others are on the verge of full commercialization following value adding to the fruits by processing (Akinnifesi *et al*., 2004). Typical examples of efforts to commercialize include the making of a tasty fruit juice out of the fruits of the baobab (*Adansonia digitata)* called Mlambe juice. Baobab fruits are harvested in rural areas and the juice is extracted and marketed with approximately 4000 bottles of Malambe juice being produced per month, allowing rural people to earn a living. The juice is very healthy having 8 times more vitamin C than orange juice and also containing a lot of iron (Cambray, 2005). It was also reported that a fruit juice processing company (Project) in Mwanza district produces more than 10 000 Cartons (125 000 – 210 000 kg) of value added juices per annum from indigenous fruits realizing sales of approximately 200 000 Malawi Kwacha) for the period 1998 – 2000 (Bekele, 2001).

Table 1. The top 10 priority indigenous fruit tree species in Malawi (Malembo *et al.,* 1998)

Rank	Species name	Count*
1	*Uapaca kirkiana*	99
2	*Parinari curatellifoila*	70
3	*Strychnos cocculoides*	41
4	*Flacourtia indica*	37
5	*Azanza garkeana*	26
6	*Annona senegalensis*	24
7	*Vangueria infausta*	24
8	*Syzygium owariense*	17
9	*Adansonia digitata*	15
10	*Ficus sycomorus*	14

*The number of households out of the 128 sampled that included the species as one of their top 10.

2.3 Mushrooms

Miombo woodlands are a home for over 30 edible mushroom species and are an important source of food and income for rural communities, throughout the country (Ngulube, 2000). These are collected before the first crops mature in the rain season. Once collected, they are frequently sold fresh but may also be processed and stored for future use. The study by Ngulube (2000) revealed that mushrooms are among the most important NTFP of the miombo woodlands in Malawi. Over 20 edible mushroom species occurring

between November-April during the wet season were recorded, the genera *Amanita, Cantharellus, Russula* and *Termitomyces* being the most preferred (Figure 4). February and March are the peak months for most of the mushrooms, with more than 70% of them being collected during this period in the study areas (Figure 5). In Machinga, southern Malawi, mushrooms rank number one, accounting for over 73% of the NTFPs being sold (Figure 2). In Chimaliro/Kasungu, central Malawi, they are similarly important, ranking second to firewood and accounting for over 20% of the NTFP assessed (Figure 2). Other reports have identified over 60 edible species in Malawi also predominantly belonging to the genera *Amanita*, *Cantharellus* and *Termitomyces*. Identification of edible mushrooms is critical as there are several poisonous species resembling edible ones especially in the genera *Amanita* which has been reported to account for 90% of mushroom fatalities (http://www.wildmanstevebrill.com/Mushrooms.Folder/ Amanita.html). Identifying the mushrooms fall upon the women in most societies in Malawi. Estimates from Machinga showed that as much as US$ 100 worth of mushroom can be sold at one selling point during the the one rain season (Ngulube, 2000). The prices vary with season, the cost being higher during the beginning of the season (November-December) and at the end of the season (March-April), compared to the peak period (January-February). *Amanita* and *Termitomyces* species store poorly compared to *Cantharellus* and *Russula* and therefore attract much lower prices on the market. Most *Cantherellus* and *Russula* species can be processed by mild boiling followed by sun drying for use later in the season. Processed mushrooms attract higher prices than fresh ones which may provide an entry point for value adding for possible commercialization of wild mushrooms

The potential for revenue collection from miombo woodlands is high and revenues play an 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.

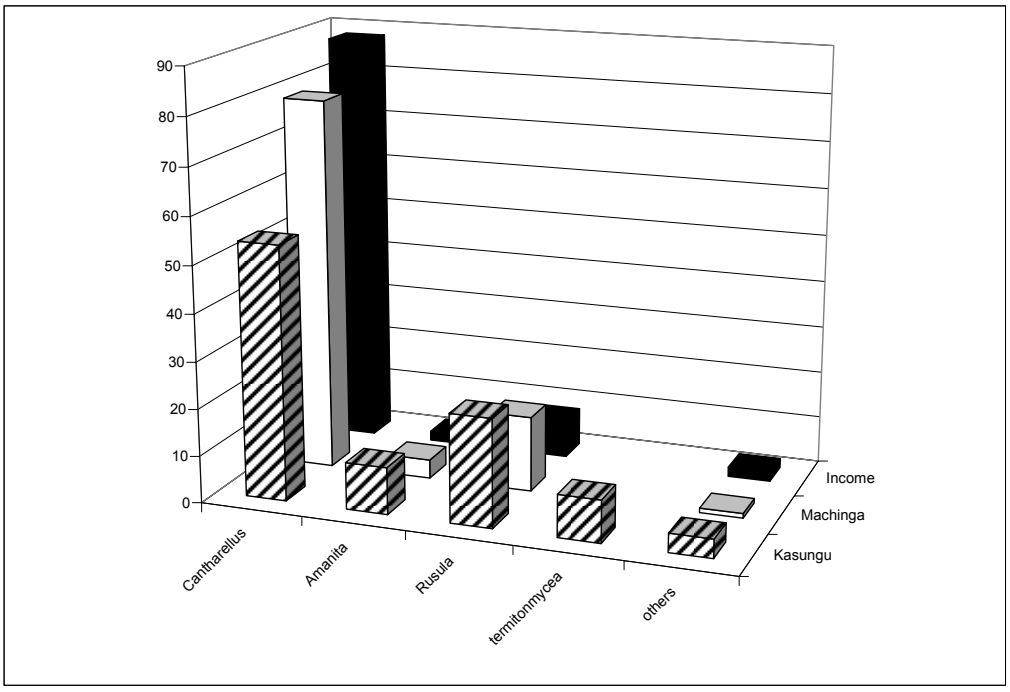


Figure 4. Major mushroom types collected and sold in Machinga and Kasungu districts and the cash income.

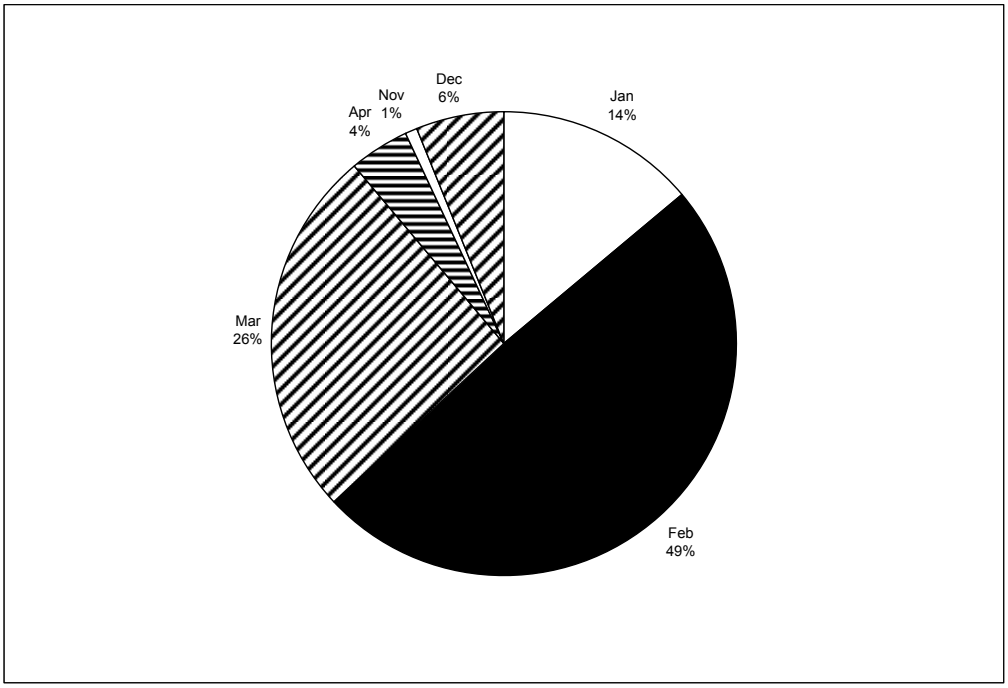


Figure 5. Seasonal variation in mushroom productivity within Malawi.

2.3 Construction poles, bark & fibre, implements & curios

In a study reported by Ngulube (2000), construction poles did not feature highly, probably due to scarcity on customary land and apparent restriction in forest reserves. In both Dedza and Machinga, construction poles were among the least used, most probably due to the extensive use of other available biological substitutes such as the planted Eucalypts, *Senna siamea* and *Gmelina arborea* in woodlots around homesteads. In Machinga, about 3% of the respondents indicated the use of poles from the woodlands, especially from forest reserves. This is an undertaking mostly done by males (Ngulube, 2000), construction activities being a male domain by tradition. The most preferred species with respect to durability (resistance to termites and woodborers) and straightness are *Brachystegia boehmii*, *B. spiciformis, B. floribunda, B. utilis, Bauhinia petersiana, Pericopsis angolensis* and *Uapaca kirkiana.* The highest demand for poles is mostly from small diameter trees (about 5-cm dbh) and utilization of such sizes is common for most rural construction requirements. Limited sale of poles from the indigenous species exists, Eucalypts and other exotic species being highly sold. As for firewood, pole production costs to the rural communities entails harvesting and transporting cost only.

Fibres are an important NTFP from the miombo woodlands, widely used around the homestead for making fastening strings and ropes, mats, baskets, fishing nets, lines, bags and many other items (Ngulube, 2000). The use of fibre from Miombo woodlands is dependent on the availability of the right species which is currently mostly collected from forest reserves. The department of forestry restricts collection from the reserves as extraction methods are mostly destructive. Bark fibre is obtained by stripping the bark from young saplings, shoots or branches. The study by Ngulube (2000) showed that the most commonly used species included *Brachystegia boehmii, B. longifolia, B. spiciformis, B. utilis* and *Bauhinia petersiana* with *B. beohmii* as the most preferred tree species because of its fibre strength and ease of peeling. The fibre can be stored for over a year following drying. The current list of preferred species largely conforms to the list provided by Peham (1996) from Liwonde forest reserve. Williamson (1975) lists over 50 species used for making strings and ropes, mats and baskets, for stuffing pillows and in construction work around the homestead, which include the above species as well. However, sisal (*Agave sisalina*) is the most preferred substitute for rope fibre and is widely used in most domestic chores throughout Malawi. It is widely sold in rural areas as well as in periurban centres as a binding material.

The making of implements such as hand hoe, axe and spear handles, pestles and mortars, cooking sticks, bowls, bows, arrows, drums, knob kerries, ox-harnesses and ox-carts is an exclusively male domain demanding particular skills (Ngulube, 2000). Some of the species used include *Swartzia madagascariensis, Diplorrhynchus condylocarpon, Annona senegalensis Combretum molle, Julbernardia paniculata*, *Dalbergia melanoxylon*, *Pericopis angolensis* and *Sclerocaya birrea*. However, most of these species are becoming

scarce. There is limited sale of the implements within communities, but in town centres implements like hoe and axe handles and cooking sticks are on high demand.

The study by Ngulube (2000) showed that curios were mostly found in Machinga in southern Malawi with up to 21 species commonly used for carvings among these, the most utilised are *Newtonia buchananii, Pericopsis angolensis* and B*ridelia micrantha*, accounting for over 50% of the wood used in curios (Figure 6). Other noteworthy curio trees include *Burkea africana, Dalbergia melanoxylon, Khaya anthotheca, Terminalia sericea* and *Uapaca kirkiana*, each accounting for 5%. Wood for the curios is mostly obtained from woodlands on customary land. Curio makers buy the wood from individuals and in some cases off-cuts left by timber sawyers are also utilised. For ornamentals, off-cuts from timber of curving big chairs are ideal.

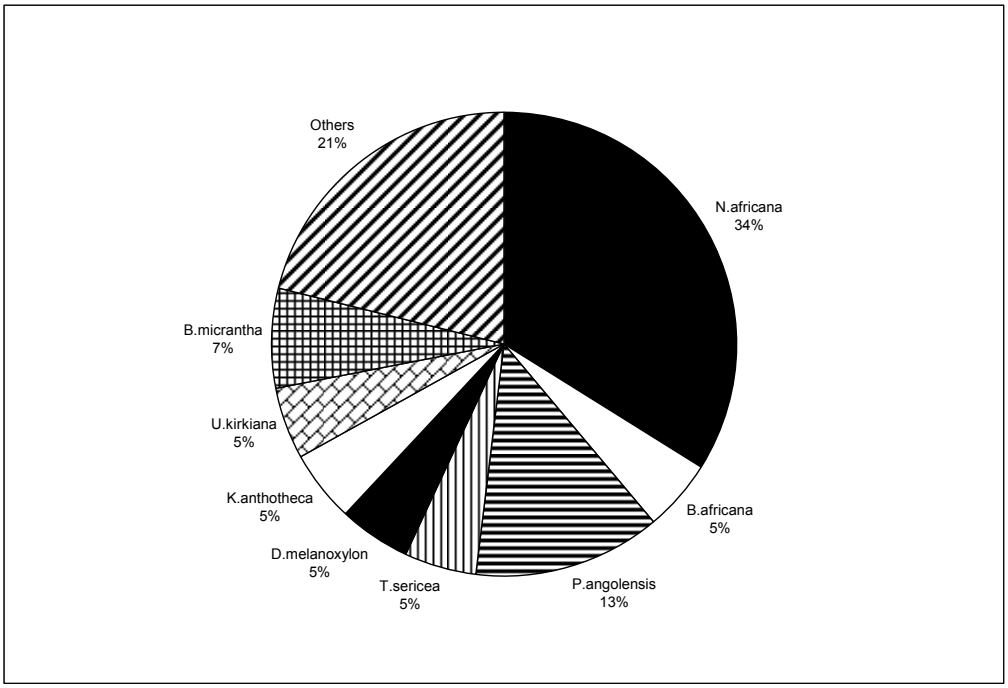


Figure 6. Major tree species used for curio making in Machinga, Malawi.

2.5 Non wood products

A variety of products are derived from bamboos (mainly *Oxytenanthera abyssinica*), palms (mainly *Raphia farinfera*), and reeds (*Phragmites mauritiana*). Ngulube (2000) identified that a particular community from Machinga harvested over 80% of the bamboos with 50% being used for weaving baskets and granaries, chairs, bed mats and shelves and a small amount for other various products. For reeds, over 80% were used for mats and the remaining 20% were used in basketry, fence construction around homesteads, granaries and doors. *Raphia farinifera* is mainly used for producing chairs (40%), tables (25%), shelves (20%) and other products including toys (15%).

In Malawi, grass is still one of the most important NTFP and widely used in construction. Grass is mostly used as a protective material for roofing and fencing. Thatch is mostly obtained between May and July from fallow and estate land and to a lesser extent from the forest reserves (Lowore, 1993). The most favoured grass species is *Hyparrhenia rufa* (Ngulube, 2000). Thatch grass also provides an important seasonal source of income as a coping strategy in times of hardships, especially among the poorest sectors of the community (Abbot, 1996; Ngulube, 2000).

Honey collection and game hunting have also been reported as a means of livelihood from the Miombo woodlands in Malawi with their exploitation in the forest reserves being heavily restricted because of the forest fires associated with these activities. However demand for honey and bee wax products is increasing in Malawi and efforts are underway to involve more people into honey production by using artificial beehives. It is estimated that a single beehive can produce 20–30 kilograms of honey if climatic conditions are favourable (Ngulube, 2000). There is therefore great potential in this activity and honey is likely to become one of the most important NTFPs in Malawi. The Miombo woodlands are also an important

source of edible insects such as caterpillars (*Imbrasia* spp*)* with five species being identified as the most important (Ngulube, 2000).

A few other products have been reported to be contributing to the rural livelihood of the people, albeit in small quantities. The most prominent are edible wild vegetables and tubers, gums and dyes for various domestic chores. Ngulube (2000) identified a variety of vegetables, including leaves of *Adenia cissampeloides*, *Bidens pilosa***,** *Hibiscus acetosella* and *Sesamum angolense* which are collected from the wild and are highly appreciated by the communities as relish. Tubers and roots have played important roles as food resources to rural communities for a long time, especially in times of seasonal food shortages or famines. Malaisse and Parent (1985) list some 39 edible storage organs including roots and tubers, bulbs and rhizomes and Williamson (1975) reports 20 edible wild roots and tubers from the miombo woodlands. A tuber of *Habenaria walleri*, a slender herb growing up to 80 cm tall, processed into firm jelly-like cakes, reddish-brown in colour with a gristle-like texture (resembling meat), locally known as Chinaka is the most commonly used as relish by the rural communities in Malawi (Ngulube, 2000). Chinaka sells fast on the local market and even across the Zambian border as a delicacy. Latex from *Diplorhynchus condylocarpon* and *Ficus natalensis* is widely used in making birdlime for bird trapping while sap from *Pterocarpus angolensis*, bark from *Berchemia discolor* and roots from *Euclea* spp provide dyes for clothes or basket weaving material.

2.6 Medicinal plants

Medicinal plants provide up to 80% of the world population's primary health care products while at the same time form a basis for cultural identity and heritage, income generation and are an important resource base for new drug products (Diedererichs, 2006; Mander & Breton, 2006). In Malawi, the predominant medical system in use is that of traditional medicine, especially in the rural areas (Maliwich, 1997). Earlier studies done in Malawi indicate that the miombo woodlands are an important source of medicinal plants with local communities using over 20 different species for medicinal purposes (Ngulube, 2000). The demand and use of plants for medicinal purposes by both the population at large and the traditional healers are well recognised. Manders *et al.* (2006) estimated that there may be up to 70 000 traditional healers in Malawi. Some of the primary medicinal species used include *Erythrophleum sauveolens (*mwavi*), Pterocarpus angolensis (*mlombwa*), Khaya anthotheca, Erythrina abyssinica* and *Afzelia quanzensis* (R. Bwanali, G. Meke & V. Williams[1]). Most of the medicinal plants are traded locally, although export to neighbouring countries such as Zambia, Zimbabwe, Mozambique and South Africa of some species is not uncommon. In a 6 month border (Mwanza-Malawi/Mozambique) survey conducted between 22 June and 24 November 2004, 133 people declared the material they were exporting and 38% was traditional medicine consisting of mainly roots with a mean mass of 37 ± 26 kg and 95% of it was destined for South Africa (Richard Bwanali, Gerald Meke & Vivienne Williams). As most of the plant material is harvested from wild resources, the increase in demand both on the local and export markets will result in a reduction in the resource base. A recent study in parts of Malawi showed that the majority of herbalists (93 percent) claim that the availability of medicinal plants in general has decreased over the last ten years (Kayambazinthu *et al*., 2005).This has an added constraint especially when the issues of value adding and commercialization come into play as the expanded international market will need a reliable supply of the raw material (Manders *et al*., 2006). There is therefore urgent need to evaluate the population status of the most important medicinal plants for proper management and conservation for sustainable supply. Additionally, as the rate of growth for most of the species is slow, a deliberate domestication policy should be promoted especially for the most important species as has been the case in South Africa (Crouch & Symonds, 2006; Spring & Diederichs, 2006).

3. Conclusions

It is clear that non-timber forest products have been a main focus in discourses about livelihoods for primarily two reasons. First and most important, there is a high level of actual use of non-timber forest products by the rural poor. Studies from Machinga, Dedza and Kasungu have demonstrated that there is a wide range of products that are significantly contributing to the total household income in forest areas. And it seems that, poor households tend to be disproportionately dependent on forest resources (especially firewood and medicinal plants). These high use levels have been used as enough rationale for investing in non-timber

[1] Trees for health – forever: Implementing sustainable medicinal bark use in Southern Africa Regional Workshop, Johannesburg, 1 – 3 November 2005

forest products as a way for achieving poverty reduction. This widespread use of non-timber forest products by the poor reflects that they are both useful and accessible in the prevailing circumstances. This role in poverty mitigation needs to be better understood, recognised and acknowledged by policy makers.

The second reason is that there has also been an argument that non-timber forest products harvesting has a relatively low impact on the environment. While this argument holds in some cases, Bardhan (1987) argues that when these non-timber forest products increase in value, they will attract more powerful actors who will try to control the resources and/or the market. In the context of contemporary definitions of poverty that recognises powerlessness as well as low income and wealth, it is easy to realise that the poor are at a major disadvantage in these processes. Moreover the harvesting regime and the impact of that harvesting depend very much on demand. Low-impact harvesting that prevails under low-demand conditions can quickly be replaced by much more damaging harvesting practices and/or intensities. For commercially valuable non-timber forest products over-harvesting of the target species is common. Intensified management stimulated by increased demand can also lead to forest clearing for planting high value forest products.

While it is a fact that research and development in forestry, as in agriculture, has been primarily focused on large-scale commercial models, and for the benefit of the well resourced stakeholders, there is need for research and extension appropriate for small-scale producers of these non-timber forest products. While that is said, limitations to successful commercialisation often occur downstream. Technical assistance is needed in post-harvesting processing (to reduce spoilage and improve quality) and support is needed to improve access to information (including market information), technology, and credit. Small-scale producers dealing with small volumes of products in areas with poor transportation access typically have weak bargaining positions (particularly if they lack property rights for the resource and if the product is perishable).

Therefore, more research is needed to assess the role of local institutions and learn how to better facilitate and support successful models in appropriate ways. This is an important area with high potential for impact.

4. References

ABBOT, J. (1996). *Rural Subsistence andPprotected Areas: Community Use of the Miombo Woodlands of Lake Malawi National Park*. PhD. Thesis. University College London. University of London. UK.

ABBOT, P.G. (1997). *The Supply and Demand Dynamics of Miombo Woodland: A Household Perspective*. PhD Thesis. University of Aberdeen, UK.

AKINNIFESI, F.K., KWESIGA, F.R., MHANGO, J., MKONDA, A., CHILANGA, T. & SWAI, R. (2004). Domesticating priority Miombo indigenous fruit trees as a promising livelihood option for small-holder farmers in Southern Africa. *Acta Hort*. (Ishs) 632:15-30. http://www.actahort.org/books/632/632_1.htm

BARDHAN, P. (1987). The new institutional economics and development theory. *World Development* 17 (9): 1389-1395.

BEKELE, M. (2001). *Country Report – Malawi: Forestry Sector Outlook Studies*. Working Paper No. 29. FAO Rome. 33pp

BRIGHAM, T., CHIHONGO, A. & CHIDUMAYO, E. (1996). Trade in woodland products from the miombo region. In: CAMPBELL, B. (ed.). *The Miombo in Transition: Woodlands and Welfare in Africa*. CIFOR, Bogor.

CAMPBELL, B. (ed.) (1996). *The Miombo in Transition: Woodlands and Welfare in Africa*. CIFOR, Bogor.

CAMBRAY, G. (2005). Taste Them - don't waste them. *Science in Africa*. http://www.scienceinafrica.co.za/2005/september/baobab.htm

CROUCH, N. & SYMMONDS, R. (2006). Propagation technologies for medicinal plants. In: DIEDERICHS, N. (ed.). *Commercialising Medicinal Plants: A Southern African Guide*. African Sun Media, Stellenbosch. pp 53-65.

COOTE, C., LOWORE, J., LUHANGA, J. & ABBOT, P. (1993). *Community use and management of indigenous trees and forest products in Malawi: the case for four villages close to Chimaliro Forest Reserve*. FRIM Report No. 93007. pp. 1-24.

CUNNINGHAM, A. B. (1993). *African medicinal plants setting priorities at the interface between conservation and primary healthcare*. People and Plants working Paper 1. UNESCO. Paris

FALCONER, J. & KOPPELL, C.R.S. (1990). *The Major Significance of 'Minor' Forest Products. The Local Use and Value of Forests in the West African Humid Forest Zone*. FAO, Rome. 32pp.
FAO (1992). *Forests, Trees and Food.* Rome. 26pp.
HYDE, W.F. & SEVE. J.E. (1993). The economic role of wood products in tropical deforestation: The severe example of Malawi. *Forest Ecology and Management* 57:283-300.
IRIN, 2005. MALAWI: *Charcoal production threatens forests*. http://www.irinnews.org/report.asp?ReportID=45288).
KAYAMBAZINTHU, D., BARANY, M., MUMBA, R. & ANYONGE, C.H. (2005). Miombo woodlands and HIV/AIDS interactions: Malawi Country Report. *Forestry Policy and Institutions Series title: Forestry Policy and Institutions*. Working Paper No 6. FAO, Rome.
MAGHEMBE, J.A. (1994). Out of the forest. Indigenous fruit trees in southern Africa. *Agroforestry Today* 6(2): 4-6.
MAGHEMBE, J.A. & SEYANI, J. H. (1991). *Multipurpose trees used by smallholder farmer in Malawi: results of an ethnobotanical survey*. AFRENA Report 42, ICRAF. pp. 1-30.
LOWORE, J., COOTE, C., ABBOT, P., CHAPOLA, G. & MALEMBO, L. (1993). *Community use and management of indigenous trees and forest products in Malawi: the case for four villages close to Chimaliro Forest Reserve*. FRIM Report No. 93008. pp. 1-59.
MALAISSE, F. (1978). The Miombo Ecosystem. In: UNESCO/UNEP/FAO *Tropical Forest Ecosystems*, Paris.
MALAISSE, F. & PARENT. G. (1985). Edible wild vegetable products in the Zambazian woodland area: A nutritional and ecological approach. *Ecology of Food and Nutrition* 18:43-82.
MALEMBO, L., CHILANGA, T. & MALIWICH, C.P. (1998). Indigenous miombo fruits selected for domestication by farmers in Malawi. In: MAGHEMBE, J. SIMONS, A. KWESIGA F. & RARIEYA, M. (eds.). *Selecting Indigenous Tress for Domestication in Southern Africa: Priority Setting with Farmers in Malawi, Tanzania, Zambia and Zimbabwe*. ICRAF.
MALIWICH, C.P. (1994). *Ethnobotany and plant conservation in three villages around chancellor college. Unpublished Undergraduate Thesis*. University of Malawi, Zomba.
MALIWICH, C.P. (1997). Trade in wildlife medicinals in east and southern Africa –Malawi Component. In: MARSHAL, N.T. (ed.). *Searching for A Cure: Conservation of Medicinal Wildlife Resources in East and Southern Africa*. Unpublished Report prepared for TRAFFIC East/Southern Africa.TRAFFIC International, Cambridge, UK. 1998.
MANDER, M., DIEDERICHS, N. & STEYTLER, N. (2006a). Marketing of Medicinal Plants and Products. In: DIEDERICHS, N. (Ed). *Commercialising Medicinal Plants: A Southern African Guide*. African Sun Media, Stellenbosch.216p. pp 169-192.
MANDER, M. & LE BRETON G. (2006). Overview of the medicinal plants industry in southern Africa. In: DIEDERICHS, N. (ed.). *Commercialising Medicinal Plants: A Southern African Guide*. African Sun Media, Stellenbosch. pp. 1-8.
MANDER, M., STEYTLER, N. & DIEDERICHS, N. (2006b). The economis of medicinal plant cultivation. In: DIEDERICHS, N. (ed.). *Commercialising Medicinal Plants: A Southern African Guide*. African Sun Media, Stellenbosch. pp. 41-52.
MAUAMBETA, D.D. (1994). *The role of fruit trees in farming systems in Eastern and Southern Africa*. M.Sc. Thesis. Linacre College. University of Oxford.Unpublished.
MAUAMBETA, D.D. (1998). *Utilization and commercialization of non-timber forest products as a tool for sustainable management of indigenous forests*. A paper presented at a coordination unit for the rehabilitation of the environment meeting held at Shire Highlands Hotel, 27th November 1998.
MINAE, S., SAMBO, E.Y., MUNTHALI, S.S. & NG'ONG'OLA, D. H. (1995). Selecting priority indigenous fruit tree species for central Malawi using farmers' evaluation criteria. In: MAGHEMBE, J.A., NTUPANYAMA, Y. & CHIRWA, P. W. (eds.). *Improvement of Indigenous Fruit Trees of the Miombo Woodlands of Southern Africa*. Primex Printers, Nairobi. pp. 84-99.
MWANYAMBO, L.M. (1994). Non-medical plant uses of the Nyakyusa, Lower Songwe Valley, Karonga, Malawi. In: SEYANI J.H. & CHIKUNI, A.C. (eds.). *Proc. XIII Plenary Meeting AERFAT*.

NGULUBE, M. (1993). Domestication of indigenous fruit trees in Malawi. *FRIM Newsletter. Issue No. 71*. pp 2.

NGULUBE, M.R. (1996). Indigenous fruit trees in southern Africa. *Agroforestry Today* 7(3): 17-18.

NGULUBE, M R. (2000). The utilization and marketing of non-timber forest products from the miombo woodlands of Malawi: A case study. In: NGULUBE, M.R., MWABUMBA, L. & CHIRWA, P.W. (eds.). *Community- based Management of Miombo Woodlands in Malawi*... Proceedings of a National Workshop, Sun and Sand Holiday Resort, Mangochi, Malawi 27-29 September 1999. Forestry Research Institute of Malawi. pp. 44 -69.

NDAWALA J., KALANDA G. AND MAHY M. (2000). *Malawi MDHS Data Analysis.* Malawi National Statistics Office. http://www.nso.malawi.net/

PACKHAM, J. (1993). *The value of indigenous fruit-bearing trees in Miombo Woodland Areas of South-Central Africa*. Rural Development Forestry Network Paper. http://www.odi.org.uk/fpeg/publications/rdfn/15/rdfn-15c-ii.pdf

PEHAM, A. P. K. (1996). *Non-timber products as miombo resource: a Malawi case study with special reference to bark fibre*. B.Sc. Thesis. Universität für Bodenkultur, Wien.

SAKA, J.D. & MSONTHI, J.D. (1994). Nutritional value of sixteen edible wild fruits growing in Malawi. *Forest Ecology and Management* 64: 245-248.

SPRING, W & DIEDERICHS, N (2006). Farming medicinal plants. In: DIEDERICHS.N (ed.). *Commercialising Medicinal Plants: A Southern African Guide*. African Sun Media, Stellenbosch. pp. 67-86.

TAYLOR, D.A. (1996). *Income Generation From Non-wood Forest Products in Upland Conservation*. FAO Conservation Guide 30. FAO, Rome. 72pp.

WILLIAMSON, J. (1975). *Useful Plants of Malawi*. Revised and extended edition, Montfort Press, Limbe, Malawi.

WILKIE, M.L., ECKELMANN, C.M., LAVERDIÈRE, M. & MATHIAS, A. (2002). Forests and forestry in small island developing states. *International Forestry Review* 4(4): 257-267.