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COUNTRY BRIEF ON NON-WOOD FOREST PRODUCTS

Republic of Mozambique

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This paper has been minimally edited for clarity and style

ABBREVIATIONS

ACP	**African, Caribbean and Pacific Countries**
EC	**European Community**
FAO	**Food and Agriculture Organization**
NWFP	**Non-Wood Forest Products**
INE	**Instituto Nacional de Estatística**
DNE	**Direcção Nacional de Estatística**
DNFFB	**Direcção Nacional de Florestas e Fauna Bravia**
US$	**United States Dollar**
Kg	**Kilogram**
NGO	**Non-Governmental Organization**
EMOFAUNA	**Empresa Moçambicana de Fauna**
GERFFA	**Gestão dos Recursos Florestais e Faunísticos**
TFCA	**Transfrontier Conservation Areas**
SPFFB	**Serviços Provinciais de Florestas e Fauna Bravia**
IUCN	**International Union for Conservation of Nature**
SADC	**Southern African Development Community**
CBNRM	**Community Based Natural Resources Management**
ADB	**African Development Bank**
GNP	**Gorongosa National Park**
GNRMA	**Gorongosa Natural Resources Management Area**
ZNP	**Zinave National Park**
SEI	**Sociedade de Estudos e Investimento**
RSA	**Republic of South Africa**

I. INTRODUCTION

1.1 The objectives of the study

The traditional "management paradigm" world-wide is that if forests are properly used and managed, then the use of non-wood forest products will be sustainable. If data on non-wood forest ecosystems is systematically gathered by Forest Departments, the non-wood component will be easily integrated into the planning, implementation and monitoring levels of the adopted forest management system.

The Directorate of Forestry and Wildlife in Mozambique is committed, through its policy and sector development strategy and its five year development programme (PROAGRI), to protect, conserve and utilize forestry and wildlife resources in a sustainable way. The successful materialization of these objectives is the first step to ensuring economical, ecological and social benefits of both present and future generations. The Sector Policy and Development Strategy addresses the use of resources by local communities in the context of conserving biological diversity and promoting economic self sufficiency.

If more than 80% of rural people are poor and traditionally rely on existing non-wood goods and services, and if biological diversity conservation has to be assumed as a serious challenge, then sustainability and its related social and ecological benefits have to be secured from well conceived management programmes. However, this will not be realistic unless data on non-wood forest goods and services are systematically collected.

Scientific data on non-wood forest products in tropical countries, and particularly in Mozambique, are lacking or simply scarce. Furthermore, the knowledge of their economical and social uses, as well as their distribution and market, are limited.

The main aim of the current study is to present both qualitative and quantitative information on the most important uses, distribution and market for the country's non-wood forest products, and for goods and services, other than timber and fuelwood. The study also intends to prepare country data on non-wood forest products goods and services which will be required for planning and sustainable use of forest resources.

The information presented in this study is based on a review of the available literature, professional experience and the personal observations of the authors, as well as on the non-wood forest products market survey.

1.2 The concept

Among various concepts and definitions, [1]FAO (1995) defines non-wood forest products (NWFP) as consisting of goods of biological origin other than wood, as well as services, derived from forests and allied land uses, and trees outside forests.

In a broader context, [2]FAO (1998) suggests that the NWFP definition includes non-wood goods and services, available from both forest and trees outside the forests, i.e. home gardens, wind break plantations, etc. NWFPs are mainly either for subsistence or for commercialization in local, domestic or regional markets.

1.3 The Importance to the country socio-economic context

There are a wide range of NWFPs that are produced and marketed by rural communities in Mozambique. Notable ones include (i) medicinal plants, (ii) grass, (iii) bamboo, (iv) reed and veldt foods, such as wild vegetables, fruits and tubers. The degree to which they are marketed depends on the distance to and from the market.

Medicinal plants are gathered in small quantities from dispersed locations throughout rural communities in Mozambique. However, the main markets are located in urban centres, such as Nampula, Beira, Quelimane and Maputo. It would appear therefore that the cost of transport is a major limiting factor to the commercialization of medicinal plants owing to the fact that the margin of profit is rather low.

Other products, such as bamboo and reeds, are relatively far away from the main markets and thus local traders have faced serious difficulties in transporting them to the main markets.

Other types of NWFPs that are of extreme importance and contribute to the income of rural households, especially along the coastline, are cashew nuts and mangoes.

II. BACKGROUND INFORMATION ON NON-WOOD FOREST PRODUCTS

[1] Definition proposed and adopted at the International Expert Consultation on Non-Wood Forest Products, organized by FAO, Jogjakarta, Indonesia, January, 1995

[2] Definition proposed by country representatives to the FAO/UNEP/EC workshop on data collection and analysis for sustainable forest management in ACP countries held in Mutare, Zimbabwe, December, 1998.

2.1 NWFP and ecosystems

2.1.1 Geography, climate and population

Mozambique covers an area of 799,380 km^2 and occupies the south-eastern part of Africa. The coastline extends from the Rovuma River mouth (10^{0}27'S) to the South African border (26^0 52'S). It is bordered by Tanzania to the north, by Malawi, Zambia, Zimbabwe, South Africa and Swaziland in the west, and by the Indian Ocean to the east. It covers about 78.6 million hectares, of which 62 million are natural vegetation.

The climate is subtropical in the south and tropical in the centre and the north. There are two distinct seasons: rainy and dry. The rainy season is from November to March, October and April being transitional ones. The coastline usually receives 800-900 mm of rainfall per year. North of Save River, the rainfall is even greater, ranging from 1,000 to 1,400 mm. However, in Gaza province and Tete there are places where the climate becomes drier with rainfall dropping rapidly from about 600 to 400 mm, especially along the boundary with Zimbabwe.

According to INE (I997), the total population is around 16,5 million[3]. The rural population is estimated at 80 % of the total population. The population density is 21 inhabitants per km^2. Distribution is uneven, Maputo province and city (capital) are about 1.02 million inhabitants i.e. 3,384 inhab/km^2 while Niassa province is the less densely populated 6 inhab/km^2.

2.1.2 Major vegetation types

Mozambique, because of its geographical position and extension (about 2,700 km of coastline), exhibits diverse climatic and edaphic conditions that contribute to creating diverse ecosystems. The purpose of this section is to describe the major vegetation types that occur within the country since there is a correlation between the types and utilization of NWFPs, and the vegetation type that occurs in a specific habitat.

2.1.2.1 Broad-leaved forests

Sub-hygrophilous forest **is one representative of the closed forest, which occurs chiefly in the Zambeze, Manica, Sofala and Cabo Delgado provinces. This forest formation occupies relatively small and scattered areas, at the foot or on the mountain ridges where the amount of precipitation is greater than 1,800 mm, like on the southern and eastern slopes of the Namuli, Milange, Tamassa, Gorongosa and Chimanimani mountains and on the Mueda plateau. The most common tree**

[3] Statistical year book (DNE-1997)

species are: *Mellitia excelsa, Cordyla africana, Kigelia africana, Morus lactea, Newtonia Buchananii, Ficus* spp. *Uapaca* spp. and *Vitex* spp.

***Mountain forests* are closed and moist and usually occur in very restricted area's subject to heavy rainfall (> 2000 mm) and frequent fog, such as Gorongosa and Chimanimani mountains, in Sofala and Manica provinces, and in the highest parts of mountains in Zambezia province. The dominant tree species are: *Widdringtonia whytei, Acacia xiphocarpa, Podocarpus* sp., *Celtis dioica, Aphloia myrtifolia, Maesa lanceolata* and *Rauwolfia inebriens*.**

Woodlands* are the most common vegetation type in the country. The most relevant broad-leaved woodlands are miombo and mopane, followed by cimbirre woodlands. However, there is occurrence of diverse undifferentiated woodlands characterized by the dominance or codominance of the following genera or species: *Acacia* spp., *Strychnos* spp., *Combretum* spp, *Terminalia* spp., *Adansonia digitata, Milletia stuhlmannii, Uapaca* spp., *Trichilia emetica, Sclerocarya birrea, Guibourtia conjugata, Hymenocardia ulmoides, Pteleopsis myrtifolia, Xeroderris stuhlmannii, Albizia versicolor, A. adianthifolia, Afzelia quanzensis, Burkea africana, Pterocarpus* spp., *Pseudolachnostylis maprouneifolia, Dialium schllechteri, Lonchocarpus capassa, Syzigium cordatum* and *Garcinia livingstonei.

***Miombo* is characterized by the dominance of trees in the genera *Brachystegia* and *Julbernardia* of the family *Fabaceae*, subfamily *Caesalpinoideae* (Chidumayo,1997; Frost, 1996; Malaisse, 1975). Miombo is the most common vegetation type in the country. Its territory extends from the Rovuma river in the north up to the Limpopo river mouth in the south. The dominant soils are typically acid, characterized by low cation exchange capacities, low in nitrogen and extractable phosphorus (Frost, 1996; Desanker et al. 1995, Chidumayo, 1997). According to White (1983) the common Mozambican miombo is dry and is characterized by having a canopy height of less than 15 m and a vegetation floristically impoverished, it occurs in areas receiving precipitation less than 1000 mm per year.**

Mopane* is characterized by the dominance of only one specie, *Colophospermum mopane,* which forms pure stands. Mopane is characteristic of semi-arid habitats. This vegetation occupies extensive areas in the western part of the country. In Gaza province, it is found in the northern part of the Libombo hills, the region of Pafuri-Changalane-Massangena. In Tete province, it occurs in the southern part bordering the Zambeze River. It is also found in a variety of soils at various altitudes ranging from clay to sandy. Other species commonly encountered in the mopane communities are *Commiphera* spp., *Terminalia prunioides, Combretum apiculatum, C. imberbe, Kirkia acuminata* and *Adansonia digitata.

Cimbirre* woodlands are characterized by the dominance of *Androstachys johnsonii*. Cimbirre typically constitutes a canopied, unistratal, even-aged woodland with an open understory composed of scattered grasses and slender stemmed shrubs *of

***Croton pseudopulchellus*. Cimbirre woodlands occur on well-drained, xeric and deep red sands.**

***Thickets* occur on medium to heavy textured base saturated soils, but sometimes on sands. In southern Mozambique, thickets occur on sand throughout the whole region from the seafacing windward slopes of the littoral dunes across the central coast plains to the inland sands (EATS, 1990). Different thicket types are characterized by particular species dominance (EATS, 1990) or mix of related species (Mangue, P. pers. obs). The most common thickets are: thickets and bush clumps, clay thickets, termitaria clump-thickets, sand thickets, ravine thickets and reverie thickets.**

2.1.2.2 Fineleaved forests

Fineleaved forests are usually found in the Acacia communities. The dominant species are *Acacia nilotica, A. nigrescens, A. senegal, A. tortilis, A. xantophloea* and *Dichrostachys cinerea.*

2.1.2.3 Wetland

Mangroves, along with reverie forests, are the most important wetland ecosystem in Mozambique. Other important wetland ecosystems are: mixed freshwater swamp forest, reed swamps, mixed herb swamps and grass swamps.

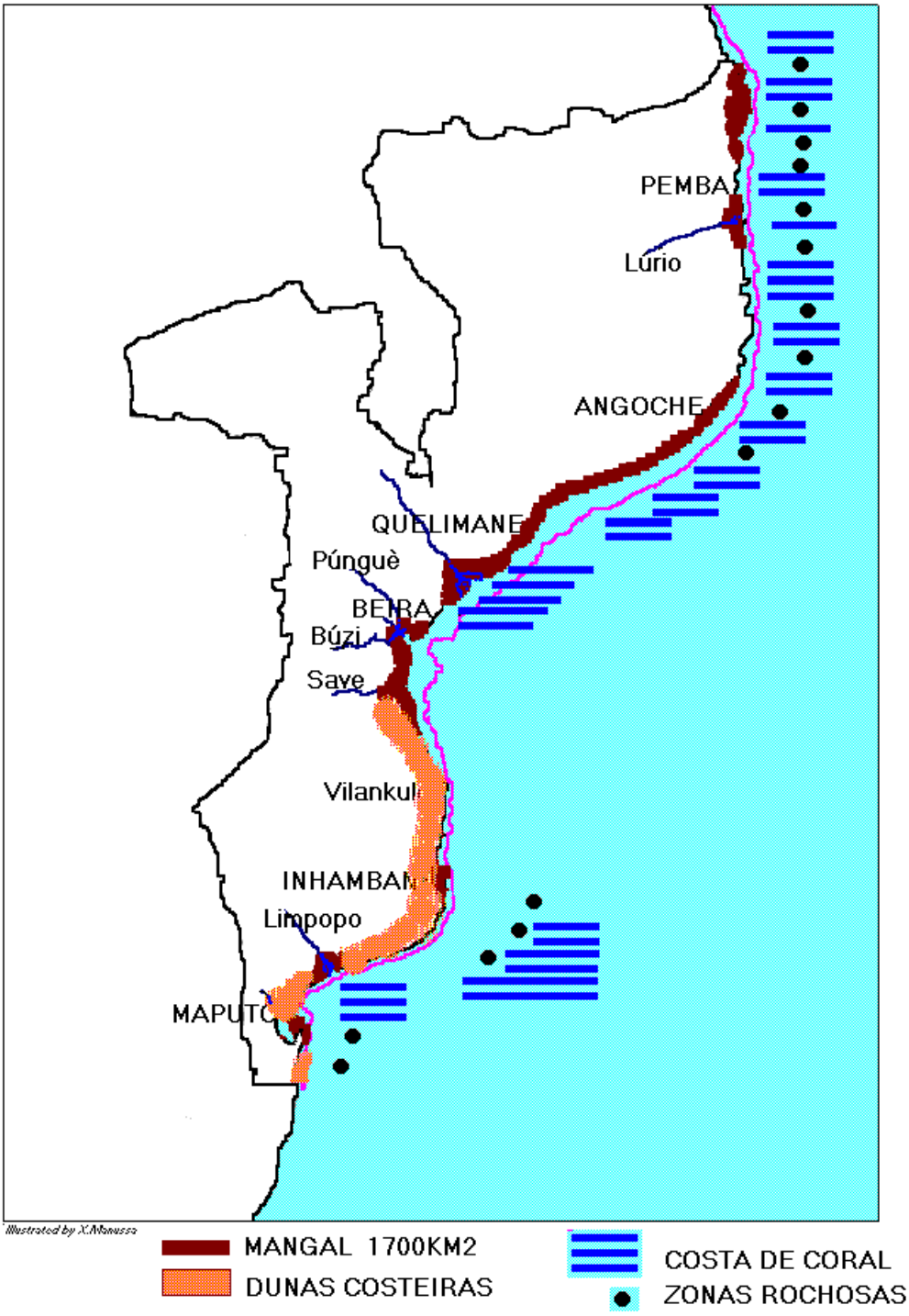
Gallery forests/Reverie forest **- Reverie forests are characterized by bordering the banks of rivers and streams. They consequently contain species tolerant to regular seasonal inundation. This vegetation type plays a very important ecological function by consolidating the riverbanks and thus controlling the course of torrential waters. Currently, gallery forests are found in the northern and central part of the country as they were severely depleted in the south. The most common tree species are *Khaya antoteca, Adina microcephala, Erythrophleum suaveolens, Diospyros mespiliformis, Sterculia africana, Acacia forbesii, A. karroo, Breonadia microcephala, Cassia abbreviata, Garcinia livingstonei, Hymenocardia ulmoides, Maytenus senegalensis, Mimosops fruticosa, M. obovata, Lannea stuhlmannii, Pteleopsis myrtifolia, Sideroxylon inerme, Spirostachys africana,* etc.**

Mangroves **- Mangrove resources in Mozambique, play an important role in the social and economic welfare of the country. They also play an important role in the natural functioning of the biological, physical, geological and chemical situation of the environment where man lives. With these dual functions, mangrove resources deserve to be well managed for the purpose of preservation and it is necessary to secure their conservation for future generations.**

The mangrove resources have also contributed for a long time to the economic development of the country. These include forestry products and mangrove dependent fishery resources that have been extracted from mangrove areas. Mangrove dependent fisheries alone contribute about 45% of the external revenue source of the country. Mangrove areas also provide other ecological and aesthetic amenities necessary for the further maintenance of the area.

The most important mangroves in the country are those of the estuary of the rivers Messalo, Zambezi, Pungué, Save, Limpopo and Maputo. There is considerable variation in structure and floristic composition along the coastline, depending upon local conditions. The characteristic species are: *Sonneratia alba, Avicenia marina, Rhizophora mucronata, Bruguiera cylindrica, Heritiera littoralis, Lumnitzera racemosa* and *Xylocarpus granatum*.

Figure 1. The Distribution of Mangroves along the Coastline of Mozambique.



Font: Mangrove management project, DNFFB (1998)

Legend of the Figure 1:

Mangal:	**Mangroves;**
Dunas Costeiras:	**Sand Dunes;**
Coasta de Coral:	**Corals;**
Zonas Rochasas:	**Rocky shores**

Eight species of mangroves have been identified in the northern and central part of Mozambique. Table 1 shows the different species found in Mozambique and Figure 1 shows the distribution of mangroves along the coastline of Mozambique.

Table 1. Mangrove areas in ha per province and changes occurred between 1972 and 1990

Province	Mangrove area 1972 (ha)	Mangrove area 1990 (ha)	Depleted Mangrove areas (ha)	New area of Mangroves (ha)	Deforestation rate over 18 years (%)
Maputo	14,605	12,599	2,217	211	15.2
Gaza	387	387	0	0	0
Inhambane	20,094	19,848	246	0	1.2
Sofala	129,997	125,317	6,334	1,654	4.9
Zambezia	159,417	155,757	3,766	106	2.4
Nampula	55,849	54,336	2,006	493	3.6
Cabo Delgado	27,730	27,836	0	106	0
Total	408,079	396,080	14,569	2,570	3.6

Source: Saket & Matusse, 1994.

The diversity of mangrove species decreases in the south. *Xylocarpus granatum, Heritiera littoralis and Sonnaratia alba* drop out of the association in the vicinity of Inhambane province. *Avicennia marina, Bruguiera gymnorrhiza, Lumnitzera racemosa* and *Ceriops tagal* become dominant, although the last two are less abundant and almost reach their southern limits. Table 2 shows a range of species found in Mozambique.

Table 2. The different mangrove species found in Mozambique.

Family	Scientific Name	Local Name (Sena)
Avicenniaceae	***Avicennia marina***	**Invede**
Combretaceae	***Lumnitzera racemosa***	**Mpiripito**
Meliaceae	***Yxlocarpus granatum***	**Inrubo/ M'rubo**
Rhizophoraceae	***Bruguiera gymnorhiza***	**Mfinse**
Rhizophoraceae	***Ceriops tagal***	**Nhacandale**
Rhizophoraceae	***Rhizophora mucronata***	**Nhantazera**
Sonneratiaceae	***Sonneratia alba***	**M'pia**
Sterculiaceae	***Heritiera littoralis***	**Ncolongo**

Source: Zambezi delta Mangrove sub-project, IUCN Mozambique, 1997

Hughes & Hughes (1992) explained this pattern of distribution by the predominance of sandy, rather than muddy, shores in southern Mozambique and the increase in mean wind velocity and wave energy, and the progressive decline of winter temperatures in the south.

Human population and traditional use of mangrove resources

Mozambique is a maritime country. Most of the population lives along the coastal zone. A majority of the population are fishermen and subsistent farmers. The people depend on available resources for their needs. Mangrove resources are not spared from these uses. Traditionally, mangroves were harvested to be used as poles for building houses, for construction of fishing stakes, for drying fish catches and for fences. Some favourite species are used to make simple household furniture, such as tables, chairs, cabinets and beds. Small branches were used as firewood and construction of simple household articles, such as ladders, spoons, simple benches and tables. In some areas, mangroves are used to make charcoal for cooking and heating purposes. Deterioration of mangrove areas has been mostly observed in the coastal district of Dondo in Sofala due to uncontrolled harvesting of mangrove trees for charcoal making and firewood. On the other hand, there is evidence of sustainable use of mangrove forest products in the coastal zone of Marromeu. The main difference between the two areas is the accessibility of the resource to local residents and the number of people using the resource.

Reed swamps **are dominated by** ***Phragmites australis***, ***Typha capensis*** **and occasionally by** ***Cyperus papyrus*****. In some lakes in the south, there is occurrence of a few floating-leafed aquatics like** ***Nymphaea capensis*****. All over the country, the reed swamps are a source of building material and mattresses.**

III. STATE OF NWFP STATISTICS IN THE COUNTRY

3.1 Overview of non-wood goods and services

3.1.1 Non-wood goods

The natural ecosystem contributes to all aspects of local communities providing land for agriculture, leaf litter, building materials, medicine, fuelwood, wild foods, grazing and household commodities. It is also a source of many essential services, such as traditional medicine, ecotourism, control of erosion, maintenance of soil fertility and hydrological cycles. Much of the forests are also a source of cultural symbols and sacred sites.

Miombo is the most widespread vegetation in southern Africa. However, there are very few systematic studies which attempt to measure the overall value (NWFP) of miombo woodlands to local communities and compare the woodlands as a source of economy to other activities, such as timber, crop and livestock production (Clarke et al., 1996). In Mozambique, like in other tropical countries, most of the studies consist of forest inventories which are concerned only in enumerating that part of the ecosystem which is of interest for immediate exploitation of timber (UNESCO/UNEP/FAO, 1978; Mangue, P. personal obs.).

Albano et al. (1998) in their survey on NWFP in *regulado* de Santaca, southern Mozambique, recorded 41 edible fruit species, and Xavier (1998) in a remnant of miombo, in Senhote, northern Mozambique, an area of about 6,000 ha, found 144 tree species with multiple uses.

3.1.1.1 Bamboo and palm leaves products

Trade in bamboo and palm products is mostly concentrated in urban areas, particularly in Maputo, Inhambane, Beira, Chimoio, Quelimane, Nampula, Tete and Pemba. In Maputo, there are a growing number of palm leaf processing small enterprises. The products are diverse, from furniture, through to baby's cots and carpets. The markets are large and usually located where there are more tourists, like on the roadside, in front of hotels, restaurants and along the beach. The prices vary, as can be seen from Table 3 below.

Table 3: Current prices of some non-wood goods

item (product)	price/unit (US$)	market
Single chair for the living room	30	**Costa do Sol, Shoprite**
Complete set for the living room	120 -150	**Costa do Sol, Shoprite**
Book shelf	50 -70	**Costa do Sol, Shoprite**

3.1.1.2 Wild fruits

Fruits are perhaps the most important wild food from the forest, since fruit trees bear fruits in different seasons and even in drought years. They can be eaten crude, cooked, roasted (seeds and nuts) or as a flower.

The preferred fruit species vary according to the region. Thus in Maputo the most valuable fruit trees are *Sclerocarya birrea* and *Strychnus madagascariensis*. In Manica Province, both *Uapaca kirkiana* and *Sclerocarya birrea* are known to be of greater importance due to their cultural value. Later in this report, the cultural value of these species will be discussed in detail. The value of *Strychnus madagascariensis* is based on its by-product *fuma. Fuma* can be consumed either by itself or with honey as a stable food during the hunger periods in the agricultural cycle.

Albano et al. (1998) in their survey on NWFP in "Regulado de Santaca", Maputo Province, recorded 41 edible fruit species. According to this survey, the most common fruits are *Strychnos madagascariensis, S. spinosa, Sclerocarya birrea, Hyphaene coriacea, Phoenix reclinata, Aloe sp., Ficus sycomorus, Ximenia caffra, Boscia albitrunca, Diallium schlecteri, Trichilia emetica, Antidesma venosum, Ziziphus mucronata, Grewia* sp., *Garcinia livingistonei, Dovyalis longispina, Syzygium*

cordatum, Mimusops* spp., *Manilkara discolor, Landolphia kirki, Tabernaemontana elegans, Vangueria infausta, Coffea racemosa.

3.1.1.3 Wild meat

It is believed that around 80% of rural households still depend on wild animal protein as a supplement to their diet; these are either birds, reptiles, small mammals or amphibians (Chambal, 1997).

In the past, there was a clear difference between hunting strategies. The hunting was and still is a male activity. Although the children were allowed to accompany the adult males, big game hunting was restricted to adult males while small game hunting, like mice and birds, was left to the children. The prevailing hunting methods used by adults were snares, dog chasing and traps for the children (Joaquim Tembe, personal communication).

According to Chambal (1997) most of the game animals have been drastically reduced as a result of the Tripanosomiasis Control Mission, and secondly as a result of indiscriminated hunting undertaken during the civil unrest and more recently due to a lack of resource use control and law enforcement.

Although, the legislation states that permission to hunt requires a license, in practice it has been different. The number of legal hunters is very low. Local communities hunt and sell wild meat along the main roads or at local markets. But, in general, most wild meat is for household consumption, whilst, poachers are market oriented. They hunt specifically to sell in their houses, at some specific markets or to deliver to restaurants.

In hunting concession areas, the hunting quota has been increasing drastically. From 1992 to 1994 the quota increased, in average 74% for residents and 33% for non-residents (Nhantumbo and Soto, 1994).

3.1.1.4 Edible insects

Edible insects, in Mozambique, play a very significant role in food security in rural areas providing animal protein. The most common edible insects are caterpillars and termites. Caterpillars feeding on *Sclerocarya birrea* (Maputo and Gaza provinces), *Burkea africana, Erythrophleum africanum* (Manica, Sofala and Zambézia) and *Colophospermum mopane* (Tete provinces) are the most sought after by rural households. Although, Gaza along with Tete are the most densely covered provinces with *Colophospermum mopane*, local communities report the disappearance of "mopane worms" around the 70s, but the causes are not clear (Mangue, P. pers. obs.). Caterpillars are normally harvested by women and children. They can be cooked fresh or dried.

Termites dwell chiefly in miombo ecosystems and are very common during the rainy season. Since termites are attracted to light, in rural areas the harvesting techniques consist of placing a torch in a container of water, so that they can capture them. In villages and towns, it is common to see hundreds of children with baskets around electricity poles to collect the termites all night long. Although, every member of the household gathers termites, during the peak of the termite dispersal, the main harvesting group consists of women and children.

3.1.1.5 Leaves

Leaves, mostly of herbaceous plants, contribute significantly to the diet of all rural households in Mozambique. The most common leaves consumed in Mozambique are *Adeinia gummifera, Amaranthus* sp., *Corchorus tridens, Ipomea lapatifolia and momordica balsamica.* These leaves are cooked with peanuts or *Sclerocarya birrea* nuts and consumed with rice or maize porridge.

3.1.1.6 Roots and tubers

Roots and tubers are consumed only on an occasional basis. The most important ones are *Commiphora neglecta, Nymphaea capensis, Oxalis semilobata and Scilia hyacinthina (*Albano et al. 1998*).*

3.1.1.7 Honey and Beeswax

Honey collection from the wild and beekeeping are very common practices all over the country. The most important honey trees are from miombo (in the genera *Brachystegia*) and acacia woodlands. The harvesting process often involves the use of fire. This technique kills many bees and the smog greatly reduces the quality of honey and beeswax.

Most honey and beeswax is produced traditionally by rural households. The number of traditional beekeepers has been estimated at 20,000 and the production of honey and beeswax at 360,000 and 60,000 kg per year, respectively (Nhatumbo and Soto, 1994). The production from modern beekeepers is estimated at 20,000 and 8,000 kg of honey and beeswax, respectively. In Maputo, the price of honey for domestic consumption has been increasing, from 3.66-4.16 US$/kg in 1994 (Nhatummbo and Soto, 1994) to 5.6 US$/kg in 1999 (Mangue and Nakala, current survey).

Presently, there are a growing number of people and organizations involved in beekeeping countrywide. The hard work carried out by the "Programa Nacional de Apicultura" from 1978 to 1994, can be referred to as an example of such a growing

trend. In Manica, there is an effective beekeeping association run by women and supported by AMRU, a local NGO.

3.1.1.8 Mushrooms

Mushrooms are one of the most sought after wild foods in natural ecosystems, particularly in the miombo ecosystem. The mushroom season starts with the first rains, early in November, with its peak in January. Despite the prevailing lack of officially recorded data, results from recent studies indicate that in Malawi, especially in the miombo ecosystems, 60 mushroom species were reported (Williamson cited by Clarke et al. 1996).

3.1.1.9 Household goods and wood carvings

Households in rural areas rely on locally produced goods. The local producers are highly selective of species since certain attributes are required of the wood for specific purposes (Clarke et al. 1996). The most prominent characteristics are flexibility, durability, strength and resistance to splitting.

For mortars, pestles and plates, the preferred species are *Afzelia quanzensis* and *Albizia versicolor*, and for grinders the preferred species are *Dialium schlecteri, Manilkara discolor and Newtonia hildebrandtii, Terminalia sericea, Diospyros inhacaensis and Spirostachys africana* (Albano et al. 1998, Massango unpublished). Cooking sticks and plates are made from *Afzelia quanzensis, Albizia versicolor, Cantunaregam spinosa, Trichilia emetica, Tabernaemontana elegans* and *Diplorhynchus condilocarpon* (Albano et al. 1998). For weaving baskets and hats, palm tree leaves are used but for making brooms they use only the stem. The common palm species in the country are *Phoenix reclinata* and *Hyphaene coriacea.* Fish traps are made from *Pavetta* sp. and canoes from *Balanites maughamii*. For teeth brushing *Euclea natalensis* is preferred.

Forests also provide most agricultural tools, such as hoe and axe handles. Women rely on natural shampoos for cleaning their hair, mostly from *Dicerocaryum senecioides.* For fire starting, the common species are *Brachylaena discolor* and *Tabernaemontana elegans* (Albano et al. 1998). Other goods made from wood or cane are carved stools and sleeping mats. The most preferred tree species for wood carvings are *Diospyros inhacaensis* and *Spirostachys africana.*

3.1.1.10 Sleeping mats

Among various NWFP obtained from wetlands, mat production has been recorded as the most traded locally, starting from villages to the city belts of main towns. It is

commonly used for sleeping on. However it also plays a major role in traditional ceremonies. It is made with *Phragmitis australis* and *Cyperus papyrus*.

3.1.2 Non-wood services

3.1.2.1 Wildlife

In recent last years, wildlife was, along with the beaches, the most significant tourism attraction in Mozambique. This is not surprising, since according to UNESCO/UNEP/FAO (1978), within the tropics, Mozambique has one of the world's richest fauna diversity. However, in Mozambique, most animals were victim to illicit use during the civil unrest; consequently, the population of all large mammals is well below the hunting areas and park's carrying capacity.

Wildlife plays an important role in forest dynamics as seed dispersal and pollination agents (FAO, 1995). Thus, if we agree (UNESCO/UNEP/FAO, 1978) that major adjustment in the habitat can bring about major differences in animal population, conversely, significant changes in animal population and composition can also bring about significant alterations in the forest.

In view of the dangers with which wildlife and forests are threatened in most parts of tropical and subtropical Africa, new approaches to wildlife management have emerged. These land use systems are characterized by the involvement of local communities in management of natural resources. This form of management is rooted on the belief that if wildlife still persists it is because local communities are capable of managing their natural resources in a sustainable way.

In southern Africa there are a lot of good examples of wildlife management with the involvement of local communities. Those land use systems are termed CAMPFIRE in Zimbabwe, ADMADE in Zambia, Tchuma Tchato in Mozambique, particularly in Tete province. They can sustain village nutrition, generate local income, employment and foremost conserve wildlife populations (FAO, 1995).

Table 4: Safari companies and animal number for 1994

Company	Place	Hunting concession area (nº.)	Quantity
Gaza	**Gaza-Chicualacuala**	16	245
Safrique Lda	**Sofala-Manica**	6,7,8,9,15	745
Madal Naimba	**Zambézia**	10	153
Promotor	**Sofala**	11	141
Moçamique Safari	**Tete**	Magoe	299
Southern African Wild	**Safari**	4	182
EMOFAUNA	**Zambeze/Marrome**	-	-

	u		

Source: Nhatumbo and Soto, 1994

3.2 Community based ecotourism development

In Mozambique, the best known and legally recognized community based wildlife resource management project is *Tchuma Tchato*. The name of the Project "Tchuma Tchato" in the local language has a connotation of "Our Wealth" i.e. wildlife resources under the Project area are part of the community wealth (The Bawa Village Community, 1997). Other natural resource management projects which currently involve local communities are listed below:

Project Title: Forest and Wildlife Resource Management Project (GERFFA)
Duration: 1996-2001
Locality: Sofala, Manica and Cabo Delgado Provinces
Main activities**: (i) to provide institutional support to DNFFB and SPFFBS in the above provinces, (ii) to rehabilitate Gorongosa National Park and Marromeu Game Reserve, (iii) to develop social forestry; and (iv) to carry out forest resource inventories and prepare management plans for concessions.**

Project Title: Transfrontier Conservation Areas and Institutional Strengthening (TFCA) Project**.**
Duration: 1997-2002
Locality: Gaza, Manica and Maputo Provinces
Main activities**: (i) to provide institutional support to DNFFB and SPFFBS in the above provinces, (ii) to establish a Government presence in Banhine and Zinave National Parks, Maputo Game Reserve and Futi Corridor; and (iii) to develop community participation in wildlife management.**

Project Title: Support for Community Forestry and Wildlife Management.
Duration: 1997-2002
Locality: Nampula and Maputo Provinces
Main activities**: (i) to strengthen capacity of DNFFB and SPFFBS in community projects, (ii) to support formal education at Eduardo Mondlane University, and (iii) to implement pilot community forestry projects.**

Project Title: Zambezi Valley Wetlands Conservation and Resource Utilization
Duration: 1997-2000
Locality: Sofala/Tete/Zambezia Provinces
This project is a SADC regional project involving all countries sharing the Zambezi River drainage system. It is under implementation by IUCN Mozambique Office in collaboration with a number of partners

including DNFFB. The project contributes to CBNRM objectives of the Forest and Wildlife sector through (i) wetlands inventory, monitoring and evaluation; and (ii) assessing community needs, current use of resources and tenure issues.

Project Title: Expanding Tchuma Tchato in the Province of Tete
Duration: 1997-2000
Locality: Tete Province

The Tchuma Tchato community wildlife project is DNFFB's "flagship" example of community empowerment motivating successful land use based on wildlife management. The budget provides for (i) further strengthening of the Bawa community project; (ii) expansion of the project to Daque; (iii) training for SPFFB and project staff; (iv) DNFFB monitoring of the project.

The project is administered by IUCN Mozambique and approximately two-thirds of the Ford Foundation grant has been included in the amounts allocated against the Investment Programme.

Project Title: Niassa Reserve Management Programme.
Duration: Ongoing
Locality: Niassa Province

This joint venture aims at rehabilitation and expansion of Niassa Game Reserve through an initial "holding operation" with additional funds to be raised through lease of ecotourism rights to private operators. The project includes a corporate management structure which involves Government, Investimentos Niassa and local communities as shareholders.

In developing joint ventures with local communities, the following aspects are taken into consideration: (i) local community awareness and information on the company's activities, (ii) local community motivation and awareness of proposed ways for their involvement, (iii) informing local people on ways and opportunities to raise their skills, (iv) local community information and awareness of the benefits resulting from the joint development venture, (v) local communities awareness of the viable options for the development of a joint venture and (vi) negotiation with local communities.

3.3 National parks

There are four national parks covering an area of 16,150 km^2, namely: (i) Gorongosa; (ii) Zinave, (iii) Banhine; and (iv) Bazaruto. According to the existing wildlife law, ecotourism development within the National Parks is limited to non-consumptive wildlife resource uses, such as game viewing and photographic safaris,

etc. Qualitative and quantitative data on National Parks is presented in Table 5, below.

Table 5: National Parks: location and size

national park	province	area km^2	notes
1. Banhine N.P.	**Gaza**	7,000	**Rehabilitation commenced July 1997 -TFCA project**
2. Gorongosa N.P.	**Sofala**	5,370	**Rehabilitation commenced 1996 under ADB project**
3. Zinave N.P.	**Inhambane**	3,700	**Rehabilitation commenced July 1997 -TFCA project**
4. Bazaruto N.P.	**Inhambane**	80	
	TOTAL	16,150	

3.3.1 Background to the Gorongosa National Park

In 1920, part of the Gorongosa (Vila Paiva de Andrade) District was set aside as a controlled hunting area to serve as the main source of animal protein to feed labour in major sugar and coconut plantations established at that time in the region. By 1935, the initial 1,000 km^2 of hunting area was turned into a Game Reserve and the size increased to 3,000 km^2. The first Headquarters was established in the early 1940s but due to floods, a year later it was abandoned and became the resting spot for lions -"lion house". By late 1950s, the Chitengo site was selected and a new headquarters was erected. In 1960, the game reserve was upgraded to a National Park with the actual surface area of 5,300 km^2.

Until the breakout of the civil war, Gorongosa National Park had two major tourist camps: Chitengo and Boa-Vista - and the number of visitors reached its peak of 11,000 people in 1973. Due to the prevailing instability in the region and several attacks, the Park was closed in 1983 and all management and tourist activities ceased. All the Park's infrastructures were destroyed and the diverse and abundant wildlife reduced to a minimum.

In 1995, an emergency programme funded by the European Community and implemented by IUCN-ROSA, was designed to establish an anti-poaching holding team and initiate the rehabilitation work.

In October 1996, this programme ended successfully and GERFFA (Forest and Wildlife Management Project) of the National Directorate of Forestry and Wildlife (DNFFB) took over. Today a provisional Park HQs has been established in Chitengo after the rehabilitation of some ruins of the old camp and management activities have been re-established, including anti-poaching operations which are being carried out from 13 ranger posts established on the perimeter of the Park.

GERFFA project funded the by African Development Bank is entrusted with the responsibility of rehabilitating the park's infrastructures, establishing sound management practices, promoting applied research and creating the basis for tourism development.

3.3.2 Eco-tourism development facilities in the GNP

The National Tourism Policy of Mozambique aims at attracting national and foreign tourists to benefit from the existing natural resources, and national and foreign investors to invest in developing those resources, enabling visitors to enjoy the tourism product, project a prestigious image of Mozambique to the World, create more job opportunities for Mozambicans, secure the participation of local communities as a way to guaranteeing their sustainable development, promote the development of regional and internal tourism, develop high quality regional and international tourism and give priority to, and provide incentives for, national entrepreneurs in the development of tourism.

3.3.3 Description of the area

The Gorongosa Natural Resource Management Area (GNRMA) is situated in Sofala Province in central Mozambique, between the lower reaches of the Pungue and Zambezi rivers and extending from Gorongosa Mountain eastwards to the coast, within the Districts of Gorongosa, Marromeu, Mwanza and Cheringoma.

3.3.3.1 Landscape

Bisected by the Urema Trough, which is the southern end of the Great Rift Valley system of east Africa, the area can be divided into five regions, namely the Gorongosa Mountain, Gorongosa Plateau or midland, the Urema Trough, Cheringoma Plateau or Cuesta and the Cheringoma Coast.

3.3.3.2 Vegetation

The region has 43 vegetation types which can be put into 7 major groups; open mountain grassland, miombo woodland, savannah woodland, grasslands, riverine vegetation, mangrove and coastal dune vegetation. Within the five landscape regions identified in 2.1.1, the vegetation type areas are as follows:

Gorongosa Mountain **- Open Mountain Grassland occurs on the summit, associated with marshy drainage lines in places. Granite outcrops on the summit are surrounded by thicket and short mountain forest, which merges with the more extensive tropical rain forest on the slope. Savannah woodlands occur on the lower**

slopes of the mountain. As an isolated inselberg, Gorongosa Mountain has many plants, which are unique to the region.

Gorongosa Plateau **- The plateau is largely covered by savannah woodlands of the "Hill Miombo" type, which form a closed canopy savannah. Glades or patches of open grassland are also encountered in this region.**

Urema Trough **- Dry forest is found on the sandy areas of old river beds and alluvial fans, while tall tree savannahs with different dominant species are found on sandy clays and loam. Grasses are tall to medium height perennials. The floodplain consists of short open grasslands, especially on southern and north-western plains around the Urema Lake. In areas with abundant large termite hills, these are covered by trees or bush thickets forming islands in the area of open grassland or savannah cover.**

The Cheringoma Plateau or Cuesta **- The steep, westward slopes are covered by miombo woodlands with dry forest and thicket along the lines of numerous reverie and tall ravine forest trees growing along the ravine floors. To the east of the escarpment, on the gently undulating deep slopes, miombo woodland is interspersed with water logged drainage line grasslands or dambos. Where the dambos are incised, their banks support gallery forests or swamp forests in areas of poor drainage. On lower areas near the coast, thickets of heath are found.**

The Cheringoma Coast **- The Zambezi Delta alluvial grasslands and papyrus swamps narrow to the south behind broad areas of mangrove forests along the delta front and at the mouths of Cheringoma rivers. On the drier areas, palms and clumps of savannah lie between the flood channels. These merge into the dambo miombo and the forest of the Cheringoma cuesta. The coastal line consists of a low plain with straight beaches and lower barrier dunes fixed by scrub thicket. At the river mouths, extensive mangrove swamps and salt marches occur behind sand pits.**

3.3.3.3 GNP potential for wildlife

The GNRMA is potentially home to a wide variety and abundance of wildlife, ranging from rare birds to large mammals. Gorongosa Mountain is particularly well endowed with many mountain forest birds, some of which are unique to the area.

The miombo woodlands of the Gorongosa plateau also have a wide variety of birds, as well as being the prime habitat for Sable and Liechtenstein's Heartbeats among other ungulates.

The Rift Valley, apart from a variety of different birds some of which are of international significance like the Wattle Crane, used to support large numbers of Buffaloes, wildebeest, hippo, elephant, zebra, lion, waterbuck, sable, eland reedbuck

impala, kudu, nyala, bushbuck, oribi, duikers and suni. Although hunting for ivory and meat has decimated most of these herds by various armed groups between 1983 to 1995, positive recovering of most species has been observed lately (Zolho and Dutton, 1997)

3.3.3.4 The unique physical features of the region

Several unique features are recognized in the GNRMA which make it worth considering for future integrated development for specialized markets.

3.3.3.5 Biological diversity

By virtue of its physical structure and relief and associated changes in vegetation, the area between the coast and Gorongosa Mountain is one of the regions with the highest biodiversity in Mozambique. The ecosystems form a grid pattern, through the north/south Rift coast parallel zones, cross/linked by riverine bands from inland to the coast, and off both slopes of the cuesta (Tinley, 1997) have been identified 74 different vegetation systems, 15 geological formations and some 40 soil types. This has given rise to an extraordinarily rich flora with thousands of different species; a high species diversity of reptiles, frogs and fish, with at least one endemic (a mountain minnow); an avifauna of 500 or more species; 25 wild ungulate species including seven miniature antelope; six primates and three galagos (Tinley, 1995).

3.3.3.6 Scenic values

From Gorongosa Mountain on a clear day views of the surrounding countryside reach as far as the frontier mountain range to the west and the Chiri river confluence with the Zambezi to the North. Views of the mountain from the Rift Valley are imposing, while the limestone ravines of the western Rift Valley wall (Cheringoma Plateau) are spectacular. The delta plains and the coast are interesting while the feeling of an untamed African wilderness permeates the entire area.

3.3.4 Background to the Zinave National Park (ZNP)

Zinave National Park is approximately 3,700 km^2. It has some of the best wildlife habitats in southern Africa. It was, initially, declared a hunting concession in 1962 and was run by Mozambique Safarilandia, and was upgraded to National Park status in 1972. Most of the ZNP is located in the north-western corner of the Mabote District of the Inhambane Province.

3.3.4.1 Hunting and fishing in the context of ecotourism development

Fishing and hunting, which forms the livelihood of a number of people who net and dry fish or seek meat for their own consumption or for sale, is currently taking place mainly along the Save River which crosses the ZNP.

3.3.4.2 ZNP potential for wildlife

The species which were found in the recent past and those which are present today, are shown in Table 6.

Table 6: Large mammal species which are known to have occurred in ZNP and their present status.

Species	Status
Elephant	Nil
Black rhino	Nil
Hippo	Said to be about 100 left
Giraffe	Nil
Buffalo	Nil
Zebra	Nil
Eland	Nil
Kudu	Few still present
Nyala	Few still present
Bushbuck	Few still present
Roan antelope	Nil
Sable antelope	Nil
Waterbuck	Nil
Common reedbuck	Very few.
Wildebeest	Nil
Lichtenstein hartebeest	Nil
Impala	Few still present
Steenbok	Common in suitable habitat
Sharpe's grysbok	Common in suitable habitat
Klipspringer	Common in suitable habitat
Grey duiker	Common in suitable habitat
Suni	Common in suitable habitat
Warthog	A few present
Bushpig	Present
Lion	Nomads pass through
Leopard	Few still present
Cheetah	Nil
Wild dog	Nil
Spotted hyena	Few still present

Font: Transfrontier Conservation Areas and Institutional Strengthening Project (TFCA)/DNFFB

3.3.5 Game reserves and hunting areas

Game Reserves in Mozambique, most of which are under rehabilitation programmes, cover three provinces, namely: Niassa, Zambezia and Sofala, and extend over an area of 18,600 km^2 (see Table 5).

Table 7: Game Reserves

game reserve		province	area km^2	notes
1.	Gile	Zambezia	2,100	**Status uncertain. Air survey planned for 1997 under ADB project. Rehabilitation 1998**
2.	**Marromeu**	**Sofala**	1,500	**Rehabilitation commenced 1996 under ADB project with further inputs from Zambezi Wetlands project**
3.	**Niassa**	**Niassa**	15,000	**Better status of wildlife than other areas. Receiving assistance under joint venture with MADAL.**
TOTAL			18,600	

Private sector investment is being sought in the context of the overall five year Agriculture and Fisheries Development Master Programme, to rehabilitate all Game Reserves. Presently, two of the above areas are already under agreements with private sector investors. Niassa Game Reserve is receiving support under an agreement with Grupo Madal and Maputo Game Reserve is under an agreement with Blanchard Mozambique Enterprises.

The main activities for ecotourism development, other than rehabilitation, are (i) ecological monitoring (ii) reserves management (iii) community mobilization and awareness campaigns and (iv) concessions development and joint management agreement promotions.

The hunting areas, in turn, cover about 51,206 km^2. Most of the hunting areas are concentrated in four provinces: Manica (37 %), Sofala (30%), Gaza (19.5%) and Inhambane (13%).

There are 13 gazetted hunting areas in Mozambique ranging in size from 300km^2 to 12,300km^2 and totalling 59,700km^2 in area (see Table 6).

To make investment attractive in these hunting areas, private safari hunting operators require a reasonable period of lease, probably not less than 10 years.

Table 8: Hunting areas "Coutadas"

hunting area		area km^2
1.	**Coutada 4**	12,300

2.	**Coutada 5**	6,868
3.	**Coutada 6**	4,563
4.	**Coutada 7**	5,408
5.	**Coutada 8**	300
6.	**Coutada 9**	4,333
7.	**Coutada 10**	2,008
8.	**Coutada 11**	1,928
9.	**Coutada 12**	2,963
10.	**Coutada 13**	5,683
11.	**Coutada 14**	1,350
12.	**Coutada 15**	2,000
13.	**Coutada 16**	10,000
	TOTAL	59,704

3.3.6 Trading and marketing

Game ranching, ecotourism development, game farming, commercial and sport hunting, are some of the diversified wildlife services in Mozambique. Wildlife products trade and marketing, including wild and live animal exports, constitute a more common service. Table 9 shows a wide range of services offered by the wildlife sector.

Table 9: Wildlife services by company and region

region	province	location	company or project name	service	remarks
	Maputo		**Chikwirimiti Moçambique**	4,5	**on going**
	Maputo	**Umbeluzi**	**Crocodilo de Umbeluzi**	3	**interrupted**
	Maputo	**Matutuine**	**Machangulo Reserva da Natureza**	2,4	**on going**
	Maputo	**Sabie**	**Korumana Joint Safaris**	1,2,4	**to commence**
	Maputo	**Magude**	**Reserva de Caça de Mapulanguene**	1,2,4	**n.a.**
	Maputo	**n.a.**	**African Dive Safaris**		
		n.a.	**(P.Manoli)**	2,5	**n.a.**
	In'mbane	**n.a.**	**Criação de Crocodilos**	3	**interrupted**
	In'mbane	**n.a.**	**Crocodilos de Moçambique**	3	**on going**
Southern	**Gaza**	**Coutada 16**	**Gaza Safaris de Moçambique**	4,5	**on going**
Region	**Gaza**	**Chigubo**	**Safaris de Banhine**	2,5	
	Tete	**n.a.**	**Safaris de Caça**	2,5	**on going**
	Tete	**n.a.**	**Safaris de Moçambique**	2,5	**on going**
	Tete	**Zumbo**	**Chumachato**	6	**on going**
	Manica	**n.a.**	**Crocodilos de Manica**	3	**cancelled**
	Manica	**n.a.**	**Captura de Répteis**	3,5	**to commence**
	Manica	**Dombe**	**Rancho da Caça Stimbak**	1	**to commence**
	Manica	**Coutada 4**	**Díceros Lda**	4	**in rehabilitation**
	Manica	**Coutada 7**	**Kambako Investimentos**	4	**in rehabilitation**
	Manica	**Coutada 9**	**Rio Save Safaris**	4	**in rehabilitation**
	Manica	**Coutada 13**	**Nhati Safaris e Turismo**	4	**in rehabilitation**
	Sofala	**n.a.**	**Zambeze Delta Safaris**	2,4	**on going**
	Sofala	**n.a.**	**Captura e Exportação de**		

	Sofala	**n.a.**	**Animais**	1,5	**on going**
	Sofala	**n.a.**	**PGS Safaris Mozambique**	2,4	**to commence**
	Sofala	**n.a.**	**Coovida Moçambique**	2,5	**n.a.**
	Sofala	**Coutada 5**	**SEI**	4	**in negotiation**
	Sofala	**Cout's 6/15**	**Moçambique Safaris**	4	**in rehabilitation**
	Sofala	**Coutada 10**	**Bahati Adventures**	4	**in rehabilitation**
	Sofala	**Coutada 11**	**Promotur**	4,5	**on going**
Central	**Sofala**	**Coutada 12**	**Companhia de Moçambique**	4	**in rehabilitation**
Region	**Sofala**	**Coutada 14**	**Wicker Trading Consultants**	4,5	**on going**
	C.Delgado	**Lugenda**	**Lugenda Safaris**	2,4	**n.a.**
	C.Delgado	**Montepuez**	**Reserva de Kambako**	2,4	**on going**
	C.Delgado	**I. Q'mbas**	**Quirimbas**	2,6	**in negotiation**
Northern	**Niassa**		**Gestão e Desenvolvimento**		
Region			**da Reserva do Niassa**	2,4,6	**on going**

Source: TFCA 1998 annual report

Note: **Wildlife service in column 5: Game ranching (1), Eco-tourism development (2), Game farming (3), Commercial and sport hunting (4), Others including wildlife animals or products exports (5), Community based wildlife resources management (6), n.a. information not available**

Data from existing working documents and reports at the Investment Promotion Centre (Table 7), have shown how fast private investment initiatives have been growing all over the country since the peace accord was signed and an economic recovery programme was commenced, and particularly in response to the recently introduced code for fiscal benefits and other incentives introduced by the government. Apart from these companies, the following private enterprises are involved in wildlife products exports:

Table 10: Wildlife products export and destination

Nbr	company	product	destination
1	**Mozambique Reptile Exporters**	**live animals**	**USA, Canada, Switzerland**
2	**Expofauma Lda**	**live animals**	**Portugal**
3	**Simão Barbosa**	**carving**	**Portugal**
4	**Jowa Safaris**	**live animals**	**RSA, Germany, Japan, USA**
5	**Ibranse International Moçambique**	**live animals**	**France, Japan**
6	**Chikwirimiti Moçambique**	**live animals**	**USA**
7	**Moçambique Safaris**	**leather**	**France**
8	**Gaza Safaris**	**leather, trophies**	**RSA,**
9	**Promotur**	**leather, trophies**	**RSA,**

3.3.7 Traditional beverages

3.3.7.1 Sclerocarea birrea

One of the most important trees for non-wood services in Mozambique is *Sclerocarea birrea*, in Portuguese known as "Canhoeiro" and "ncanhi" in ronga, mostly spoken in Maputo city belt.

***Sclerocarea birrea* is the most highly valued tree for the Ronga ethnic group. Probably due to this fact, a most striking phenomenon, in the areas cleared for fuelwood or shifting cultivation, *Sclerocarya birrea* is the only species left behind.**

Although planting of indigenous fruit trees is not a common practice in rural households, they are commonly selectively retained when the farmer clears the land for agriculture. These trees make up the bulk of trees left standing on many rural farms (*machambas*). The importance of fruit production in making decisions regarding tree clearance is suggested by the removal of male (non-fruiting) S. b. from arable lands. They cut male trees but leave 2 to 3 in order to pollinate the female ones (Junod, 1974).

***Sclerocarea birrea* belongs to the *Anacardiaceae* family. It is a medium sized tree up to 10 m in height, but in good sites it may reach 18 m (Carvalho, 1968). It does occur in medium to low altitudes in open woodlands (Palgrave, 1977). The canopy is round and flowering is in unbranched sprays, 5 to 8 cm long. Sexes separate, on the same tree or on different trees. When this form is dominant, local people clear the trees bearing male flowers, leaving 2 to 3 trees per site for pollination (Junod, 1974). Fruits are produced from January to March, and they are fleshy almost spherical varying from 3 to 4 cm in diameter, indehiscent, yellow when mature. The fruit usually ripens on ground in mounds gathered by children and women.**

The fruits can be used to produce an alcoholic drink called "*Ucanhe or Bucanhe*". The pulp is said to contain four to eight times as much vitamin C as orange juice (Palgrave,1977; Makombe, 1993). According to Makombe (1993), 70% of the people in southern Africa eat the fruit which is a seasonal staple in local diets. Without this valuable contribution, many children, who are most vulnerable and the chief consumers, would be affected by dietary deficiency diseases.

Each fruit has a single stone (container), inside which there are usually 2 or 3 seeds. These nuts may be eaten either raw or cooked. The Ronga use it as a substitute for peanuts or oil for special meals since they are rich in protein. The stones are used for a game called "*ntchuba*" or by witchdoctors in their divination. The bark is used in the treatment of dysentery and diarrhoea. It is also believed to prevent malaria, particularly if gathered before the first flush of leaves.

A feast celebrating the first fruits of *Sclerocarea birrea* symbolises the celebration of good crops. This feast is performed by the elders of the *regulado* by pouring a libation of the fresh juice over the tombs of their dead chiefs (Junod, 1974, Palgrave, 1977).

3.3.7.2 Palm wine

There are two types of palm wines: *Sura* and *Utchema*. The first is produced from an exotic palm tree (*Cocus nocifera*), mainly in Inhambane and Zambézia provinces.

The second wine is obtained from indigenous palm trees (*Hyphaene coriacea* and *Phoenix reclinata*); it is, actually, the most common and produced largely all over the country. *Hyphaene coriacea* and *Phoenix reclinata* occur in savannahs located on clay soils which are subject to annual flooding. This activity constitutes big business for a majority of households located along main roads. The production is continuos throughout the year. In Matutuine, south Mozambique, the peak of production is at the beginning of the rainy season, with 20 litres per day (Albano et al., 1998). Contrarily, Koppell (1990) reports that in Cameron the peak of production occurs during the dry season.

3.3.7. Medicinal plants

The demand for medicinal plants is over 80% of the population (Nhatumbo and Soto, 1994). The forest is highly inhabited by traditional healers "curandeiros". Their knowledge is passed on in the family after death through the spirit or medium. The forest is highly valued as a source of medicinal plants for those traditional healers. Both rural and urban people travel long distances in order to get treatment or to solve all spiritual problems.

The traditional doctor is a healer, diviner, adjudicator, and protector of his whole community (Iwu 1993). Thus, when the birth process is difficult a traditional healer is consulted (Junod, 1974) even though it is usually attended only by ladies and is done at the back side of the hut (*mahóssi*) of the pregnant lady where the hut is surrounded by mattresses to avoid bad looks, when labour is difficult, the traditional healer is consulted (Junod 1974).

For Ronga in the southern part of the country, the healer is also consulted to name a new born child. Babies born premature born that are thin or weak are wrapped in leaves of *Ricinus communis* and in a big pan subject to treatment and exposed to the sun (*Tobane*). One week after birth, medical treatment and a religious ceremony called "*cu tjibela chirenguelene*" are performed. This treatment consists in placing all kinds of pieces of wild animals skins, such as antelope, elephant, hippopotamus, rodents, hyenas, snakes near to the fire until they burn. When they finish smoking, the new born baby is wrapped with smog and the child cry expire. At last, the doctor takes the remaining skin and mix it with the oil *Trichilia emetica* and spreads the unguent on the child, mainly around the articulations, and he smoothly distends it in order to help the baby to grow. This treatment has a preventive function, against all threats from by wild animals, after this the child can leave the hut.

Although the knowledge and use of medicinal plants are centred or dominated by traditional doctors, it is not only restricted to them. Each member of the community has a reasonable knowledge of first aid treatments particularly concerning the most common diseases like diarrhoea, fevers, and snake and insect attacks. This knowledge, contrary to the knowledge of traditional doctors, is passed on in the family.

In the southern part of the country, Licuati Forest, the most sought out medicinal plant is *Waburdia salutaris* and *Securidaca longipedunculata* (Halafo 1996, Adamo et al 1997, Massango unpublished). Over-exploitation of traditional medicinal plants is a result of large scale commercialization in urban areas, a breakdown of taboos and the introduction of more efficient tools such as cane knives and metal axes (Cunningham, 1997).

The most common parts of plants collected are leaves, roots and bark. The high frequency of roots, bark or bulbs as medicines at markets in southern African region, (Cunningham, 1997) might be explained by the fact that the savannah trees and grasses have a high proportion of their biomass underground (Scholes and Walker, 1993). This behaviour is probably an adaptive response due to an erratic water supply and low fertility, supported by fire regime.

According to Cunningham (1997), due to high level of expectations, high unemployment rates and a psychologically stressful environment, many of the traditional medicinal plants and animal materials sold in urban markets have symbolic or psychosomatic value for luck in finding employment, guarding against jealousy, etc.

Massango (unpublished) surveyed 39 medicinal plants in regulado of Tanga, and Adamo et al. (1997) in four regulados, namely: Tinonganine, Kumbane Norte, Tanga and Jabula, recorded 46 species. Some of the recorded species are: *Walburgia salutaris, Balanites maughamii, Tarenna sp., Securidaca longipedunculata, Zanthoxylum sp. Bridelia cathartica, Synaptolepis kirki, indigofera sp. Xylotheca kraussiana, Acridocarpus natalitius, Erythopheum lasianum, Brachylaena huillensis, Ochna sp. Garcinia livingstonei.*

IV. MARKETING

There are basically two types of markets for NWFP: (i) the formal market, which is located in villages or towns. This type of market mainly deals with medicinal plants, wild meat, wild foods, baskets and furniture; and (ii) the non-formal market, widely spread in the country. Both types of marketing involve people of both sexes, including children and elders. Children usually are specialized in wild fruits gathering and selling along the main roads, while women on wild foods gathering or trading. Most men (elder people included), with the help of children, are involved in hunting, beekeeping, palm tree wine production, weaving of baskets and furniture. In big towns like Maputo, Beira and Nampula, baskets and other palm tree goods are made by the home guards during watching time. The gathering and marketing of medicinal plants is more complex since it involves very specialized people. In most parts of the country, the knowledge of medicinal plants is a family property. The transport of most of NWFPs is either by road or by train.

V. PROPERTY RIGHTS

Property rights can be divided into four categories: (i) private property, (ii) common property, (iii) open-access resources and (iv) state or public property (FAO 1995, Matosse and Wily 1996).

Although, in Mozambique all land is owned by the State which can grant title for occupation and use, but not ownership, to individuals and judicial entities, the new land law approved in July 1997 recognizes the existing customary rights of rural communities and its role in conservation of natural resources.

In rural areas, local communities live on a complex system of tenure and access. Thus, although the access to the resource may be classified as open, the pattern of land -use is established on a clan system in which rights of cultivation and other agricultural land-use practices are vested in the chief or regulo. Although, there are different clans in the same tribe and the customs vary from one clan to another (Junod 1974), rights of use are granted and controlled by this regulo as custodian of the people's cultural heritage and land. This form of resource-holding in the past was greatly respected. But, currently there are some frictions between regulados. The authority of the chief was diluted by centralized government and due to civil unrest that disrupted the socio-economy of the country from 1975-1992. The area under jurisdiction of a regulo is called a "regulado". Boundaries between regulados are defined and agreed upon by the regulos.

VI. LOCAL COMMUNITY EMPOWERMENT

The conservation of NWFP clearly requires the recognition of local communities' rights to their natural resources. Therefore, empowerment of local communities would encourage them to maintain their resources on a sustainable basis by application of indigenous knowledge systems and modern technologies. An indigenous Knowledge System is part of traditional management practices and is passed down orally from generation to generation.

VII. CONCLUSION

Countrywide, local communities are the principal consumers of the NWFP products especially in rural areas. Forestry and wildlife management plans will definitely need to incorporate the NWFP component to ensure both sustainable use and social benefits. Presently in Mozambique, there is a lack of systematized and recorded statistics on NWFP. In addition the NWFP is indeed a new approach in the context of forestry and wildlife resources integrated management planning.

Therefore much more work in this regard will be required and this study must be complemented with some other studies, which will better enable the environment to

prepare for community-based natural resources management programmes which will in turn seek to re-establish a sound use and enhance conservation of biological diversity in so called open access areas.

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