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Community Forestry in North-Eastern Namibia

# Assessment of Non-Wood forest products in eastern Caprivi

*Draft*

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## *Present Status and Prospects for NWFP in Eastern Caprivi Region – a discussion paper*

### Summary

Non-wood Forest Products constitute an integral element of forest utilization in eastern Caprivi – for subsistence as well as for cash purposes. At the present stage it is recommended to focus on NWFP that reflect immediate felt needs of the community instead of creating undue expectations by fictitious products and markets. Potential fields of intervention are the promotion of **indigenous vegetables** and the propagation of specific rare and highly valued **medicinal tree and shrub species** (e.g. *Securidaca longepedunculata*, *Bobgunnia madagascariensis*, *Friesodielsa obovata*, *Xylopia sp.*). Indigenous vegetables have the advantage of being ecologically adapted and in addition provide short-term benefits. Some of the indigenous **fruit trees and fruit-bearing shrubs** (e.g. *Flacourtia indica*) could be propagated on a trial basis as some of them in addition have a potential for agroforestry purposes (e.g. hedges, live fences). Basketry (made of palm leaves) and dyes form important sources of income in eastern Caprivi. Alternative sources for **dyes** are required. Raw materials that are traditionally used for this purpose (e.g. the bark of *Berchemia discolor*) are declining and measures for the promotion of these important species have to be undertaken. The establishment of **palm groves** can form an interesting component in a community forestry approach, however little experience is available up to now. Certain species used for **carvings** (though strictly speaking they do not belong to NWFP: see definition of NWFP below) should be propagated (for enrichment plantings) and remaining stands be protected and included in management plans, e.g. *Dalbergia melanoxylon*, *Bobgunnia madagascariensis*, *Schrebera trichoclada*. The marketing potential for many non-wood forest products at present is limited. Specific issues like bee-keeping have to be dealt with in a separate survey. With regard to NWFP gender issues are of great importance as it is often the women who are involved in NWFP collection, processing and marketing.

### Definition of NWFP

*“Non-wood forest products consist of goods of biological origin other than wood, derived from forests, other wooded land and trees outside forests” (FAO, 1999).*

This discussion paper follows primarily the above definition and deals with *Non-wood forest products*, not with *Non-timber forest products*. Animals are however not included in this paper with the exception of edible insects (caterpillars) as their occurrence has specific implications for forest management activities. In this report - in addition to the above-mentioned definition - in some cases “*Non-timber*”- information about tree species is also indicated (e.g. crafts, carving)

According to the definition by FAO the term “*Non-timber forest products*” includes so called “*small woods*” (household items, carvings etc. ) and fuel wood, whereas the “Community Forestry toolbox” (DED, 2002) excludes the latter.

NWFP can be grouped as follows:

- Plants and plant products for consumption: fruits, spices, oils, teas etc.
- Animals and animal products for consumption (caterpillars)
- Non-edible plant products
  - a) Thatching grass, basquetry, dyes, cords, tools, fish poison etc.
  - b) Plants and plant products used for medicinal purposes
  - c) Plants and plant products used for cultural purposes

## 1. Introduction

Since the 1980's foresters, conservationists and NGO's have become increasingly interested in non-wood forest products as an integral element in forest utilization particularly in the tropics and subtropics. NWFP not only play a vital role for subsistence purposes for local communities but often constitute the basis for rural economies. In addition a number of forest-bases non-wood products has even entered international markets. Despite the importance of NWFP, its role in forest policies, forest management and forest assessment is still neglected and seldom fully recognized. However the potential of NTFP/NWFP is not undisputed:

*"After early enthusiasm about the potential of NTFP's to provide sizeable incomes to local people and thereby reduce poverty and provide incentives for forest conservation, a number of limitations and concerns about this potential have emerged. ... The majority of these products have low cash values and are used for consumption, rather than for sale. Many are important, especially to the poorest, because they are low cost, on common property land and are used by people because they have no alternatives. NTFP's often play critical roles as safety nets by providing food or income in times of shortage, as important dietary supplements, especially for children ... . Generally speaking, it is important to recognize these values, even if they are difficult to quantify, and to protect them where possible. But such products do not, in most cases, provide a viable basis for improving income."* (Wollenberg and Belcher, 2001).

Also Wilkie, Clark and Godoy (2001) raise concerns in this respect:

*"... studies suggest that tropical rain forests are worth more for their global rather than their local values and that NTFP's may be less likely than previously thought to provide economic incentives to conserve tropical forests. ... Yet one must be cautious before attaching too much weight to the insurance value of the forest. ... There is growing evidence that as NTFP's increase in value there is a trend toward overharvesting of wild resources, increased on-farm production and exclusion of resource users by resource managers. Without reforms in relation to who has access to NTFP's most commercially valuable NTFP's will be over-harvested in the wild. On-farm cultivation will increase the economic value of NTFP's to landowner families, but will decrease NTFP access for landless families. On-farm cultivation of high value NTFP's may reduce pressure to harvest from the wild, but may increase incentives to clear forest to cultivate these new crops."*

For many reasons it seems to be wise for forestry projects not to overestimate the role of NWFP for income generation and not to raise expectations that in the future prove to be unrealistic.

In 2001 the launch of the Southern African Natural Products Trade Association SANProTA raised hopes for a better marketing infrastructure of NWFP. Primarily this association *seeks to enable poor rural communities to generate meaningful incomes from the sustainable utilization of natural resources. But more than that, SANProTA is trying to bring rural producers from traditional, subsistence production into export markets.* (Press release SANProTA). SANProTA has chosen four priority species:

- *Manketti tree – Schinziophyton rautanenii*
- *Baobab tree - Adansonia digitata*
- *Wild melons – Cucurbitaceae*
- *Sausage tree – Kigelia Africana*

*SANProTA will consider several hundred species that are produced in member countries, examining commercial interest and markets, product availability, technology and impact on the local economy.*

With regard to the development of products SANProTA focuses on:

- *Juices and Water*
- *Oils and Soaps*
- *Paper Products*
- *Cosmeceutical / Nutraceutical / Pharmaceutical Ingredients*
- *Herbal teas*
- *Jams and preserves*

#### Recommendation

The Community Forestry programme should become a member of SANProTA. The members "get special services such as trade promotion, market information, technical advice, priority access to product research and development grant funds and ... members reports, news updates and publications, market information news and technical specification requirements for products. The latest scientific product research and development findings etc.

### 3. Forests in Caprivi region

Mendelsohn and Roberts (1998) give detailed information on vegetation units and forest composition in the Caprivi region. The three mayor vegetation types are: Kalahari woodland, Mopane woodland and Zambesi floodplains. At least 200 tree and shrub are likely to occur in the region. A list based on distribution maps (v. Wyk and v. Wyk, 1996) and other sources can be found in Annex 1.

Kalahari woodland is found on sand dunes and interdunes in the Caprivi strip and extensive sandy plains in eastern Caprivi. In eastern Caprivi the Kalahari woodland consists to a large extent of a mosaic of Teak and/or *Burkea*-dominated vegetation types found on deep Kalahari Sands more or less north to the road Kongola – Katima (and on a narrow strip south to that road). Important timber species are *Baikiaea plurijuga*, *Burkea africana* and *Pterocarpus angolensis*. This vegetation type contains interesting indigenous fruit trees like *Dialium engleranum*, *Guibourtia coleosperma* and *Schinziophyton rautanenii*. *Baikiaea plurijuga* is the only species that can be economically harvested at the moment. However the financial benefits are rather small. The fact that the timber trees are scattered all over the huge State Forest makes the logging time consuming and costly. The area covered by Kalahari Woodlands is an estimated 230 000 ha (based on the extent of Kongola constituency, which is 202 000 ha) with (less than) two thirds covered by the State Forest and (more than) one third on communal land. As large parts of formerly forested communal land is under cultivation and used for grazing or lost due to the establishment of quarantine camps, it is estimated that the area of Kalahari woodlands on communal land probably hardly exceeds

40 000 ha. Mopane woodlands are found in an area of old river drainage lines, which are being covered by wind-blown sand deposits. As the name of this vegetation unit implies, the occurrence of *Colophospermum mopane* is one of the characteristic features of this vegetation type. But also *Terminalia sericea* and *Burkea africana* often play an important role in the Mopane woodland units. In fact Mopane woodlands seem to be of a more heterogenous nature than the Kalahari woodlands and consist of a large number of fairly different vegetation types. Mopane woodlands in other areas of Namibia are producing large quantities of mopane worms with high economic returns. In the Caprivi region this activity however does not play a significant role – probably

because the occurrence of mopane worms seems to be site-dependant (...). The potential of Mopane Woodlands for NTFP seems to be limited. Zambesi woodland constitute of wooded "islands" in an area of seasonally inundated grasslands. Important indigenous fruit trees like *Diospyros mespiliformis*, *Parinari curatellifolia*, and *Garcinia livingstonei* are found here. *Syzygium guineense* and *Syzygium cordatum* – both with edible fruits - occur along permanent watercourses.

#### 4. Important NWFP in Eastern Caprivi Region

The following NWFP's are of particular interest in the Eastern Caprivi Region and are discussed:

- Indigenous fruit trees
- Thatching grass
- Basketry and dyes
- Indigenous vegetables
- Medicinal trees, shrubs, herbs
- Fodder trees
- Grass and sedge species for mats

##### 4.1 Indigenous fruit trees

The important roles and functions of indigenous fruit trees and plants within farming systems and rural livelihood strategies are increasingly recognized internationally, regionally and locally. There is a growing opinion that improved utilisation of these resources could contribute even greater benefits to household food security, agricultural and forest industries and small and microenterprise development. Indigenous plants are also tolerant of the marginal agricultural conditions in Namibia and could offer significant opportunities for agricultural diversification and innovative agro-industries (CRIAA, 2000). Indigenous fruit trees are often protected by customary laws. For example in the Mafwe culture the cutting of a fruit tree was sanctioned with two cows (Hinz, 1995). The potential for the marketing of indigenous fruit trees (IFT) however should not be overestimated though some IFT have gradually entered the market and made a substantial contribution to household income. But even the so-called obvious success stories like "Amarula" liquor have to be treated with caution as in this case "*the marula content of the product is very low and the nature-identical flavouring is made in a laboratory*" (CRIAA, 2000). It remains to be seen, whether fruits like *Parinari curatellifolia* or *Berchemia discolor* are attractive enough to compete with "established" exotic fruits on the supermarket shelf. In addition most of the more promising IFT in the Caprivi region like *Diospyros mespiliformis*, *Adansonia digitata*, *Parinari curatellifolia*, *Syzygium guineense*, *Garcinia livingstonei*, *Manilkara mochisia* and others don't seem to occur in larger quantities and are restricted to fairly specific sites. *Sclerocarya birrea* and both *Ximenia* species also occur but are nowhere abundant. Species like *Berchemia discolor* and most of the other species also occur in other regions of northern Namibia and marketing has to be seen in the light of competitiveness. It seems to be important not to raise high expectations about the IFT marketing potential among the local population. Because of the importance of IFT in terms of nutritional value for the local population it also seems to be particularly important not to disrupt local collection and consumption patterns by creating an artificial demand and by opening up marketing channels which later prove to be uncontrollable and disadvantageous to the local population. It has to be clearly shown that on a local scale the offer exceeds the demand for subsistence purposes. The approach is also questionable as IFT

which are not found on established and cultivated fields are accessible for everyone in order to collect the fruits. What are the implications of profit-oriented fruit collection for customary laws? Who will have the right to collect the fruits, who decides about this question and how are the benefits shared?

The more important indigenous fruit tree species occurring in the eastern Caprivi region are briefly described as follows:

#### 4.1.1 *Berchemia discolor* (Rhamnaceae)

Local name: Muzinzila

Other names: Brown ivory

Diagnostic features: a semi-deciduous to evergreen tree up to 20 m tall with a dense roundish crown. Fruit fleshy, blue-green turning yellow when ripe, up to 20 x 8 mm. Humans find the sweet date-like taste quite pleasant. The sugar content of the pulp is as high as 30 %. Large quantities of the fruit are collected, dried and stored for later use by the people in the lowveld areas. The ripe fruits are sometimes pounded into a cake and dried. The vitamin C – content of the pulp is 65 mg/100gram. A strong alcoholic drink can also be distilled from the fruits (Venter 1996). *Berchemia discolor* is also an important dye plant.

##### Distribution

The species occurs in the whole of Northern Namibia (Ovamboland, Kavango, Caprivi).

##### Traditional management

This species is traditionally protected. When a forested plot is cleared, *Berchemia discolor* is usually not cut. There is no evidence that this species is planted by the local population.

##### Promotion and cultivation

Germination is usually good, between 80-100 %. The growth rate is relatively fast: 600 – 800 mm per year. *Berchemia discolor* is not resistant to frost and/or cold wind. Clearly a tree for the frost-free areas. It is drought resistant (Venter, 1996).

##### Processing

The fruits are usually dried. An alternative could be to solar-dry them.

##### Marketing features and marketing prospects

The fruits are sold on the open market. A cup with fruits is sold at a price of about 1 N\$ (?). Marketing fruits from the Caprivi region in other regions seems to be limited, as the species occurs all over Northern Namibia and strong competition is to be expected

##### Recommendations

Individually protected enrichment plantings in agricultural fields and forests.

#### 4.1.2 *Manilkara mochisia*

Local name: Mukisa

Other names: Lowveld milkberry

Diagnostic features:

A rather little known fruit tree. It can grow into considerable dimensions (up to 15 m). Leaves are arranged in characteristic rosettes. Fruits are rather small (1-1.2 cm) and ovoid-shaped. The common name of this tree is Lowveld milkberry referring to the fruits containing a milky latex.

Distribution:

On rather rich, fertile soils along drainage lines. The tree is not very common

Traditional management:

Not known, possible also a traditionally protected species

Promotion and cultivation:

No information available on germination or propagation methods (by cuttings ?) Live fences and individual plantations. Possibly also suitable for homegardens.

Processing:

Fruits are said to be sweet (Cunningham, 1992). The milky latex may cause problems when processing the fruits (?).

Marketing features and marketing prospects:

The lowveld milkberry is considered to have potential as a fruit tree (v. Wyk and Gericke, 2000)

Recommendations:

Germination trials and production of plants in nurseries. Trial plantations

#### 4.1.3 *Dialium englerianum* (Caesalpinaceae)

Local name: Muhamane

Other names: Kalahari podberry

Diagnostic features:

Medium sized tree with pinnately compound leaves. The dark-brown pods are small and ovoid with reddish-brown seeds embedded in a sweet mealy pulp that is edible. The outer shell is brittle and can easily be removed by hand.

Distribution:

On deep sand in Kalahari woodlands. The tree is not very common. It seems that the number is steadily declining. Many trees are damaged, in particular by fire.

Traditional management:

No specific management systems known

Promotion and cultivation:

By seeds. Other methods not published. Grafting (?)

Utilization and processing:

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The whitish mealy pulp embedding the seeds is usually soaked in water or milk. This juice has a refreshing taste. The fruits are often also directly consumed.

Marketing features and prospects:

At present rarely sold with small quantities on Katima Mulilo open market. However this has not been observed by the author himself. Perhaps it is possible to sun-dry the fruits and convert the dry pulp into a sort of (storable) instant-(juice)powder.

Recommendation:

Safeguarding genetic resources. Trial plantations (individual plantation in orchards for example) and enrichment planting in forested areas.

#### 4.1.4 *Garcinia livingstonei* (Clusiaceae)

Local name: Mokononga

Other names: African mangosteen

Diagnostic features:

Leaves in whorls of 3. Tree with a marked upright and straight habit, dark foliage. Fruit drupe – like, reddish-orange when ripe with a slightly sour taste. *Garcinia livingstonei* trees are not only dioecious, but do not fruit regularly. When they fruit however, it is in October – December, when other fruits are scarce and they also provide particularly sweet fruits which make up for their irregular fruiting habit (Cunningham, undated).

Fruits are produced in profusion and are edible, with a refreshing but slightly sweetish-acidic taste. (Venter, 1996)

Distribution:

Riverine habitats and termitaria on clay-rich soils. Often more or less close to water.

Traditional management / Promotion / Cultivation:

Germinates easily at percentages of 80 – 100 %. Seedlings transplant well. Slow growth rates. Grows best in frost-free areas and is drought resistant. Venter (1996) recommends to “plant trees in an orchard as long-term project (3-4 years). After four years the first crop of fruit can be harvested, packed and sold on the local market.

Processing / Marketing :

A refreshing drink and a beer can be made from the fruit. Drying (or solar-drying ?) of fruits for better storage could be tried (possibly mixed with other indigenous dried fruits ?).

#### 4.1.5 *Diospyros mespiliformis* (Ebenaceae)

Local name: Muchenje

Other names: Jackalberry

Diagnostic features:

Often encountered as a huge tree (up to 25 m tall) with dark bark. Fruits edible with a soft and sweet flesh, containing 22 g Carbohydrate/100g and 25 mg Vitamin C/100g.

Distribution:

Mostly found on termite mounds. Favours heavy soils on river banks and alluvial soils. The tree is fairly common.



Traditional management / Promotion / Cultivation

According Venter (1996) the viability of the seed is high for a long period. The seed can be placed in boiling water and left to soak overnight. Seedlings should be planted out when they reach the 3-leaf stage; if left longer the taproot may be damaged.

Processing / Marketing:

The fruit are often directly consumed. They can be successfully dried for later use and can be made into a type of porridge. Beer is made from the fermented ripe fruit (Venter 1996).

**4.1.6 Schinziophyton rautanenii (Euphorbiaceae)**

Local name: Mungongo

Other names: Manketti

Diagnostic features:

Huge trees with a marked globose crown and digitately compound leaves. Fruits commonly known as Manketti nuts. Fruit oval shaped, approximately 3.5 x 2.5 cm with a velvety skin. Inside the fruit is a large pear shaped very hard nut containing an edible kernel about 1 cm in diameter. Both the flesh and the nut are highly nutritious.

Distribution:

The trees sometimes form extensive groves and are usually found on deep Kalahari sands, often on top of or on the slopes of fossil sand dunes. Larger stands in eastern Caprivi are found in the Sachinga – Sikubi area.

Management / Promotion / Cultivation:

Difficult to establish in plantation due to germination barriers.

Processing / Marketing:

Valuable oil can be extracted from the nuts. CRIAA is involved in long-term product development research of Manketti oil, but a substantial demand from external markets apparently does not yet exist.

**4.1.7 Sclerocarya birrea**

Local name: Mulula

Other names: Marula

Diagnostic features: A large tree of about 10-15m in height with a spreading large crown. Trees are dioecious. Oval to almost spherical in shape and measuring 3-4 cm in diameter. Green fruit fall to the ground and ripen to a pale yellow within a few days. White flesh surrounds a large nut which contains 2 – 3 edible kernels.

Distribution: Occurs throughout Eastern Caprivi but probably at fairly low densities. The trees shows a preference for well-drained sands and loams.

Traditional management / Propagation / Cultivation:

Easily raised from seed. Truncheons of 100 – 150 mm in diameter and 2 m long can be planted in spring. One of the fastest growing trees in South Africa with a growth rate of up to 1.5 m per year

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(Venter, 1996). Major limitation for a propagation of the tree is its attractiveness (fruits, bark) for elephants which makes it rather unsuitable for Agroforestry systems – at least in regions, where elephants occur.

Processing / Marketing:

South Africa produces a good-quality, liqueur made of marula and there are several small enterprises producing marula jam and jelly. Pasteurized juice has also been marketed, though problems were experienced with it “browning” and with the flocculation of certain enzymes (Maghembe et al. 1995). Fresh juice seems to have a certain marketing potential on local level. The nutritious kernels are edible, but difficult to extract. Oil from the kernels is highly valued by the cosmetic industry due to its slow oxidizing properties. The fruit is rich in Vitamin C. Jelly (3 kg fruit to make 1 kg jelly) and jam can be made from the fruit. It produces a good-quality semi-sweet and sweet wine, beer and port (200 fruits produce 1 liter). Oil (56.2 %) can be extracted from the edible nuts. The latter can be eaten raw or roasted and are rich in protein (28 %) and oil (Venter, 1996)

#### 4.1.8 *Parinari curatellifolia* (Chrysobalanaceae)

Local name: Mobola

Other names: Mobola plum

Diagnostic features:

A tall evergreen of up to 20 m height. Fruits are oval to round and 30–50 mm long. They become orange-yellowish when ripe.

Distribution:

Open woodland on poorly drained soils. The tree is fairly common in the eastern areas of Eastern Caprivi.

Traditional management / Propagation / Cultivation

Traditionally protected tree species. Grows quite fast. Very sensitive to frost and cold wind. For detailed description of cultivation see Venter (1996).

Processing / Marketing

Fruits are edible with a quince like taste and eaten fresh or made into a porridge. Fruit can be boiled to make a very nutritious form of syrup. The seeds contain a large amount of oil and are eaten raw as a nut (Venter, 1996)

#### 4.1.9 *Guibourtia coleosperma* (Fabaceae)

Local name: Muzauli

Other names: Large false mopane

Diagnostic features:

Evergreen tree with a large, rounded, drooping crown. Pods thickly woody, splitting down one side to reveal a reddish-brown seed covered by a conspicuous scarlet aril and hanging down on a slender stalk.

Distribution:

Almost exclusively on deep Kalahari sand (Kalahari woodlands).

Traditional management / Propagation / Cultivation:

Traditionally protected tree

Processing / marketing

The species is not utilized all over eastern Caprivi and it could be interesting to evaluate whether producer – consumer links could be established. The seeds can probably be stored for quite a while, whereas the aril (which is also edible and used in soups, stews etc.) is fairly perishable. The seeds are usually boiled (to extract the aril), then roasted and finally pounded (and mixed with other ingredients, boiled again as a stew or alike.).

**4.1.10 Carissa edulis (Apocynaceae)**

Spiny evergreen shrub with edible small berries. These berries are sweet and juicy, make a good jam or jelly. Specimen found near Kalembeza however had only fairly small fruits (result of drought ?). Production of syrup perhaps possible. Propagation ideal as live fence.

**4.1.11 Strychnos coccoloides (Loranthaceae) and other members of the genus**

Well known under the name “monkey-orange”. Much appreciated by the local population . Marketed on open market in Katima (price per fruit 1 – 2 NS).

*Strychnos pungens* is also a fairly common species and as highly valued as *S. coccoloides*.

*Strychnos spinosa* was found only as a single specimen in the Kwando area.

*Strychnos madagascariensis* also occurs in the eastern Caprivi and in one case reaches considerable dimensions. It also ranks among the highly valued species but preferences may vary to a large degree. For *Strychnos coccoloides* and *Strychnos pungens* a demand exists for the distilling of a local alcoholic beverage (distilled in South Africa ?) marketed under the name “Mayuni”. Most of the fruits however are provided by the local population in Kavango region.

**4.1.12 Lannea schweinfurthii var. stuhlmannii**

This tree provides edible fruits. According v. Wyk & v. Wyk (1997) “the fruit is edible, pleasantly flavoured”. It is not yet clear whether and to what extent the fruits are consumed by the local population. The species is also known under the vernacular name “false marula” and is fairly common in eastern Caprivi on alluvial rich soils, however not on deep Kalahari sand. (indicated as *Lannea stuhlmannii* in the photo section of this report).

**4.1.12 The genus Syzygium (Mrtaceae)**

Two species with edible fruits are found. *S. guineense* is very common along the shores of the Zambesi, whereas *S. cordatum* seems to be restricted to the Kwando area. They are not yet marketed and also processing options have still to be found. Fruits are edible but not too tasty. As in particular *Syzygium guineense* is abundant in some areas, it remains to be seen, whether this species has any marketing value in the region. *Syzygium* species are said to have also a potential for dyeing purposes.

**4.1.13 Adansonia digitata**

The well known “Baobab” tree yields large fruits yielding a mealy, white pulp that is dissolved in water or milk and gives a refreshing drink. The fruits are occasionally sold in autumn along the

roads in eastern Caprivi. A large fruit cost about 2 N\$. The tree is fairly rare and there seems to be little scope at present to improve the marketing situation.

The bark is sold commercially under the name *cortex cael cedar* as a fever treatment. Seed oil is strongly non-siccative and has a demonstrably longer shelf-life than many other oils (edible and used in the cosmetics industry. The pulp has high levels of Vitamin C. (Source: SANProTA).

Resources are very limited and subsistence use at present seems to be the better choice.

#### 4.1.14 Shrubs and dwarf shrubs in Kalahari woodlands

The Kalahari woodland vegetation type hosts quite a number of interesting dwarf shrubs with edible fruits. The main species in this category are *Lannea edulis*, *Annona stenophylla*, *Diospyros chamaethamnus*, *Salaccia huebberthii* (?) and *Parinari capensis*. All these species occur as more or less monospecific and homogenous islands on the forest floor. They often form extensive mats, with the exception of *Lannea edulis* and *Annona stenophylla* that form rather small populations. Forest management practices should clearly take into account the importance of these species for the local population.

#### 4.1.15 The genus *Grewia*

The genus *Grewia* contains some very interesting species for commercialization. In particular a species locally known as "mumaka" (*Grewia falcistipula*) has a marketing potential. Children selling these fruits by the cup (1N\$/cup) along the roadside are a common sight in March and April.

#### 4.1.16 *Friesodielsa obovata*

This interesting small tree or shrub occurs primarily in riverine forests. Specimen have been found in the Kwando area but it is likely to occur also in the Zambezi valley. The fruit consists of a cluster of bright red berries that are more or less constricted between the seeds. The fruits are edible. Roots are used medicinally by them and highly valued by them. However this species apparently has become rare in certain areas and propagation trials (enrichment, planting near homesteads etc. ) are recommended

#### 4.1.17 *Antidesma venosum*

A common shrub occurring in riverine forests. It bears clusters of small white to reddish fairly sweet fruits. At maturity the fruits are almost black. However the developing fruits are very often heavily infested by a specific insect which results in entirely distorted clusters of undeveloped fruits. Nevertheless this species could have a potential for agroforestry systems (pasture enclosures, multi-purpose hedges)

#### 4.1.18 *Ampelocissus africana*

This is one of the many "wild grapes". It is a species worth considering for propagation trials as it yields fairly large, dark black and sweet grapes. The plant has a high potential for trellising e.g. around orchards. Selection of large-fruited varieties is recommended. The fruits should have a potential for marketing if produced in larger quantities. Few specimen have been found in late summer close to Bukalo but apparently this species is quite common and can thrive in a large variety of habitats.

#### 4.1.19 *Flacourtia indica*

A very interesting species, also known as *Batoko plum*, *Madagascar plum* or *Governor's plum*. Only very few specimen have been found close to Katima and propagation of this species is highly recommended. The tree does not only have a potential for fruit production, but also as a live fence as it bears spines.

It is said that the fruit makes an excellent rose wine which is hard to differentiate from a grape wine. The fruits also make excellent preserves as they are rich in pectin and are sufficiently acid for jams and jellies. Fruits of some varieties are sweet enough to be eaten raw but others are only eaten after stewing. According literature sources the flavour is variable. In areas outside Namibia it is often a very important wild fruit species. In the Condo area, Zimbabwe, for example, it ranks amongst the most important wild fruits.

This species can be propagated from seed, but germination behavior of seed is poorly known. It coppices fairly well, but no information concerning the growth from cuttings is available. A priority species ! (all information on this species taken from: *Booth, Wickens, [1988]* )

**4.1.20 Diospyros batocana**

A rare species found in woodlands in the eastern part of eastern Caprivi. The fruits apparently are not highly valued by the local population and only occasionally eaten (to be verified). It is however an important medicinal plant and roots are dug out for the treatment of various ailments. Rather for the latter reason this species deserves attention.

**4.1.21 Vangueria infausta**

This highly valued fruit tree is found in woodlands in the eastern part (only?) of eastern Caprivi. The fruits have the size of a cherry. Propagation is apparently possible with cuttings (pers. Comm. C. Mayer). The species closely resembles similar species like *Vangueriopsis lanceolata*, which is also likely to occur in the region but which has not been found.

**4.1.22 Citropsis daweanana**

A shrub or small tree found on the river banks of the Kwando. The species belongs to the Citrus family but the small and sour-tasting fruits are not edible. However this species is interesting because in South Africa this species is tested for its properties as a valuable source of rootstocks.

**4.1.23 Ficus sycomorus**

Often impressive trees with fluted stems and large, rounded crowns. Dense clusters of fruits are found on the stems. These are however highly perishable and don't seem to be highly valued.

**4.1.24 Ximenia caffra / Ximenia americana**

Both Ximenia species occur in the region. Fruits are edible and both species have a certain potential for live fencing purposes.

**4.1.25 Processing options**

Processing should primarily aim at the following objectives:

- Increasing the value/weight ratio
- Increasing the value/volume ratio
- Increasing the storability of the products
- Improving the marketability of the product (taste, colour, mix of fruits etc. )

Solar-drying of fleshy, juicy fruits can be an interesting processing option for indigenous fruits. The manufacturing of syrup is also possible with the help of solar energy. Syrup offers many advantages for marketing (concentrated and highly nutritious food, high value/weight ratio, less hygienic problems than with pure juice). Juice can be sterilized with solar-energy. The production of jams and jellies for own consumption is an interesting cash-saving option.

**Recommendations**

Indigenous fruit trees are of great importance for the subsistence of the local population and most of them are traditionally protected. For this reason they should be integral part of forest management planning. However it should be avoided to raise high expectations in local communities about the prospects of marketing the fruits as long as reliable market ties, appropriate processing techniques and marketable products have not been developed. Social and cultural implications of fruit marketing have to be taken into account. Profound baseline studies are needed to evaluate the marketing potential of IFT. Processing options have to be elaborated. Seed collection, germination trials and propagation trials (including cuttings) for the following species are recommended in order to promote their propagation for enrichment planting, woodlot, individual plantations in homegardens:

- Flacourtia indica* \*
- Ampelocissus africana* \*
- Vangueria infausta*
- Manilkara mochisia*
- Diospyros batoeana*
- Garcinia livingstonei*
- Parinari curatellifolia*
- Dialium engleranum*
- Berchemia discolor*
- Diospyros mespiliformis*
- Citropsis dawean*
- Antidesma venosum*
- Friesodielsa obovata* \*\*

Other species can be included at a later stage

\*priority species

\*\*primarily a medicinal shrub, but fruits are also edible

**4.2 Thatching grass**

It is one of the stunning features of rural Eastern Caprivi that traditional methods of house-building are still widely practiced. The use of natural building materials such as reeds and grass

has several advantages. Natural building materials are renewable resources. Their use is labour-intensive, thereby offering job opportunities while at the same time preserving the traditional knowledge of building and thatching (v. Wyk, Gericke 2000). The use of natural thatching materials is environmentally friendly and adapted to the local cultural, climatic and socioeconomic conditions. Thatching material is one of the major non-timber forest products in Eastern Caprivi and selling thatching grass on an average provides 11.3 % of cash income for rural families (Suich and Murphy 2002). In some areas the collection of thatching grass even is the highest revenue generating activity, for example in the Lizauli area (Nabane, 1995 cited in LaFranchi, 1996). Buyers are found on a local as well as on regional and national level. LaFranchi (1966) however stated that "*grass buyers interviewed unanimously indicated that they believe lodge-driven developments are likely to wane significantly in the near term. In fact, two of the three major Namibian buyers (suppliers of thatched roofs) stated or implied that they are experiencing a sharp decline in the demand for thatched roofs*". Three thatching companies demanded about 1.25 million bundles per annum (Ashipala and Nekwiyu, 1996). In the mid-ninety's tentative agreements to purchase about 1.0 million bundles would have resulted in gross revenues earned by Caprivi communities of about N\$ 550 000 (LaFranchi, 1996). Though these figures will largely vary over the years, they give a rough idea of the economic potential of thatching grass collection and marketing in Eastern Caprivi. In Salambala Conservancy a total of 500 bundles of thatching grass is used to construct a village house. On an average of 76 houses (26 new and 50 under renovation) are found in each of these villages annually. Hence, 380 tons of thatching grass are used per village for the typical construction. This accounts of 7220 tons extracted annually (MET, 2002). It should be taken into account that the collection of grass is a highly seasonal occupation. It is interesting to note that many thatching grass species can probably be established artificially on marginal sites.

#### *Recommendations*

The collection and marketing of thatching grass should be integral element in community forest management planning. Despite limited markets with high competitiveness from other regions (Kavango) and high demand fluctuations this activity still offers interesting opportunities for forest-based income generation. However basic information about the respective species is not yet available.

#### Activities:

- Collection and botanical identification of grass species used for commercial thatching purposes. Simplified mapping of reference plots for the respective species
- Inquiry about specific uses, market value and minimum/maximum demand per year of identified grass species (thatching grass dealers)
- Inquiry on available quantities, prices and capacities in the communities

### 4.3 Basketry, dyes and carving

A recent study by Suich & Murphy (2002) highlights the importance of basketry, pottery and carving for income generating in Eastern Caprivi.

#### 4.3.1 Basketry

*Hyphaene petersiana* plays an outstanding role for the basket-weaving industry in Eastern Caprivi. It is the leaves that are used to manufacture a wide scale of products. The production of baskets has become an important income-generating option for many families in rural areas. A

detailed analysis of the basket-producing sector is given by Harrison (1995), Harrison (1996) and Suich & Murphy (2002). Access to palm resources seems to be very heterogeneous. In Bukalo trial plantations have been established by community resource monitors (Salambala conservancy). These experiences should be shared.

#### 4.3.2 Dyes

The growth of the basket-weaving industry in Eastern Caprivi has severe implications also for the sustainability of dye collection. In particular the bark of *Berchemia discolor* – at the same time a valuable indigenous fruit tree – is increasingly collected and used as a dye resulting in severe damages of the tree. Specific dyes could possibly also have a limited marketing potential. A separate, detailed survey of dyes currently in use is recommended and should include substitutes and alternative sources. This should also be carried out in close cooperation with community resource monitors.

##### Recommendations

- Propagation trials of *Hyphaene petersiana* and establishment of trial plots (palm groves and the like)
- Detailed survey of dye sources including current status and possible substitutes

#### 4.4 Indigenous vegetables

A surprising variety of indigenous vegetables can be found in eastern Caprivi. These are highly accepted, widely utilized by the local population and constitute an important and nutritious supplement to the local diet. The vegetable plants are highly adapted to the local climatic and edaphic conditions. Many of the species can be dried and stored for later use. Indigenous vegetables have a relatively high marketing potential. In the rainy season they are regularly sold on the open market in Katima Mulilo. Some of the more important local vegetables are:

Ndelele (*Corchorus tridens*)  
 Sishungwa (*Cleome gynandra*)  
 Sindambi, Mundambi (*Hibiscus sabdariffa*)  
 Tepe (unidentified)  
 Libowa (*Amaranthus* sp.)

##### Recommendation

- Detailed survey, preference rankings and botanical identification of indigenous vegetables in cooperation with Ministry of Agriculture and National Botanical Research Institute NBRI
- Establishment of small trial plots in orchards or homegardens
- Elaboration of proposals for improved processing (drying), storage and preparation of indigenous vegetables

#### 4.5 Medicinal trees, shrubs and herbs and lucky charms



# Kabbe

\$: marketed, decl: declining species, inc: increasing species

Botanical name / Local name	Growth form	Part used	\$	decl	Utilization	Management proposal by community members
Garcinia livingstonei Mukononga	Tree	Fruits		decl	edible	Protection, Propagation (home, field)
Syzygium guineense	Tree	Fruits Roots Poles		decl	edible medicine construction	Protective measures
Grewia falcistipula Mumaka	Shrub	Fruits	\$		edible	Protection, Propagation, Improved marketing & storage
Phoenix reclinata Nzalu Nzalu Nzalu Nzalu	Palm	Roots Branches Poles Fruits			medicine fish nets ? Construction ?? edible	Fire protection
Manilkara mochisia Mukisa	Tree	fruits	\$	decl	edible	Protective measures, Propagation
Parinari curatellifolia Mubula Mubula Mubula	Tree	fruits bark fruits	\$	decl	edible medicine oil extraction	Problems: elephants Protective measures, Propagation

## Botanical name / Local name Growth form Part used \$ decl Utilization Management proposal by community members

unidentified Muyambezo Muyambezo Muyambezo uses and names to be verified	Tree	root bark wood	\$ ? \$ ?		medicine medicine carving	Protective measures
Terminalia sericea Muhonono	Tree	leaves roots roots			medicine medicine dye	Protective measures
Pterocarpus angolensis Mulombe	Tree	wood roots bark		decl	various purposes medicine medicine	Protective measures
unidentified * Situndi kunjelelo Mwingalwizi * identical w. Friesodielsa obovata?	Tree	fruits roots wood		decl	edible medicine carving	Problem: fire Protective measures against fire

Lucasa

List of local plant names for NWFP for further discussions  
(not comprehensive)

Itati / Sihopani  
Lungwatanga  
Musokelazebe  
Muwomba  
Malamatwa  
Musamba  
Mububa  
Mufula  
Mukenge  
Musinsi  
Mupanda  
Katemabakulu  
Ikuwa  
Muketu  
Muunga  
Muwanzo  
Mulyobu  
Mulilela  
Kabubo  
Munana  
Muhonono  
Mukisa  
Mutukutu  
Mubako  
Munjongolo  
Mwinda  
Musheshe  
Mukunu  
Mumbola  
Mubunyu  
Mucaba  
Kuma  
Mwangalala  
Bucwani  
Situnduwanga  
Nabuseko  
Muhoto  
Mulya  
Muyungwe  
Mutoya  
Mutobo  
Mutengenya  
Namunuka  
Mwange  
Mutumo  
Musuhela  
Lwanda  
Kazelu  
Lukuku  
Lwao

Mundo  
Mumbaimbai  
Nzalu  
Mupitipiti  
Muzasa  
Tepe  
Sindambi  
Delele  
Sishungwa  
Delelembala  
Nasilele  
Namundonga  
Mangambwa  
Shombo  
Samumachembe  
Mutete  
Makwangala  
Lisoto  
Makwakwa  
Matutu  
Luca  
Muchimbami  
Mukanangwe  
Mupatupatu  
Mazunzwe  
Lindowa  
Madiko  
Imango  
Maoma

### Important ntfp's Lusese (unranked)

Medicines	
Mwinda	Securidaca longepedunculata
Situnduwanga (2)	Xylopiya sp.
Munjongolo	Diospyros batocana
Sikubabe	unidentified
Muminamboma	unidentified
Mubila	Mubilo ?(Vangueria infausta)
Mukunu	Pseudolachnostylos maprouneifolia
Mubuyu	Adansonia digitata
Musheshe	Burkea africana
Mopani	Colophospermum mopane
Muzwili	Combretum imberbe
Mubbu	Vangueria infausta
Katemawakulu	Boscia albitrunca
Mwikalachulu	unidentified

Fruits	
Nzalu	Phoenix reclinata
Muzinzila	Berchemia discolor
Mukisa	Manilkara mochisia
Mukulwani/Munganda	Hyphaene petersiana
Muchenje	Diospyros mespiliformis
Mumaka	Grewia falcistipula
Munteme	Strychnos madagascariensis
Muhuluhulu	Strychnos coccoloides
Mubbu	Vangueria infausta (or Vangueriopsis ?)
Mulutululwa	Ximenia caffra
Mutente	Ximenia americana
Muchinga	Friesodielsa obovata

### Lusese

#### Listing of important NWFP

##### Men

Mungongo  
Mulombe  
Muzauli

Schinziophyton rautanenii  
Pterocarpus angolensis  
Guibourtia coleosperma

##### Women

Mataka  
Kuma  
Makwangala  
Makwakwa  
Mugwala  
Maoma  
Mwinda  
Mutoya  
Mulongo  
Situnduwanga  
Muhuluhulu  
Munjongolo  
Munteme, Mutema  
Munungulushiba  
Mulilela  
Mukua, Mukuwa  
llamatwa  
Ntulwantulwa  
Mulya, Muulya

unidentified reed  
unidentified reed  
unidentified  
unidentified  
unidentified  
unidentified  
Securidaca longepedunculata  
Syzygium guineense  
unidentified  
Xylopiya sp.  
Strychnos  
Diospyros batocana  
Strychnos madagascariensis  
unidentified  
unidentified  
unidentified  
Harpagophytum sp. (?)  
Capparis tomentosa (?)  
Diplorynchus condylocarpum

#### remarks

for manufacturing mats  
for manufacturing mats  
type of waterlily, rhizome eaten  
type of waterlily, rhizome eaten  
reed, sedge,; utilization ?  
bulbous herb, bulb eaten  
medicine  
edible fruits  
tree in flood areas  
medicine  
fruits edible  
fruits edible, medicine  
fruits edible  
other name: Mugaga (?)  
medicine  
not recorded  
medicine  
medicine  
not recorded

Botanical name / Local name	Growth form	Part used	\$	decl	Utilization	Management proposal by community members
Colophospermum mopani Mopani	Tree	Poles Firewood	\$ \$			Management proposals to be identified
Combretum imberbe	Tree	Fuelwood	\$	inc		
Bobgunnia madagascariensis Mushakashela	Tree	Roots		decl	medicine	Management proposals to be identified
Peltoporum africanum Musilu	Tree	?			medicine	
Pterocarpus angolensis Mulombe	Tree	Wood		dec	various purposes	Management proposals to be identified
Dalbergia melanoxylon Mukelete	Tree	?			medicine	Management proposals to be identified
Trichilia emetica Musikili	Tree	Wood		inc	Planks	Management proposals to be identified
Philenoptera capassa Mupanda	Tree	Wood			Planks	Management proposals to be identified
unidentified Mataka	Reed	stalks	\$		large mats	enforcement of traditional protection

## Lusese

The decline of which tree species worries you most ?  
unranked, men only

Mulombe (3)	Pterocarpus angolensis
Mulilela (2)	unidentified, not found
Mwinda	Securidaca longepedunculata
Muzauli	Guibourtia coleosperma
Mushakashela	Bobgunnia madagascariensis
Mwande	Azelia quanzensis
Mungongo	Schinziophyton rautanenii

Bukalo Resource ranking wood of products and thatching grass

Product	1. choice	2. choice	3. choice
Yokes	Muhonono Terminalia sericea	Musheshe Burkea africana	Mupanda Philenoptera capassa
Sledge	Musheshe Burkea africana	Muhonono Terminalia sericea	
Fuelwood	Mopane Colophospermum mopane	Muswili Combretum imberbe	
Mokoro	Mulombe Pterocarpus angolensis	Mwande Afzelia quanzensis	
Trough for cattle	Munggo Schinziohyton rautanenii	Mukusi Manilkara mochisia	
Bowls	Mulombe Pterocarpus angolensis	Munggo Schinziohyton rautanenii	Muzauli Guibourtia coleosperma
Fencing posts	Mopane Colophospermum mopane	Muhonono Terminalia sericea	Muswili Combretum imberbe
Thatching	Mwange unidentified	Mwangelongo unidentified	Kasisi unidentified

Lusese

?: marketed, decl. declining species, inc. increasing species

Botanical name / Local name	Growth form	Part used	\$	decl	Utilization	Management proposal by community members
Berchemia discolor Muzinzila	Tree	Fruits bark	\$	decl	edible dye	protection against elephants, enrichment planting
Hyphaene petersiana Munganda Munganda	Palm	Fruits Leaves	\$		edible Basketry	
Parinari curatellifolia Mubula Mubula	Tree	Fruits	\$	decl	edible	Management proposal to be identified
Garcinia livingstonei Mukononga	Tree	Fruits	\$	decl	edible	no Management proposals
Diospyros mespiliformis Muchenje	Tree	Fruits	\$	decl	edible	Propagation
Grewia falcistipula Mumaka	Shrub	Fruits	\$	decl	edible	Problems: fire, elephants enrichment planting
Vangueria infausta Mubilo	Tree	Fruits		decl	edible	Management proposals to be identified
Guibourtia coleosperma Muzauli	Tree	Wood		decl	various purposes	Management proposals to be identified

Botanical name / Local name Growth form Part used \$ decl Utilization Management proposal by community members

unidentified Kamanamasaka Kamanamasaka	Dwarf shrub	Roots	\$ decl	Lucky charm	Propagation / Planting
Diploynchus condylocarpum Mulya Mulya Mulya	Tree/Shrub	Roots Latex		Medicine (men) Medicine (men)	No measures proposed
Pterocarpus angolensis Mulombe Mulombe Mulombe Mulombe Mulombe	Tree	Wood Bark Fruits	decl	Canoe paddles, doors...	Zonation / Propagation (direct sowing ?) Appropriate forest operations Promotion of natural regeneration
Aloe sp. (verify, Sansevieria ?) Sihopani Sihopani Sihopani Sihopani Sihopani	Herb	Leaves Roots Leaves Leaves		Medicine (Malaria) Medicine (Malaria) Medicine (Wounds) Veterin. med. (Chicken)	No management recommendations
Parinari curatellifolia Mubula Mubula Mubula	Tree	Fruits Wood	\$	eaten raw/oil extraction Rafters	Protection, planting
Friesodielsia obovata Muchinga Muchinga	Shrub	roots fruits	decl	medicine for women edible	rare species, propagation

Botanical name / Local name Growth form Part used \$ decl Utilization Management proposal by community members

Ficus sycomorus Muchaba	Tree	berries leaves		edible medicine	
unidentified Mataka	Reed	Stalks	\$	large mats, marketed	propagation
unidentified Kuma	Reed	Stalks	\$	large mats	fire protection
Grewia falcistipula * Mumaka	Shrub	berries	\$	edible	
*contradictory info on distribution: some sources claim the species is found in Bukelo, other deny this					
unidentified Lufelo	Grass	stalks	\$	used for brooms	Protection due to decline
unidentified Mutenganya	Grass	stalks	\$	thatching	decline, zonation as protective measure
Abrus precatorius Mupitipiti Mupitipiti Mupitipiti Mupitipiti	Climber	leaves roots seeds		medicine (men, women) medicine (men, women) medicine (men, women)	zonation, propagation

Botanical name / Local name Growth form Part used \$ decl Utilization Management proposal by community members

Botanical name / Local name	Growth form	Part used	\$	decl	Utilization	Management proposal by community members
<i>Disopyros batocana</i>	Tree					
Mujongolo		Roots			Medicine (trad. Healer)	
Mujongolo		Fruits	\$		edible, or for distilling	
Mujongolo		Leaves			Medicine	Training for trad. healers
Mujongolo						Propagation and planting

Botanical name / Local name	Growth form	Part used	\$	decl	Utilization	Management proposal by community members
<i>Adansonia digitata</i>	Tree					
Mubuyo		Fruits	\$		edible	
Mubuyo		Bark			Fibres, Threads	
Mubuyo		Bark			Medicine	
Mubuyo		Leaves			Vegetable	

Botanical name / Local name	Growth form	Part used	\$	decl	Utilization	Management proposal by community members
unidentified	Shrub					
Kalibbe Kantu		Roots	\$		Medicine	
Kalibbe Kantu		Roots			Lucky charm	only in Sambia ?, extinct in Bukalo ?
Kalibbe Kantu						Propagation

Botanical name / Local name	Growth form	Part used	\$	decl	Utilization	Management proposal by community members
unidentified*	Shrub					
Mulilela		Roots	\$		Medicine	
Mulilela		Roots			Lucky charm	
Mulilela		Roots			Social functions	
Mulilela		Leaves			Medicine	Propagation, planting (plenty in Kavango)

not clear whether species still occurs or has ever occurred in Bukalo area

Botanical name / Local name	Growth form	Part used	\$	decl	Utilization	Management proposal by community members
<i>Securidaca longepedunculata</i>	Tree					
Mwinda		Roots	\$		Medicine, trad healer	
Mwinda						Propagation (seed experiments, root suckers)

Botanical name / Local name Growth form Part used \$ decl Utilization Management proposal by community members

Botanical name / Local name	Growth form	Part used	\$	decl	Utilization	Management proposal by community members
<i>Hyphaene petersiana</i>	Palm					
Mukuiwani / Munganda		Leaves	\$		Basketry	
Mukuiwani / Munganda		Leaves			hats	
Mukuiwani / Munganda		Leaves			ropes, whips	
Mukuiwani / Munganda		Fruits	\$		edible	
Mukuiwani / Munganda		Stems			cut: edible, sweet fibres	Protection, monitoring, supervision, education

Botanical name / Local name	Growth form	Part used	\$	decl	Utilization	Management proposal by community members
<i>Berchemia discolor</i>	Tree					
Muzinzila		Fruits	\$			
Muzinzila		Bark				Protection (alternative dye materials [Muchenje ?])
Muzinzila						Training, regulations, workshop for craftswomen

Botanical name / Local name	Growth form	Part used	\$	decl	Utilization	Management proposal by community members
<i>Dialium englerianum</i>	Tree					
Muhamani		Fruits			edible	not found in Bukalo, but proposed for planting
Muhamani						Propagation / Planting

Botanical name / Local name	Growth form	Part used	\$	decl	Utilization	Management proposal by community members
<i>Combretum imberbe</i>	Tree					
Muzwill		Wood			Carving	
Muzwill						Controlled cutting (quota)

Botanical name / Local name	Growth form	Part used	\$	decl	Utilization	Management proposal by community members
<i>Sclerocarya birrea</i>	Tree					
Mulula		Wood			Canoe	
Mulula		Bark			Medicinal use (diarr.)	
Mulula		Fruits			eaten raw or as juice	
Mulula		Fruits			alcoholic beverages	
Mulula						Improved processing
Mulula						Individual fire protection

Botanical name / Local name	Growth form	Part used	\$ decl	Utilization	Management proposal by community members
Acacia erioloba	Tree				
Muhoto		Leaves		Medicine (diarrhea)	
Muhoto		Leaves		Medicine (snake-bite)	
Muhoto		Pods		Fodder	(Potential for marketing ?)
Muhoto		Bark		Cultural (funeral)	Protection

Botanical name / Local name	Growth form	Part used	\$ decl	Utilization	Management proposal by community members
Schinziophyton rautanenii	Tree				
Mungongo		Wood		Stools, Canoes, Planks	
Mungongo		Fruit		Oil	
Mungongo		Fruit		Pulp	
Mungongo		Bark		Medicine (for babies)	Propagation/Planting

Botanical name / Local name	Growth form	Part used	\$ decl	Utilization	Management proposal by community members
Vangueria infausta	Tree/Shrub				
Mubilo		Fruits	\$	edible	
Mubilo		Roots		Medicinal uses	
Mubilo					Propagation

Botanical name / Local name	Growth form	Part used	\$ decl	Utilization	Management proposal by community members
Piliostigma thonningii	Tree				
Mutukutu/Mubabama		Leaves		Medicine (coughing)	
Mutukutu/Mubabama		Leaves		Medicine (eye ailments)	
Mutukutu/Mubabama		Roots		Medicine (diarrhoe)	
Mutukutu/Mubabama		Firewood			Regulate / limit cutting

Botanical name / Local name	Growth form	Part used	\$ decl	Utilization	Management proposal by community members
Bobgunnia madagascariensis	Tree				
Mushakashela		Roots		Medicine (toothache)	
Mushakashela		Roots		Lucky charm	
Mushakashela		Wood		Carving	Planting, protection
Mushakashela					Marking individual trees for protect.
Mushakashela					Protection zone

Botanical name / Local name	Growth form	Part used	\$ decl	Utilization	Management proposal by community members
Philenoptera capassa	Tree				
Mupanda		Wood		Sleighs, Yokes	Regulate cutting for specific purposes
Schreberia trichoclada	Tree				
Mukauke		Fruit		Protective charm	
Mukauke		Wood		Spoons,	Marking trees for strict protection
Mukauke					proposed fine for violation: 1 cow

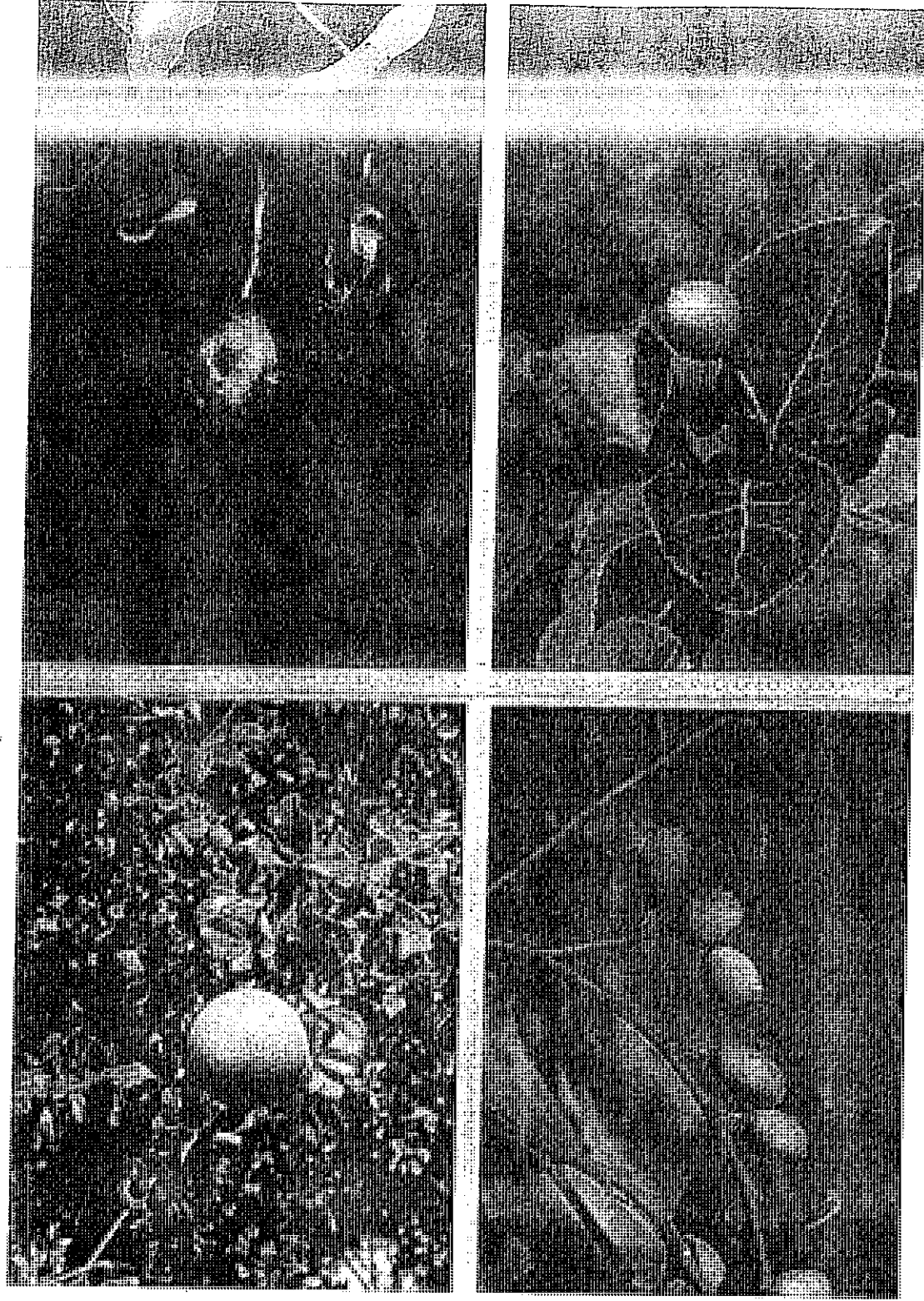
Botanical name / Local name	Growth form	Part used	\$ decl	Utilization	Management proposal by community members
unidentified	Grass				
Mwangelongo		Grass stalks		Thatching	Regulate time of cutting (May onward only)
					not found in, but only close to forest

Botanical name / Local name	Growth form	Part used	\$ decl	Utilization	Management proposal by community members
Garcinia livingstonei	Tree				
Mukononga		Fruits	\$ ?	edible	
Mukononga		Roots		Medicine	
Mukononga		Wood		Canoes, paddles	stress protection status in mgmt plan
Mukononga					awareness creation
Mukononga					Propagation and planting



1	2
3	4

- 1 *Syzygium guineense*
- 2 *Flacourtia indica*
- 3 *Strychnos madagascariensis*
- 4 *Lanea stuhlmannii*

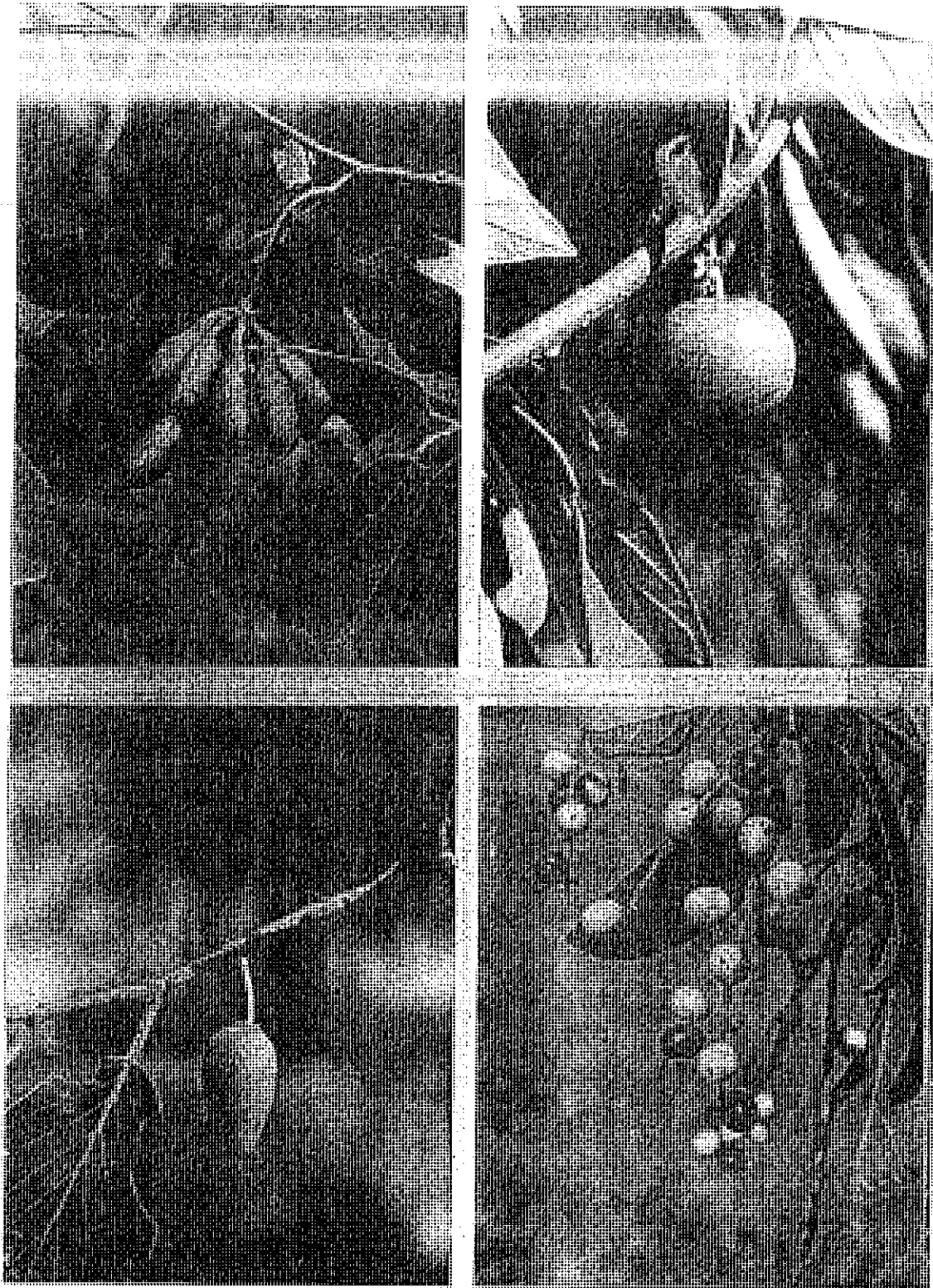


## Bukalo

marked species ranked important

\$: marketed, decl: declining species

Botanical name / Local name	Growth form	Part used	\$	decl	Utilization	Management proposal by community members
<i>Cleome gynandra</i> Sishungwa	Herb	Leaves	\$		Vegetable (cooked)	Propagation
Unidentified Tepe	Herb	Leaves	\$		Vegetable (cooked)	Propagation
<i>Hibiscus sabdariffa</i> Sindambi/Mundambi	Herb	Leaves Leaves		\$	Vegetable (cooked) Medicine	Propagation
<i>Corchorus tridens</i> Ndelele / Nderere	Herb	Leaves	\$		Vegetable (cooked)	Propagation
<i>Colophospermum mopane</i>	Tree	Bark Leaves Roots Caterpillar			Medicine Medicine Medicine edible, dried	Regulate cutting
Unidentified Lukushe Lukushe Lukushe	Herb	Stem Stem			Fibres (Mats) Fibres (Fish nets)	Marketing (demand in other comm. ?)



1	2
3	4

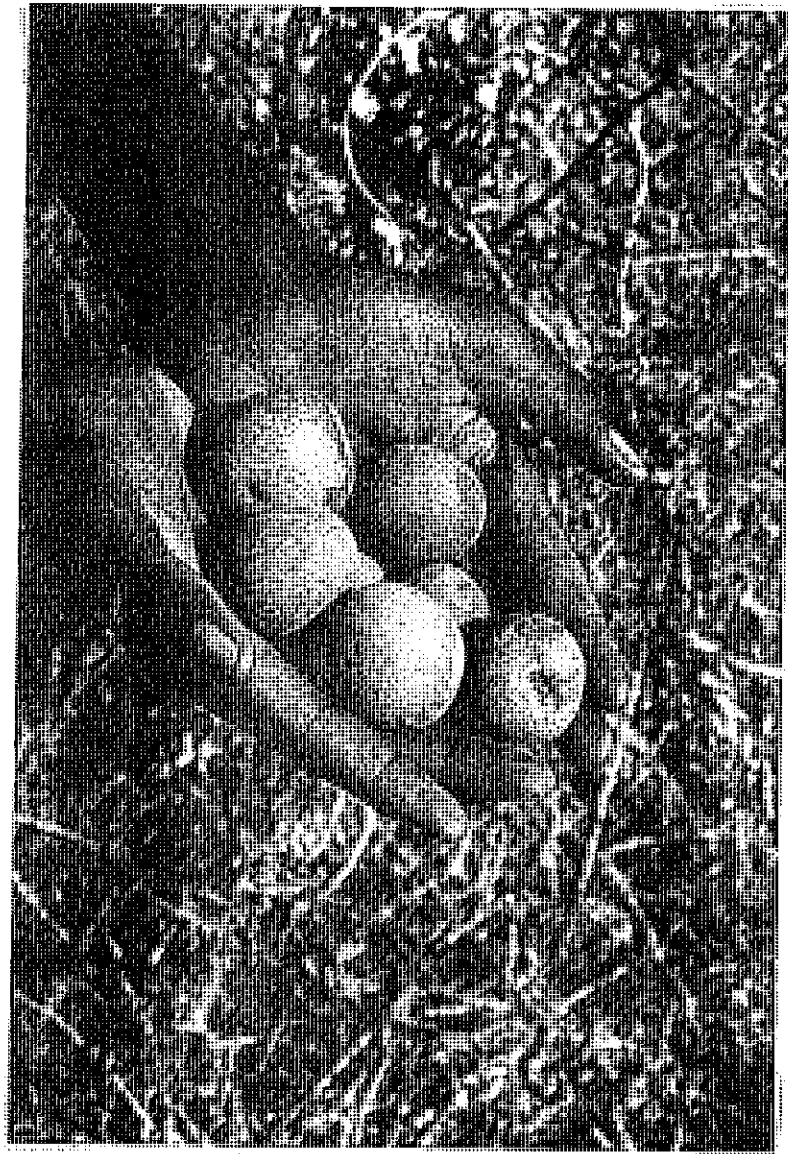
- 1 *Friesodielsa obovata*
- 2 *Vangueria infausta*
- 3 *Berchemia discolor*
- 4 *Antidesma venosum*



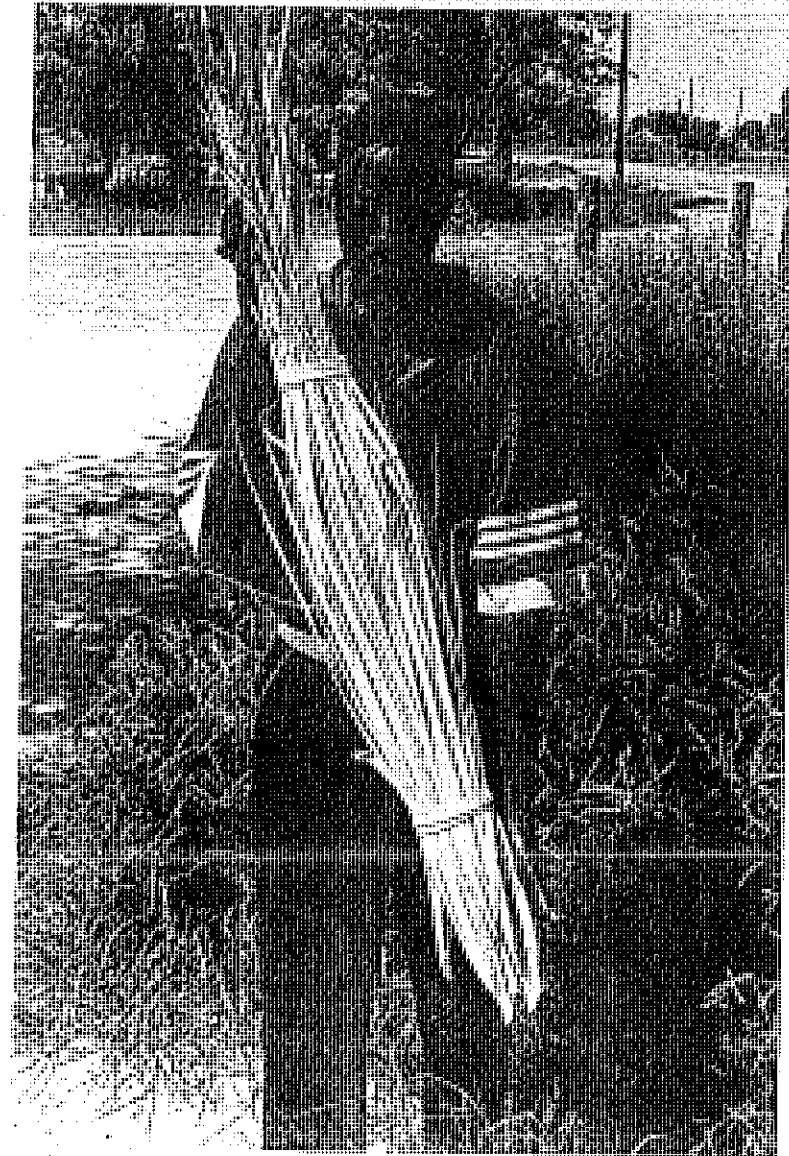
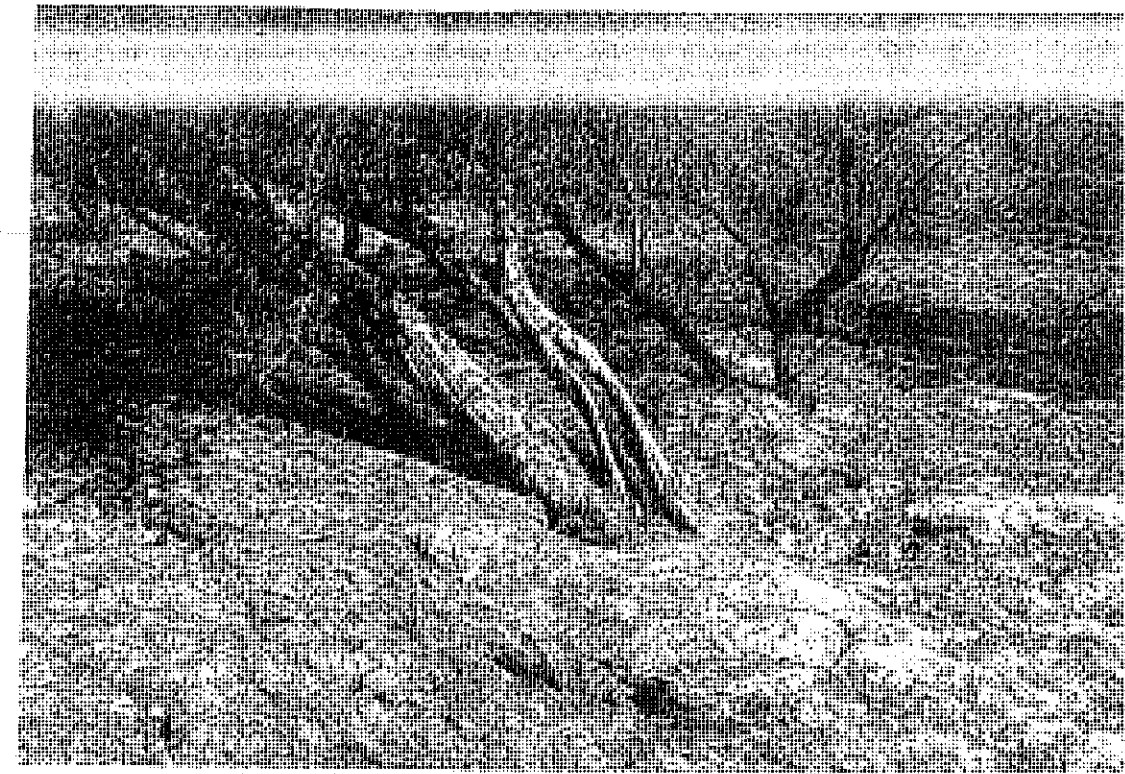
1	2
3	4

- 1 *Ampelocissus africana*
- 2 *Citropsis daweani*
- 3 *Xylopiya sp.*
- 4 *Carissa edulis*





*Parinari curatellifolia* (Chrysobalanaceae): Fruits

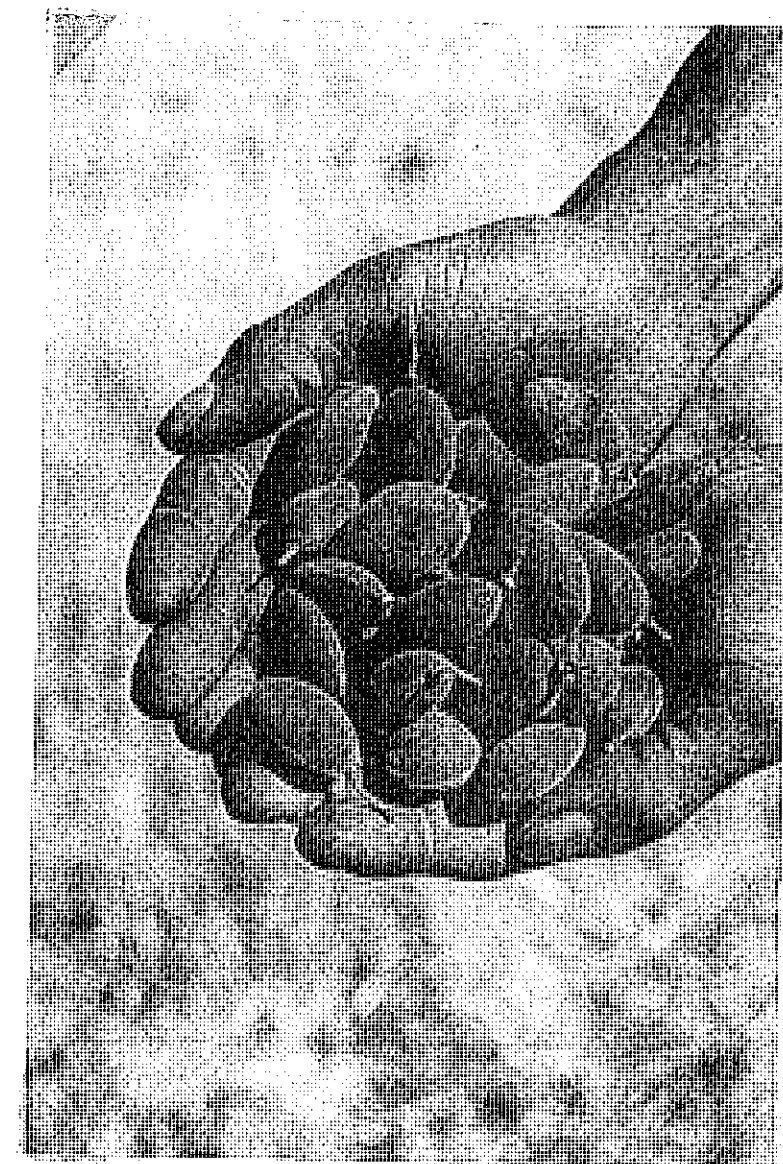


1

2

- 1 Damaged *Securidaca longepedunculata*, due to excessive removal of roots for medicinal purposes
- 2 Leaves of *Hyphaene petersiana* for sale (used for basketry)

rather indicative of the poor awareness of the community members about the Community Forestry programme than of a lack of interest of the local population in the issue. In fact mostly the community meetings rather had the character of discussions with a handful of people. The participation of main user groups (traditional healers, cattle keepers, carvers etc.) could not be achieved during all meetings reflecting weak communication channels between the Forest Management Committee and the community. For this reason ranking exercises were only in some few cases carried out. The discussions with community members about non-timber forest products was overdue as apparently no detailed forest utilization survey has yet been undertaken in none of the cooperating communities in the Caprivi region. The discussions with the community members revealed that forest utilization issues relevant to the community members in eastern Caprivi have not yet been identified by the programme, e.g. the decline of certain forest species used for medicinal purposes, for crafts etc. The community members obviously are much interested in these issues being discussed and the problems being tackled. It is imminent and crucial for future activities to proceed with this discussion and involve main user groups (e.g. traditional healers, carvers, cattle keepers) in the discussion process. This would also assure a much broader acceptance of the programme approach by the community. The direct communication with the relevant community members and user groups will prove to be of utmost importance - for the acceptance of the FMC, the development workers and the Forestry programme (including D.o.F.) as a whole and last but not least for the success of the programme. The lists with the NWFP found in Bukalo, Lusese and Kabbe can be found in Annex 1, 2 and 3 respectively.



*Dialium englerianum* (Fabaceae): Fruits

The use of plants and parts of these plants for traditional purposes is widely practiced in eastern Caprivi. Traditional healers constitute one of the most important user groups of communal forests and their activities have a significant impact on the natural resources. Some tree and shrub species are heavily exploited because of their medicinal properties and are becoming increasingly rare. *Securidaca longepedunculata* is a striking example of a very important and widely used medicinal tree which is rapidly declining. In fact the few remaining trees of this species found in the region are very likely to be found damaged due to the excessive collection of roots. Certain species even have entirely vanished from some communities and areas. The same is also valid for highly valued specific species used as lucky charms. There is a considerable interest by community members to promote these species. Important and declining medicinal species and species used as lucky charms include the following:

Mwinda (*Securidaca longepedunculata*)  
 Mushakashela (*Bobgunnia madagascariensis*)  
 Muchinga (*Friesodielsa obovata*) \*  
 Situnduwanga (*Xylopia* sp.)  
 Mujongolo (*Diospyros batocana*)  
 Kahibbe Kantu (unidentified, lucky charm)  
 Kamanamasaka (unidentified, lucky charm, use to be verified)  
 Mwangalala (unidentified, medicine, use to be verified)  
 Mulilela (unidentified, medicine and lucky charm)

(\* status to be verified, declining ?)

Interesting results are also to be expected concerning the use of plants for treating animal diseases. This aspect is not yet covered in the survey.

The fruits of *Kigelia africana* contains pharmaceutically active compounds which are known to be helpful in the treatment of skin ailments. A number of companies are already producing skin creams and shampoos derived from the *Kigelia* fruit. The sausage tree has strong potential and several SANProTA members in Zimbabwe have already developed considerable experience in producing *Kigelia* fruit extract (Source: SANProTA).

#### Recommendations

- Germination trials and propagation trials (cuttings etc.) of above-mentioned species
- Elaboration of appropriate layout for enrichment plantings, individual plantation and protective measures.
- Botanical identification of medicinal trees, shrubs and herbs not yet identified (see above)
- Mapping of remaining resources for seed procurement including protective measures within forest management planning
- Conduct specific survey of plants used for treating animal diseases
- Contact SANProTA for detailed information on *Kigelia africana*. Map seed resources.

#### Fodder trees

The following species have been named by community members in various communities as potential fodder trees (pods, not included are species providing fodder in the form of leaves). These species could be taken into consideration for agroforestry approaches.

Mubabama (*Piliostigma thonningii*)  
 Muunga (*Faidherbia albida*)  
 Muhoto (*Acacia erioloba*)

#### Recommendations

- Conduct propagation trials of the above-mentioned species in collaboration with catte-keepers

#### Grass and sedge species used for (large) mats

The following two species play an important role as raw materials for the manufacturing of large mats. These are regularly sold on the open market in Katima Mulilo. Both species were not seen and therefore could not be identified.

Mataka (unidentified)  
 Kuma (unidentified)

#### Recommendation

- Botanical identification and mapping of existing resources.
- Identification of restrictions and elaboration of management solutions

#### Management options for NWFP

To promote NWFP in the framework of the Community Forestry Programme and to increase or safeguard the resource base, the following options can be taken into consideration from a technical point of view:

Regulation of the following criteria within management planning:

- *Where*: zonation (e.g. protective zones, utilization zones etc. )
- *Who*: resource users (e.g. registered carvers, community members only vs. outsiders etc.)
- *When*: time of utilization (e.g. defining earliest month for harvesting of grass)
- *How*: introduction of appropriate and sustainable harvesting techniques (e.g. palm leaves)
- *How much*: e.g. sustainable yield as the overall criteria, quotas per family etc. . .

#### Promotion of species providing NWFP

- Enrichment planting (in forested areas, community forests etc. )
- Individual plantations near houses, in homegardens
- Planting as live fences, hedges or alike as part of agroforestry approaches
- Protective measures (fire protection, grazing protection etc. )

#### Case studies Bukalo, Lusese and Kabbe

A case study based on several community meetings and individual interviews has been carried out in Bukalo and Lusese. Kabbe was only visited once. Due to time constraints that survey is by far not comprehensive and covers only some selected aspects of non-timber forest product utilization in the region. The participation of the communities in general was very low which is

Kisumu

List of local names for NWFP for further discussions  
(not comprehensive)

Mumbu  
Muminashakati  
Muchinga  
Muiolo  
Muhuluhulu  
Mutente  
Mupani  
Musikili  
Munyelenyele  
Mutenganya  
Mukelete  
Lutaka  
Kuma  
Lilamatwa  
Munganda  
Mukenge  
Mundundu  
Kazelu

## FAO forestry

### Towards a harmonized definition of non-wood forest products

Over the past two decades an increasing number of governmental and non-governmental organizations (NGOs) and institutions, as well as the private sector, have become involved with the promotion and utilization of non-wood forest products (NWFPs). A lot of new information has been collected on the socio-economic importance and potential of NWFP utilization and its effects on the environment. However, little progress has been made to clarify the terminology for NWFPs. On the contrary, new and practically interchangeable terms have been created ("byproducts of forests", "minor forest products", "non-timber forest products", "non-wood goods and benefits", "non-wood goods and services", "other forest products", "secondary forest products", "special forest products") and a multitude of definitions proposed, all covering different aspects, species and products according to the focus of work of the respective author or organization. This lack of a clear terminology causes serious problems:

- Communication is becoming more problematic, since people are using the same term with different definitions, or without providing any definition at all.
- Studies and statistics are often not comparable, because of the different definitions and classifications used, in which some products are included while others are excluded.
- It has not been possible to create a comprehensive and consistent classification system on NWFPs, which can only be based on an agreed terminology including clear definitions. Definitions and classifications are crucial for improving the availability of statistical data.

In 1995, FAO made a first step towards a harmonized definition of NWFPs by organizing the International Expert Consultation on Non-Wood Forest Products in Yogyakarta, Indonesia, hosted by the Indonesian Ministry of Forestry. During this meeting, 120 participants from 26 countries, NGOs and UN agencies agreed on one definition of NWFPs: "NWFPs consist of goods of biological origin other than wood, as well as services, derived from forests and allied land uses."

The 1995 definition is currently being reconsidered within FAO; those concerned are evaluating the experience acquired in applying this definition during recent years and are reviewing the general discussion on terminology related to NWFPs. The discussion will lead to the use of a harmonized terminology within FAO, and it is hoped that it will contribute to a general agreement on a global definition of NWFPs.

Based on the recommendations of an internal interdepartmental FAO meeting on definitions of NWFPs held in June 1999, the following new FAO working definition of NWFPs has been adopted: "Non-wood forest products consist of goods of biological origin other than wood, derived from forests, other wooded