



# NON TIMBER VELDT PRODUCTS IN BOTSWANA



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First compiled in 2017

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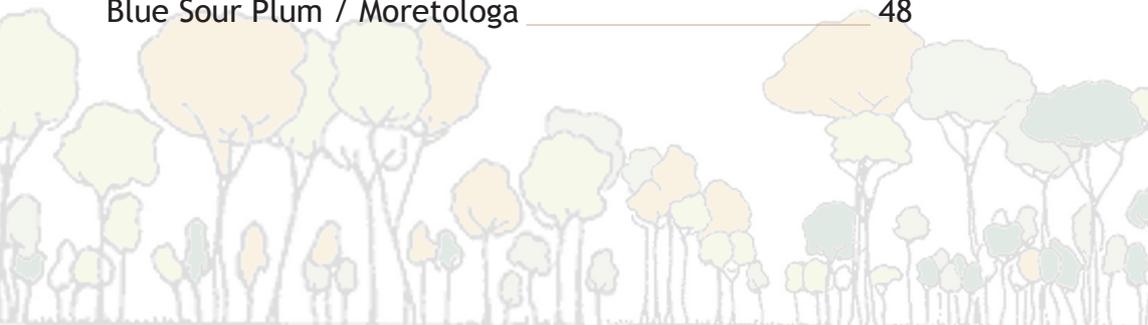
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## INTRODUCTION

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Botswana is a country with a remarkable bio-diversity of plants, insects and mammals. Some of this species are playing an essential role to sustain livelihoods of the rural population. The utilization of plants and animals from the range lands has been an ongoing process since numerous generations. The “Veld” is providing people with a variety of every day necessities like fuel, essential nutrients, medicine and raw materials for building and crafting. Products taken from the wild are even indispensable for some cultural events.

Estimations assume that up to 50 different species (without fuel wood species) are currently contributing to livelihoods in Botswana. But the potential of probably many others is still not yet discovered. Until some decades ago this customary use was adapted to the natural regeneration of the veld, mainly due to lower population densities and a traditional knowledge of a natural balance and could therefore be regarded as sustainable.

## CHALLENGES AND OPPORTUNITIES

Due to the direct dependency on a natural resource and an often competitive market environment businesses or subsistence gathering in this area are not always free of conflict. First and foremost there is always the concern of over exploitation of the resource which will both harm nature and livelihoods in the long term.

Furthermore, to cope with volatile and demanding markets, diversification of products, processing depth and marketing structures are frequently inadequate. In order to secure sustainable incomes new products from underutilized or just discovered resources should be given attention together with an appropriate standard of quality and further processing

of raw materials. In spite of this there is a great potential for income generation from range land resources. Due to a change of lifestyle and increased urbanization over the last decades a need of supplying conurbations arose which is not satisfied yet. Regional or even international trade of veld products became an economic factor too. Among the wide variety of veld resources currently utilized one way or the other in Botswana many are used far below their potential and opportunities resulting from this often require little or no seed money. Even simple processing steps like drying, squashing or packaging can be installed at relatively low cost.



## BOTSWANA NATIONAL FLORA SYMBOLS

In 2013, three (3) floral symbols were declared, in the form of a tree, flower and grass.

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They are namely Morula tree (*Sclerocarya birrea*), Sengaparile (*Harpagophytum procumbens*) and Motshikiri grass (*Eragrostis pallens*). This initiative was in recognition of the significance and the value of these plant species in the lives of Botswana. Plant species in general contribute to the sustenance of community livelihoods and are a basis for a wide range of ecosystem services necessary for people's livelihoods and wellbeing. The process of identifying national symbols was done through consultations held across the country.

### Importance of National Symbols

National symbols represent their countries in many and important ways and allow their country to stand out by being original and unique. The declaration of our national symbols is a symbolic expression of the importance of plants to humankind in the past, present, future and boost interest in their conservation and utilisation status.

Morula tree is often referred as the "tree of life" due to its ability to provide a wide range of products and services.

Motshikiri grass symbolises our culture since it provides traditional thatching material for a large part of the population in Botswana. The grass also advances the socio-economic status of the some locals through its sale. Sengaparile flower symbolises our courage, strength and fortitude and Botswana's ability to prosper despite seemingly insurmountable obstacles. The plants hardiness also symbolises our strong nation which has survived and prospered under semi-arid conditions.

### VELDT PRODUCTS UTILISATION MONITORING

Non timber products commonly known as veld products are monitored through issuance of permits.

There are three types of permits:

a) Harvesters: Allows citizens to gather, cut, or collect veld products. Non-Citizens are not allowed to harvest veld products.

b) Dealers: Allows a person to carry out business of dealing in veld products

c) Exporters: Allows a person to export any veldt product listed in the schedule.

A full elaboration of resources that need and those that do not need a permit is provided on the ARB (Utilization of Veld Products) Regulations of December 1, 2006.

### HARVESTERS VELDT PRODUCT PERMIT ACQUISITION PROCEDURE

There is a friendly way of acquiring veld products. This is mainly founded upon our tradition and culture and norms of BOTHO and THERISANYO.

1. Consult the residents of the local area that you intend to harvest the resource, fully laying down your proposal to the elderly people over there.
2. After reaching a consensus, go to the relevant local authority to acquire an approval document stating whether the resource to be harvested is available and in intended quantities, and officially stamped. The local authority is supposed to do this with his people who either live or frequent that particular area. This is done for all veld products that require a permit to be harvested. Submit your permit/s application at Forestry office
3. Forestry office would then conduct an assessment of the required product and provide a permit thereafter.
4. In the case of the office having visited the area shortly before the request, the office may evaluate the request and issue the permit instantly.
5. In case the permit expires before the client could harvested the quantity he/she intended, he/she must go and prepare a fresh permit, where he/she is expected to pay the said charges again.

## VELDT PRODUCTS PERMIT CONDITIONS

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1. All harvesters and dealers must pay stipulated fees before they harvest, deal or export the veldt product regulated
2. Harvesters and dealers must obey quotas stipulated in the permit
3. Permit is only valid for the stipulated period
4. Harvesters permit is exclusive to Botswana citizens only
5. Permits cannot be transferred to another person or used as a family permit
6. A permit is only valid for a particular area/District and Ministry of Environment, Natural Resources Conservation and Tourism
7. Sustainable harvesting methods must be adhered to
8. Use only clean containers to avoid disease transmission
9. Harvesters and dealers must always be ready to produce their permits anytime when requested to do so by authorized officials.
10. The dealer should only purchase from harvesters who have a valid official permit from the Department Of Forestry and Range Resources
11. Please note that certain species are also subject to separate Convention on International Trade on Endangered Species (CITES)
12. Exporter should declare the export value to the Customs Officer during export.
13. No one is allowed to hire personnel to harvest veldt products on his/her behalf



# 1. Grapple plant / Sengaparile



## INTRODUCTION

The grapple plant (*Harpagophytum procumbens*) is a medicinal herb traded internationally for remedies against joint inflammation, arthritic disorders and other ailments. The species distribution is limited to the countries of Namibia, Botswana and South Africa. In Botswana its commercial utilization started in the 1970s, whilst the traditional use may go thousands of years back. The grapple plant harvesting season starts from 1st April to 31st October every year. Only the plants' succulent carrot shaped tubers are extracted and utilized, which are afterwards sliced and dried in the sun on clear material but not on the bare ground.

## IMPACT ON LIVELIHOODS

Every year, the majority of individual harvesters are women. The selling of the semi-processed product plays an important role in the rural communities' income in the districts of Kweneng, Kgalagadi, Southern and Gantsi. As a result, the grapple plant has been identified as one of the most important national plant resources for rural development. Hence, the plant is subject to projects which aim to maximize the revenues from it by value adding and increased trade.



## POTENTIAL FOR DEVELOPMENT

An average of about 15 tons dried grapple plant tubers is annually exported from Botswana and less than 1 ton is consumed by the local market. Although Namibia does not have more grapple plant in its range, it exports up to 250 tons annually. This demonstrates that Botswana has not yet exploited the potential of the plant fully, so it can be seen as an under-utilized species.

## WILD CRAFTING VERSUS CULTIVATION

In Botswana no cultivation is ongoing or planned. All the traded material originates from wild collection. Cultivation

trials in the neighboring countries show that cultivated material is 3-4 times more expensive than wild collected. Under this circumstances and the fact that grapple plant is abundant in Botswana's sandveld, it is hardly economic viable and currently not an option to work on.



### **THE ROTATIONAL HARVESTING METHOD**

In 2006 a new system of harvesting has been introduced in Botswana: The rotational harvesting of grapple plant. Beyond the existing harvesting guidelines to keep the plant populations stable, it aims to increase the harvest and the plants distribution as well. The method prescribes harvesting only to be carried out in one quarter of the plants distribution around the settlements. The following year the harvesting activities shift towards the next quarter and so on. That means the grapple plant has 4 years to regenerate and reproduce sufficient tubers before harvesting takes place at the same locality again.

### **CONSERVATION OF THE GRAPPLE PLANT**

Grapple plant is a regulated plant species under the Agricultural Resources (utilization of veld products) Regulations 2006, and therefore any harvesting, dealing or export of the species requires permits issued by the Department of Forestry & Range Resources (DFRR). Prior to the harvesting season, DFRR assesses the harvesting sites to determine quotas for extraction and issues harvesters with permits up to a maximum of 35 kg per person.



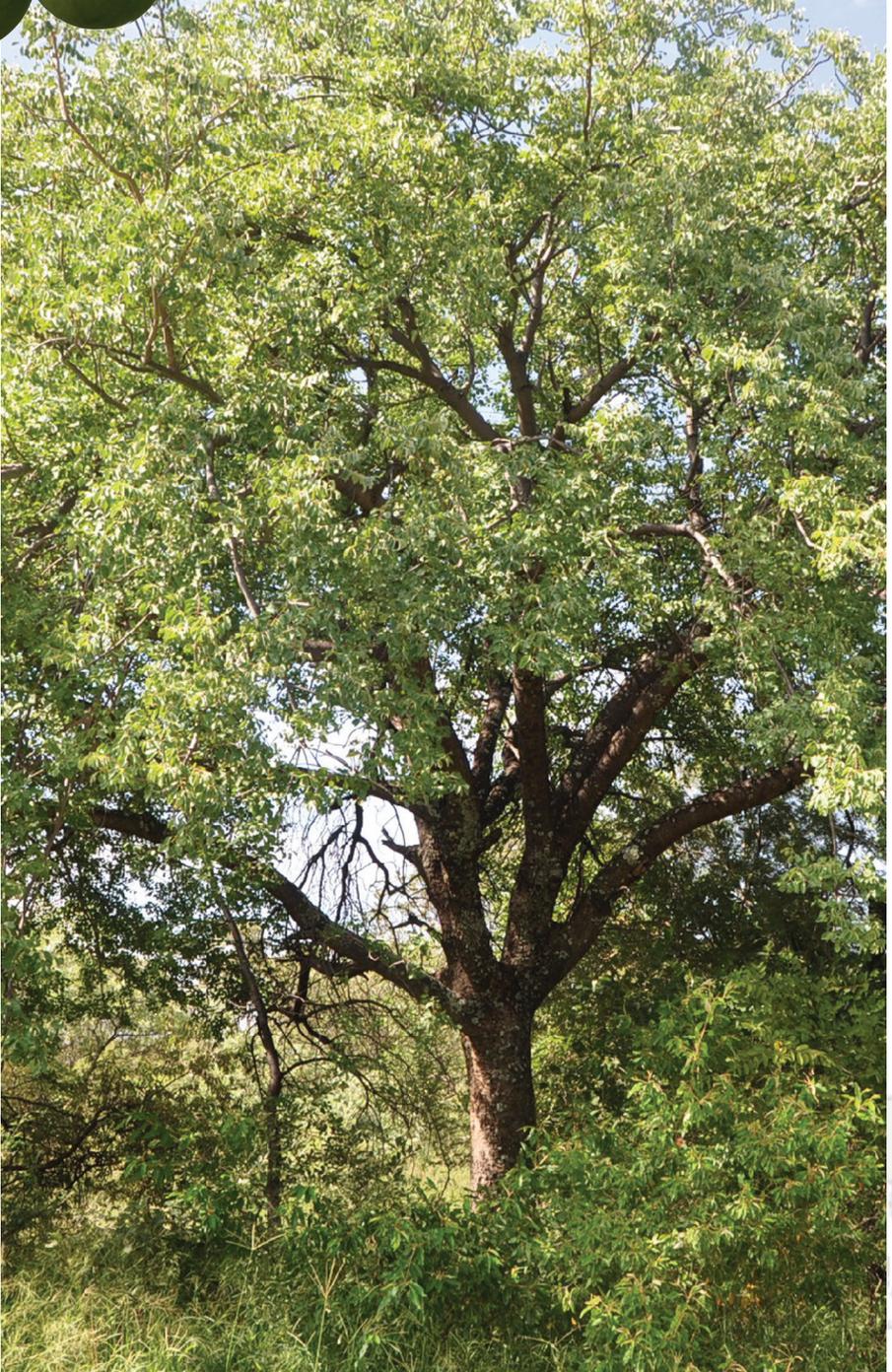
### **MONITORING AND REGULATION**

Requires a permit if harvested for commercial purposes but does not require a permit if harvested for domestic use.



## 2. Morula

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## INTRODUCTION

Morula (*Sclerocarya birrea*) is a medium-sized to large deciduous tree, with a single stem and a wide spreading crown indigenous to the miombo woodlands of Southern Africa. Morula is one of Southern Africa's most valued trees as its edible fruits have been used as a source of food for years and has considerable socioeconomic importance.

## DISTRIBUTION

Morula is widespread in Africa from Ethiopia in the north to KwaZulu-Natal in the south. It occurs naturally in various types of woodland, on sandy soil or occasionally sandy loam. In Botswana it occurs throughout the eastern, southeastern, and northern parts of the country, often growing at very low population densities per unit area.

## ECOLOGY

Marula are mostly found in low altitudes and open woodlands together with low elevation vegetation types from trees to shrub grassland. Insects pollinate the flowers. Elephants, antelope, zebra and many others browse the leaves.

The trees bears a wealth of fruit for other living organisms including humans. The larval stage of the beautiful green African moth *Argema mimosae* feeds on marula.



## DESCRIPTION

The Morula tree grows up to 18m, with a taproot and sturdy lateral roots extending as far as 30m. It is one of the plants that played a role in feeding people in ancient times. Male and female flowers are borne on separate trees, with the male flowers plants producing pollen and the female flowers

producing the fruit for which the tree is so well known.

- a) The stem:
- b) The leaves:
- c) The flowers:

## USES

Morula can be consumed as a fruit, and the nuts can be crushed and eaten after drying. Morula fruits can be processed to make traditional beer and jam. The stems of morula trees are very hard and durable, thus they have been used to make sledges which is a traditional mode of transport.

## PROPAGATION

It occurs throughout the eastern, southeastern, and northern parts of the country, often growing at very low population densities per unit area.

## SUSTAINABLE HARVESTING

Harvesting of the plant is done by cutting the branches and stems. Since it is a perennial plant it recovers easily from the harvesting impact if there is enough rainfall. Even though Mosukujane is not listed under endangered species, the Department of Forestry and Range Resources regulates its utilization/harvesting by issuing permits to harvesters. For advice or assessment of your specific situation, please contact the Department of Forestry and Range Resources (DFRR).



### 3. Thatching Grass



## INTRODUCTION

Traditionally in Botswana, structures were roofed with all kinds of natural materials. The most prominent materials were long and durable grass species with a strong stem. These species were found all over in the rangeland according to their ecological requirements. Each region specialized in the harvest and utilization of particular species. Until recently the naturally thatched hut/house was the preferred architecture of the rural population as it is a cost effective alternative to roof tiles/pan tiles. In the case of bigger rural structures like lodges, thatching grass is often used because of the appealing design.

## THATCHING GRASS IN BOTSWANA

Therefore, thatching material is still in high demand for renovation and new building. A significant part of the poorer rural population, which are mainly characterized as not permanently employed, is dependent on this seasonally recurring income opportunity of harvesting grass in Botswana.



## THATCHING GRASS SPECIES

The majority of resource users in Botswana are middle-aged women. Most of the bundles and loose material is marketed directly at local markets. Today export of grass is uncommon. The price range as per 2011 for 500 g or bundle equivalent was P 0.81 to 8.1 (5.9 avg.) and the revenue per day/harvester spanned from P 69 to 173 (116 avg.).

## QUALITY REQUIREMENTS

Raw material for thatching purposes should meet the following criteria. These standards are applicable to both fine and coarse varieties.

- Cut length not less 0.8 m (fine) to 1.2 m (coarse)

- Butt end diameter between 1.2 to 3 mm
- Being cut above the first node to be relatively straight
- Free of adulterations (only the stems of the respective species)
- Stems should be hollow (preferably) and flexible

## MANAGEMENT AND REGULATION

In Botswana harvesting is allowed from the 15th of July to the 15th of September. Harvesting is free for the first 800 bundles. In excess of that, a harvesting permit is needed. Dealing with the resource requires a dealers permit. Permits are available at all DFRR district or sub district offices.

The grass must be completely dry when cut and plumes must be free of seeds. Preferably, the stems are to be cut above the first node with a sharp tool, normally a sickle, to ensure straight cut edges. Afterwards the grass is loosely bundled and each bundle is shaken vigorously to dislodge all loose material. The bundles are then cleaned by combing them with a sickle in order to remove remaining leaves from the bundle and finally combined into tight bundles of 75 - 100 mm diameter and 1.2 - 1.6 m length.



## UTILIZATION

Thatching grass is obviously used to cover the roofs of houses and huts but other uses are common too. Grass including reed grass can be used to make brooms, mats, screens, sieves, furniture and even the walls of huts.

## BUSINESS MODELS

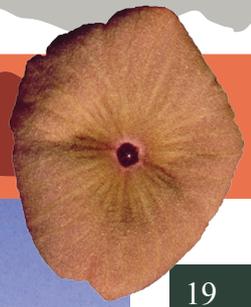
The thatching industry, especially value addition to the mere grass provision is still at its early stages in Botswana. The major obstacle for expanding the industry is the individualized structure in Botswana. There are several opportunities for networks or community enterprises to increase the long-term revenue from the resource. For example, through cooperatives better prices might be attained, due to their ability to deal with bigger orders or even trade regional, to provide proper storage facilities, to add value like post-harvest treatment against fire or decay to the resource and to offer complete packages that contain the quality resource plus high end thatching services.

## THATCHING GRASS SPECIES

Specie (Latin)	(Setswana)	Culm (mm)
<i>Eragrostis pallens</i>	Motsikiri	30 30 - 200 - 200
<i>Cymbopogon excavatus</i>	Mokamakama	200
<i>Cymbopogon plurinoides</i>	Mokamakama	-
<i>Hyparrhenia hirta</i>	Bojang	30 - 100
<i>Hyparrhenia filipendula</i>	Bojang	60 - 200
<i>Hyparrhenia dissoluta</i>	Bojang	200
<i>Aristida congesta</i>	Seloka	10 - 75
<i>Aristida stipitata</i>	Seloka	30 - 150
<i>Stipagrostis uniplumis</i>	Tshikitshane	30 - 80



## 4. Hoodia



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## INTRODUCTION

The Hoodia plant (*Hoodia gordonii*) is a spiny succulent plant of Southern Africa, which is distributed in the Karoo, Namib and Kalahari. The plant has been used by Basarwa for thousands of years to suppress appetite on hunting trips and as a thirst quencher. Some decades ago these interesting properties of Hoodia have been discovered by scientists to treat obesity and increase weight loss. Many products are already on the international market and more are still under development. Currently, the massive demand for these products can not be met by the current supply, though the prices paid are high.

## HOODIA IN BOTSWANA

In Botswana two species of Hoodia exist, namely *Hoodia currenii* and *Hoodia gordonii*. The latter one is found in the most arid parts of the Kgalagadi district, and is the most sought after species, as it is the one with the desirable properties. As in the neighboring countries it is used traditionally by the local communities to suppress appetite and to treat various ailments.



## HOODIA IS ENDANGERED

Due to the few populations found in the wild Hoodia species are highly endangered. Unfortunately, the plants became rarer during the past years due to alleged illegal collection. At the moment it is not possible to promote collection in the wild, as any further disturbance to the limited populations may lead to its extinction. Therefore, Hoodia needs strict protection in the veld and control of traded material or products.

## EFFORTS TO MANAGE HOODIA

Since wild harvesting is impossible, cultivation may offer the

only alternative to exploit the economic potential of Hoodia. A series of propagation experiments to tame Hoodia as a new crop have been carried out by DFRR and were successful. It has been proven that Hoodia can be multiplied and grown artificially. In addition, conservation measures and cultivation initiatives have been promoted by the Department.

### **A NEW CROP FOR ARID AREAS**

Hoodia is an exciting potential new crop for various reasons. Firstly, the value of the products is very high and promise good benefits for everyone involved in the business. Furthermore, Hoodia as a desert plant is highly adapted to drought areas, where no other conventional crop provides reasonable yields. Therefore, Hoodia provides an opportunity to develop arid parts of Botswana where in the past no conventional crop could be established.

Due to the ecology of Hoodia it is currently not feasible to grow the plant in Europe or the USA, where the main consumers of the products are located. This is an important factor, as it creates a niche for producers in Southern Africa.

### **COMMUNITY CULTIVATION PROJECT**

In order to ensure economic opportunities for the people in rural areas, a community based cultivation project has been started in Bokspits area. The communities of BORAVAST Trust have been trained in propagation and cultivation methods and are supported by accessing funds to implement the related activities.

### **FUTURE MARKETS OF THE PRODUCTS**

Any production of agronomic products must go along with accessing markets for the products. In case of Hoodia, contacts have been established with one international food company and other traders in the region. Although, no Hoodia is produced yet, the building of a supply chain is of major importance.

## 5. Kalahari truffles / Mahupu

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## INTRODUCTION

The Kalahari truffle (*Kalaharituber pfeilii*) is an aromatic fruit body of an underground fungus, known for years as a delicate and nutritious food for the people of the Kalahari. This species only grows in sandy soils, and are named after the Kalahari region by the first European settlers.

## DISTRIBUTION

The plant is found in the Kalahari region of Southern Africa, including Namibia, Botswana and Northern Cape Province of South Africa. In Botswana they are mostly found in the sandvelds of Kgalagadi, Gantsi and Kweneng Districts.

## ECOLOGY

Kalahari truffles grows in the sandy soils where rainfall is erratic. In the southern Kalahari they fruit from April to May following the late summer rains. They are most common in undisturbed grassveld and shrubby areas.

They form a symbiotic relationship with the roots (host) of several species of plants including trees, grasses, and fruits, depending on the geographic location.

## DESCRIPTION

Mahupu have an irregular spherical, sub-globose shape with a basal tangle of hyphae roots. The fruit is mostly covered with soil or sand giving it a reddish brown color but often gets



exposed revealing its yellowish brown to dark brown color with yellowish wrinkles or cracks. The interior solid of the fruit is white in youth becoming yellowish to brown fertile pockets separated by white veins at maturity.

## USES

Kalahari truffles are edible fungi used as a nutritious food delicacy for the poorer communities of the Kalahari. They have a subtle, nutty and earthy taste with a high protein content. Truffles are served either baked or sliced and fried. They can also be used as a recipe in various dishes. The species is also beneficial to host plants as it provides moisture and mineral salts (calcium and phosphorus) to them.



## PROPAGATION/CULTIVATION

The plants occur naturally and no sowing or propagation has been established yet. Natural regeneration rely on wind dispersal of spores to scatter spores near a suitable host on which to germinate and grow.

## MONITORING AND REGULATION

Requires a harvesting permit if the amount to be harvested exceeds 2kgs per month.

## 6. Hood Wild melon / Kgengwe



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## INTRODUCTION

African melons, although less nutritious than the related pumpkins and squashes of America, have always been greatly favoured as a delicacy. In more arid areas, the abundant round, green- or white-fleshed Tamma melon has also played another role as an essential source of water for humans and a wide variety of animals life.

*Citrullus lanatus* is an annual plant with several herbaceous rather firm and stout stems up to 3 m long; the young parts are densely woolly with yellowish to brownish hairs while the older parts become hairless. It is both a fruit and a vegetable; a vine-like (climber and trailer) plant originally from southern Africa.

Tamma melon is the ancestor of the red-fleshed *C. lanatus* subsp. *vulgaris*, the most common type of melon.

## DISTRIBUTION

The plant is wide spread, especially in around the southern central part of the Kalahari.

## ECOLOGY

The plant grows in grassland and bush land, mostly in sandy soils, prefers light (sandy) and medium (loamy) soils and requires well-drained soil. The plant prefers acid, neutral and basic (alkaline) soils. It cannot grow in the shade. It requires dry or moist soil and can tolerate drought.

## DESCRIPTION

*Citrullus lanatus* is a trailing or climbing herb to 6m, sometimes woody below, spreading out from a large underground tuber as long as 3m irregularly cylindrical. Young parts covered with soft rust-red hairs, later grey.

### The leaves:

The leaves are heart shaped, about 5-20 cm wide with rusty

hairs below, especially on the nerves.

The flowers:

Male and Female flowers occur on the same plant.

The flowering time is mostly from January to April.



#### The fruits:

The fruit of the wild form is subglobose, greenish, mottled with darker green and up to 20 cm in diameter. The colour sometimes vary from pale yellow to darker green. The fruiting time is mostly from February to May. Dry or rainy years influence flowering and fruiting.



#### The seeds:

The seeds are numerous, more or less ovate in outline, sometimes bordered. In wild forms they are black or dark brown, mostly 6-12 mm long.

## USES

As the flesh is normally too bitter for human consumption the main interest is on the seeds which contain an edible oil (17% monosaturated, 19 % saturated and 64 % polyunsaturated fatty acids). The golden yellow oil is extracted from the seed by conventional presses and has a pleasant nutty odour and an agreeable taste. The meal remaining after oil extraction has a remarkable 52% protein. For direct consumption the seeds must be either roasted or boiled.

The young leaves and tender growing shoots can be harvested, de-strung, thinly sliced and steam-fried as a vegetable relish or spinach. They have a purgative effect if too many are eaten.

## MONITORING



## 7. Wild Medlar / Mmilo

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## INTRODUCTION

*Vangueria infausta* is one of the southern Africa's more popular veld fruits, and can be enjoyed while walking.

## DISTRIBUTION

The plant is wide spread through-out Botswana.

## ECOLOGY

The species is widely distributed in wooded grassland, often in rocky or sandy places. It can withstand long periods of drought and mild frost.

## DESCRIPTION

*Vangueria infausta* is a deciduous tree 3-8 m in height with a short trunk and hanging branches. It can be a single or multi-stemmed tree, but usually the latter. The bark is pale grey-brown, peeling in untidy flakes.

### a) The leaves:

The leaves are single, opposite arranged with an entire margin. They are dull green, oval, covered with soft, velvety short hairs even more so when young.

Unripe fruits

### b) The flowers:

Small greenish- white yellowish flowers about 4mm long and 6 mm in diameter densely hairy, in crowded branched heads. They occur in clusters along the short lateral branches. In southern Africa, the tree flowers from September to November. The seeds of wild medlar



### c) The Fruit:

The fruit is almost rounded, glossy, dark green when young and changing to a light brown when ripe. The ripe fruit is soft, fleshy and rich in fiber with a leathery skin that encloses

3-5 seeds embedded in soft pulp. It can be found on plants from January to April.

## USES

*Vangueria infausta* has economic value as the fruit is edible and contains a high level of vitamin C, protein, carbohydrates sodium, vitamin B3 (nicotinic acid) and high levels of calcium and magnesium. It can be used as a substitute for applesauce and today many rural people wives make use of it in puddings.



The fruit is mostly eaten raw but in some areas it is stored as dried fruit to be used in time of food scarcity. Alcoholic or soft drinks can be made from a ripe fruit.

An infusion made from the roots is used to treat coughs and other chest troubles.

Among other traditional medicinal uses an infusion of leaves is used for the relieve of tooth ache. Leaves can also be used to treat skin irritations and as a mosquito repellent. Timber; poles for houses, implements and utensils.

## PROPAGATION

Wild medlar can be well propagated from fresh seeds or cuttings. It germinates best without the pulp in well drained, sandy soil mixtures. Properly dried and stored seeds retain their viability for up to one year. Thousand seed weight is 2 kg. Young plants transplant well but must receive regular watering for the first weeks. Beginning of the rainy season is the best time for sowing.



## 8. Transvaal red-milkwood / Mmupudu



## INTRODUCTION

*Mimusops zeyheri* commonly called Transvaal red-milkwood, moepel and mmupudu in South Africa and also in Botswana is commonly known as Mmupudu, its native to Africa (Tanzania, Mozambique Malawi, Zimbabwe, Zambia, Botswana Swaziland and South Africa).

## DISTRIBUTION

The plant is not widely distributed outside Africa however it is found in germplasm collections of sub tropical and tropical areas.

## ECOLOGY

It occurs at low altitudes in hot areas with an adequate rainfall, frequent on well wooded rocky hillsides, in riverine fringes, at the margins of evergreen forest and in dry open woodland

## DESCRIPTION

Occasionally a large shrub, but usually small to medium sized tree up to 15m in height, sometimes taller, with a round well-shaped crown;

### a) Bark:

Grey, dark brown to blackish, rather smooth in young specimens roughened when older.

### b) The leaves:

The leaves are scattered, ovate, lanceolate to oblong, 4 to 11 x 2 to 5cm, thickly leathery, shiny dark green above, paler green below, the young leaves and twigs covered with dense appressed rusty hairs which are lost by maturity; apex broadly

tapering to rounded, often notched; base tapering; margin entire, slightly thickened: petiole up to 3cm long.



### c) The flowers:

Sepals with grayish hairs, petals creamy-white, star-shaped, about 10mm in diameter, on slender stalks up to 3cm long, clustered in axillary groups of 3 or more, often in profusion (October to March)

### d) Fruit:

Ovoid to fleshy approximately 2-3 x 1-2,5cm yellow when mature. ; embedded into it are one to four large flattened, shiny brown seeds.

### **USES**

The fruit is a good source of vitamin C (50-80mg/100g pulp) (Ohiokpehai)

### **The fruit**

Crushed fruit can make juice which can be served fresh or fermented. There are reports that fruit makes an excellent jelly or jam. The plant can be used as general purpose timber.

Can also be used as an attractive garden tree if situated in a well drained area with summer rainfall and mild winter climate. .



### **PROPAGATION/CULTIVATION**

The plant grows easily from seeds and it grows slowly under natural conditions during the rainy season.

### **MONITORING AND REGULATION**

May not require a harvesting permit if the amount to be harvested exceeds 2kgs per month.

## 9. Mogorogorwane

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## INTRODUCTION

The monkey orange tree has a large economic potential because the fruit is sold in rural and urban local and regional markets especially between Zimbabwe and Botswana.

## DISTRIBUTION

Mogorogorwane is native to South -East Africa. Its range within Botswana stretches from the South to South East and Northern parts. In South Eastern Botswana the stands are patchy and scattered.

## ECOLOGY

*Strychnos cocculoides* grows naturally in woodlands and in mixed forests, deciduous woodlands and lowland, under the average mean annual rainfall of about 500 - 1200 mm and prefers sites with sandy soil or rocky hill slopes.

## DESCRIPTION

*Strychnos cocculoides* is a deciduous tree of about 2-8 m high. The tree has a compact crown with strong curved spines.

### Bark:

It has a creamy brown bark which is deeply corky and longitudinally ridged.

### c) Leaves:

Pari-pinnate dark green leaves usually shiny above and dull below. They are ovate -oblong to almost circular and measurements ranges from 1.5 - 5 cm. Leaves have 3 - 7 veins which start at or just above the base. The apex and base broadly tapering to rounded, while margin is entire.

### d) Flowers:

Small greenish white flowers which have dense compact heads up to 3.5 cm in diameter, the flowerers are terminal on the main branches or on the short lateral shoots.



It is a monoecious tree that contains separate male and female flowers on the same plant.

#### e) Fruit:

The fruit is hard or woody shelled and about 7 cm in diameter. It is green in color and finally turning yellowish when it is ripe during April - August. It takes 8-9 months from flower fertilization to fruit ripening.

#### f) Seed:

The tree has many seeds which are embedded in the pulp/ fruit. The Seeds are reported to contain toxic substances.

### USES

Fresh leaves pounded into paste are used to treat sores. The fresh leaves are crushed and soaked in water; the drained liquid is used as a spray for vegetables to repel insects such as aphids and scales. The root is chewed to treat eczema and its decoction is used to cure gonorrhoea. Ripe fruit is eaten fresh or is used to prepare a sweet-sour non-alcoholic drink. The fruit is used to make a dye that provides also protection from insects to color trays and containers. The fruit is used as soap for washing clothes too. Fruits mixtures with honey or sugar are used to treat coughs and also used in making eardrops. Wood is used to make implement handles and building materials.



### PROPAGATION

The *Strychnos cocculoides* regenerate naturally by seed, coppice or root suckers. The seeds will germinate without any pre-treatment; however, soaking in warm water for 24 to 48 hrs will improve germination. The seed should be sown at a depth of 2-3 cm in pots or seedbeds. Germination should occur in two to four weeks. Seed viability is high within 6 months of extraction from the fruit, after this time, it sharply declines.

# 10. Real Fan Palm / Mokolwane



## INTRODUCTION

Among the indigenous trees of Botswana, the fan palm (Mokolwane) is one of the mostly used natural resource by people.

## DISTRIBUTION

The plant is mainly found in low land Savanna of South-East Africa where its distribution area stretches along the northern parts of Zimbabwe, Botswana and Namibia and up to Tanzania. Sizeable numbers of the fan palm occur in Botswana from Gweta village towards the Okavango Delta.

## ECOLOGY

The tree grow well in areas with shallow saline water table, even in temporarily flooded areas. That makes it a common element of salt pan habitats. Generally, it can be found on sandy soils. Sometimes it forms small clumps but in general, it grows solitarily.

The fruits ripen from November to December and are favorite foods of elephants, which shake the trees in order to dislodge the fruit. They are then swallowed completely and the undigested seeds are excreted in a pile of manure ready to germinate. The extremely hard shell of the seed is dependent on such a stimulus for quick germination. A bush fire is even more effective in weakening the shell to enable the embryo to grow.

## DESCRIPTION

A small to medium-sized palm with usually a single erect stem, which can grow up to 18 m. Occasionally two-stemmed specimens can be seen. The bare stem is often slightly swollen in the middle of the upper section and has scars from where the old leaves have fallen off.



### a) Leaves:

The 1.5 - 2 m long fronds (including petiole) are fan-shaped and crowded at the tops of stems. The petiole is grayish-green and covered with black thorns along the edges.

### b) Flowers:

Male and female flowers are on separate plants. The male flowering spikes are fairly short and produced among the leaf basis whereas the female flowering spikes are larger and produce large spray which develop into trusses of fruit (inflorescence up to 1 m).

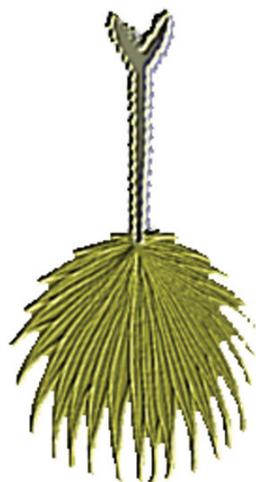
### c) Fruits:

The fruits of Mokolwane are shiny-dark brown, almost perfectly round and of a diameter of 40 - 60 mm. It contains a single seed, with exceptionally hard ivory-colored layer known as 'vegetable ivory'.

## **USES**

There are several plant parts used extensively by people where the plant occur for e.g. making palm wine ("Mochema") from fermented mesocarp pulp (non-destructive) and from sap by tapping flower buds (non-destructive) or by tapping the palm sap which is fatal to the tree. The wine is then distilled into spirits. Less often is the fibrous mesocarp eaten fresh. As the palm heart is edible and the tree needs to be cut down to access the heart, this utilization destroys the resource.

The leaves are mainly used for roofing and basket weaving. Leaves are also utilized to make chairs, tables and floor mats. These products are either sold nation-wide through Botswana Craft Shops or used locally at household level in the area.



## PROPAGATION

Mokolwane can only be propagated by seeds. Sowing should be direct, and preferably where a hard pan is present.

A hardpan usually ensures a period of water logging in



which period the seed takes up enough water to germinate.

The developing taproot makes it unsuitable to be raised in a nursery. The long taproot also

makes it impossible to transplant wildings. Sowing can take place

all year round, and most seeds will eventually germinate. It

can take more than two years after sowing before the seedling

emerges. Pretreated seeds

(bruised seed coat) will germinate more rapidly.

## MONITORING AND REGULATION

Requires a harvesting permit if the amount to be harvested exceeds 2kgs per month.



## 11. Morama Bean / Thamani



41



## INTRODUCTION

Morama bean (*Tylosema esculentum*) belongs to the Fabaceae family like common beans. It is being cultivated successfully outside its endemic area and it is getting more and more attention because of its nutritional value all over the world.

## DISTRIBUTION

*Tylosema esculentum* is endemic to Botswana, Namibia and South Africa. The plant is found mainly in the Kalahari Desert and neighboring sandy regions. It is commonly found in arid to semi-arid regions where rainfall is low and erratic.



## EOLOGY

It is a long-lived perennial legume species adapted to arid zones of southern Africa.

Morama bean is a tuberous legume that can grow under high temperatures (typical daily max 37° C during growing season) and radiation (frequently in excess of 2000 mmole m<sup>-2</sup> s<sup>-1</sup>) in poor sandy soils with low rainfall.



## DESCRIPTION

Stems grow at least 3 meters, in a prostrate or trailing form, arising from a large tuber that can grow to 10 kg and above, with forked tendrils that facilitate climbing. A raceme up to 25mm (1 inch) long, containing many yellow-orange flowers, ultimately produces an ovate to circular pod, with large brownish-black seeds. The bean compares well in protein and oil content with soya and peanut. Seeds contain 30 - 39 % protein

which is composed of 12 essential amino acids (tyrosine 11.6%, leucine 5.5 and lysine 5.5% are the dominant), 36 - 43 % fat (including several unsaturated fatty acids like oleic acid 43% and linoleic acid 22 %) and approximately 24 % carbohydrates.

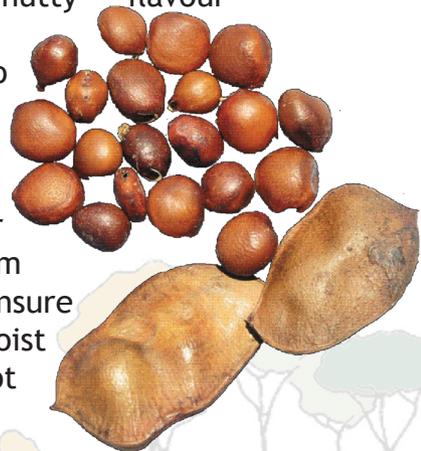
## USES

The plant is used as a dietary food for the people in the Kalahari region. The tuber also stores large amounts of water thus are used as an emergency source of water for both humans and animals. The seeds are not eaten raw as they are tasteless with an unpleasant slimy texture, but after roasting, they have a delicious nutty flavour, resembling roasted cashew nuts.

Morama beans are also boiled with maize meal, or ground and pounded to a powder for making porridge or a cocoa-like beverage. The oil resembles almond oil and is suitable for domestic purposes, having a pleasant nutty flavour although a slightly bitter taste. In some areas the tubers and young stems are also roasted and eaten when young.

## PROPAGATION/CULTIVATION

Seeds germinate in warm conditions after rainfall. The seed coat is a very hard 1 mm thick shell that needs to be scarified to ensure germination. Seeds must be planted in moist neutral to acid soil or sand that should not be waterlogged.





## 12. Fever Bush / Mosukujane

44



## INTRODUCTION

The fever bush (Mosukujane) is probably Africa's most underrated fragrant medicinal plant as it can be used to treat a variety of medical conditions. However, it is not used to its possible extent yet.

## DISTRIBUTION

The plant is wide spread through-out Botswana. It is commonly found in hard veld areas that experiences medium to heavy rains.

## ECOLOGY

It grows in the open sun in grasslands and stream banks and on forest margins. The plant grows well in disturbed areas. It can grow in Eastern Africa up to an altitude of 2200 m.

## DESCRIPTION

*Lippia javanica* was first identified in Java-Indonesia, by the Italian traveler called Augustin Lippi, hence the epithet *Lippia javanica*. The plant is a member of the Verbenaceae which is a family of herbs and shrubs or small trees. The plant is an aromatic high woody shrub and is multi-stemmed.

### a) The stem:

The erect stem can grow up to 1 - 2 m high.

The stem is much branched from the ground level and yellowish cream to light brown longitudinally fissured.

### b) The leaves:

The leaves are hairy with noticeable veins and when crushed gives a lemon-like smell.

### c) The flowers:

The creamy-white flowers occur in dense, round, small stalked clusters. The fruits are inconspicuous, small and dry.

## USES

The plant is well known for its medicinal properties. Among those it is especially famous for fever treatment hence its name Fever Tea.

The following are some of Mosukujane uses:

A weak infusion can be used as tea substitute. Strong infusion used for treatment of coughs, and cold. Its mixture with *Artemisia caffra* can effectively treat malaria, influenza and measles. It can be used as a prophylactic against lung infections. Leaf smoke can be used to treat coughs, bronchitis and asthma. Leaves can be used to treat skin irritations. It can be used as a mosquito repellent.



The rural communities derive income from the sales of this plant.

There are organizations in Botswana that are already engaged in the processing and packaging of the plant.

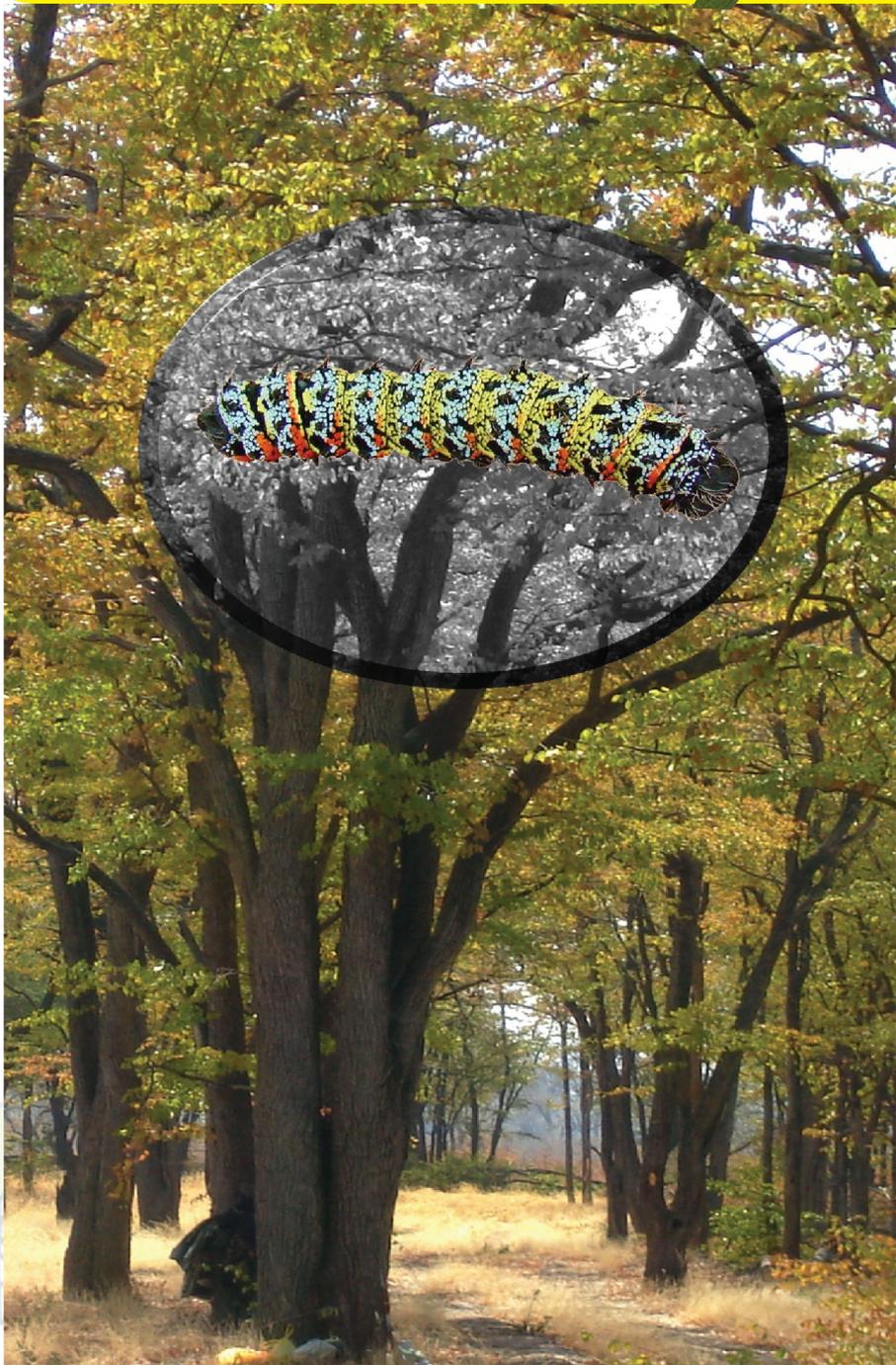
## PROPAGATION

Mosukujwane can be grown from seeds and cuttings. The right time for propagating this plant would be during summertime during the rainy season. It grows relatively fast and prefers sunny areas but it is not very particular when it comes to soil conditions and might do well in most soil types.

## MONITORING AND REGULATION

Requires a harvesting permit if the amount to be harvested exceeds 2kgs per person per month.

# 13. Phane



## INTRODUCTION

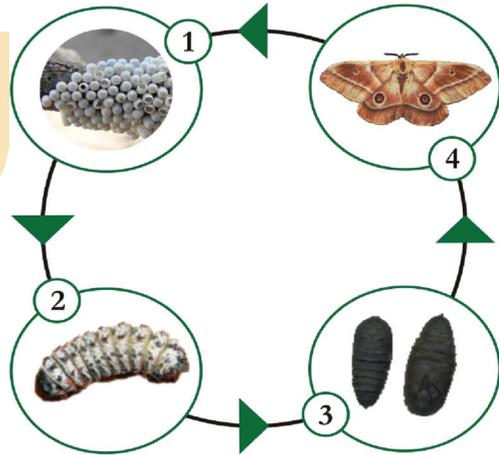
The caterpillar of the emperor moth, *Imbrasia belina*, commonly known as Phane in Setswana, is found widely in Southern Africa. The worm derives its name from its host plant that is locally known as Mophane (*Colophospermum mopane*). As the utilization of Phane has become very much commercialized in Botswana the pressure on the resource has risen significantly.

## DISTRIBUTION

Phane is concentrated and widely distributed in the north Eastern part of Botswana, and primarily it follows that of its host plant *Colophospermum mopane*.

## ECOLOGY

It is important to understand the life cycle of the Phane to realize the vulnerable point which may result in the collapsing of the reproduction system. Rainfall is considered to be important for both moth emergence and caterpillar growth. The Phane moths appear and lay eggs on leaves at the beginning of the rainy season from late October to mid November when the mophane trees produce new leaves. The moth that does not feed at all during her short existence dies soon afterwards. The eggs will hatch after about 10 days into small caterpillars. The caterpillars pass through 5 stages of development which takes about five to six weeks. The last stage is the one to be harvested as the caterpillar is then at its largest size. The larvae (caterpillar) feed on leaves of the tree where they hatch. The worm then moves down the tree to burrow and



becomes, after a pupa stage in the ground, the moth during the next season.

### USES

Many rural people predominantly women, engage in Phane harvesting twice a year (December - Jan and April - May) as a means of earning revenue to support their families. Phane harvesting is a visible income generation activity for many and has now become commercialized.



Generally Phane have been harvested for: food, source of revenue and animal feed. Phane is rich in protein (essential amino acids) and fat, and as such it is an important source of nutrition. Some of the fatty acids are essential too, which means they cannot be formed by the human body and must be taken up.

### Comparison of Nutritional Quality (%)

Sample	Protein	Fat	Carbohydrates	Calcium
Phane	56.8	16.4	13.8	0.458
Beef	22.6	8.0	0	0.016
Bilton	55.4	1.5	0	0.016
Chicken	20.5	6.5	0	0.010

### MONITORING AND REGULATION

Requires a harvesting permit if the amount to be harvested exceeds 10 kgs per person per month.

## 14. Blue Sour Plum / Moretologa

50



## INTRODUCTION

The blue sour plum (*Ximenia americana*) also known in setswana as Moretologa is one of the abundant but underexploited plant species in Botswana that have a economic potential.

## DISTRIBUTION

The plant is wide spread , especially in the Northern, South West and Southern part of Botswana.

## ECOLOGY

The species is mainly found in semi-arid bush land, dry woodland, savanna, in the understorey of dry forests or on riverbanks. It is drought resistant but should receive at least 300 - 400 mm of rainfall per year. A mean annual temperature of 14°C is needed which limits the altitudinal spread to approximately 2000 m. The sour plum is unassuming with regard to the soil type which leaves the plant often to the poor and dry spots.



## DESCRIPTION

The growth form is mainly a shrub (1- 3 m) but sometimes develops into a small tree (3-7 m) with a rounded or conical crown. The trunk diameter seldom exceeds 10 cm. The overall appearance of the canopy is bluish green. The durable heart wood is yellow-red to brown-orange.

### a) The bark:

The bark is dark brown to pale grey, smooth when young but is becoming rough and scaly with age.

**b) The leaves:**

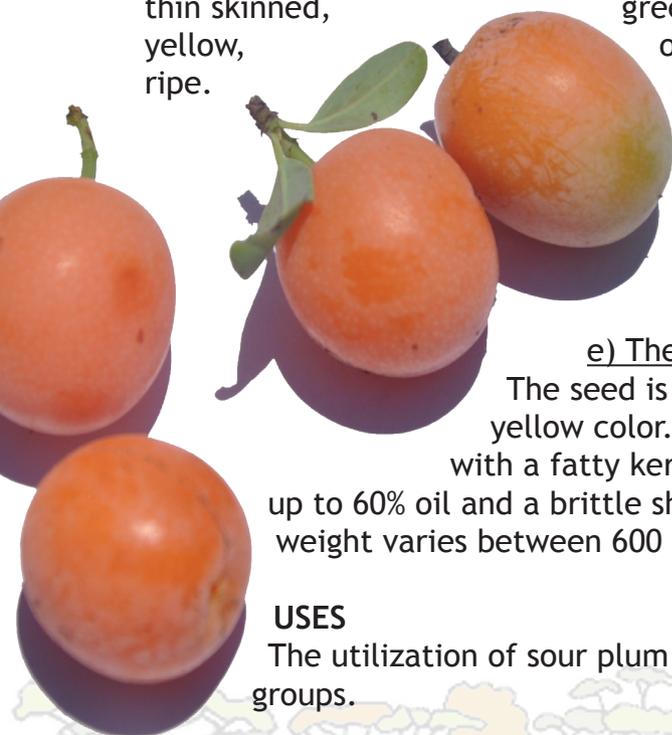
The simple leaves are alternate or clustered on short side branches. The leaves are oblong and normally 4-7.5 by 2-4.5 cm, and are often folded upwards along the midrib. They are blue-green and when young densely hairy, but later lose the hairs and become shiny.

**c) The flowers:**

The fragrant flowers are small and white to greenish-cream or even pink. They occur in small branched clusters with a common stalk. Male and female organs occur on different plants. The species flowers in September to December.

**d) The fruit:**

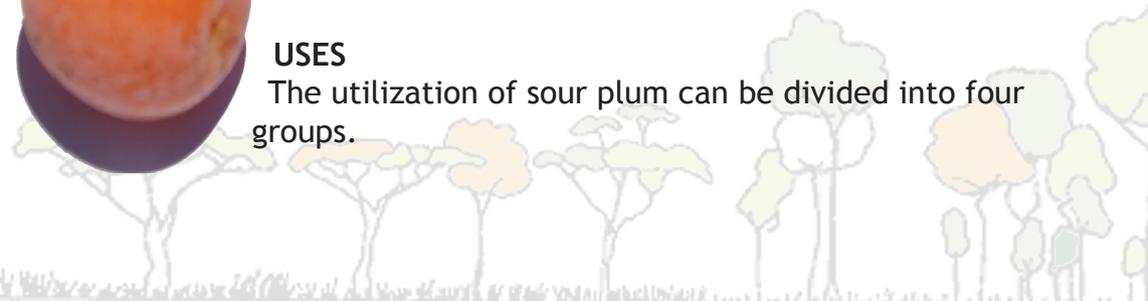
The oval fruit is approximately 2.5–3 cm in diameter, shiny, thin skinned, greenish when young, turning orange or pink-red when ripe. It contains a juicy pulp and one large yellow-brown seed. The fruit is sour but becomes sweeter when ripe which makes it edible.

**e) The seed:**

The seed is woody and of light yellow color. Its size is 1.5 by 1.2 cm with a fatty kernel which can contain up to 60% oil and a brittle shell. The thousand seed weight varies between 600 g and 800 g on average.

**USES**

The utilization of sour plum can be divided into four groups.



**i) Food and beverage:**

The fruits are used to make jams, jellies, juices as well as alcoholic drinks. The young leaves are edible after thorough cooking.

**ii) Cosmetics:**

The seed oil can be used for body and hair oil as well as for soap making.

**iii) Traditional medicine:**

The bark, roots and leaves are used as decoction, dried or powdered to treat various ailments mainly related to the skin but it is said to be effective against head-aches and other complaints as well. Bark and crushed fruit rind are applied to sores on domestic animals to keep off fleas.

**iv) Industrial:**

The bark and roots contain tannin, which is used in tanning processes. The Heartwood contains of an essential oil that can be used for fumigation and as a mosquito repellent. The wood is mainly used for fire wood. Some rural communities derive income from this plant by selling or processing the raw material.

**PROPAGATION**

Seeds should after-ripen for 2-3 days but fermentation of the pulp must be avoided. After the removal of the pulp seeds should be dried. Storage is then possible. Seeds readily germinate between 26°C - 36°C when sown in sand and kept moist. Under such conditions the seeds germinate in about 16- 30 days. Seedlings should transplanted to plastic pots after some weeks and hardened off before put to the final destination.

**Current permit fees**  
(liable to change)

TYPE OF PERMIT	CATEGORY		
	Citizens	Residents	Non Residents
Harvesters	P2	N/A	N/A
Dealers	P50	P100	P500
Export	P500	P1000	P2000

**Schedule**  
(regulations 3 (1) )

CATEGORY	SCIENTIFIC NAME	PRODUCT VERNACULAR/ COMMON NAME
A	<i>Hoodia Species</i>	Thokabotshwaro/ Sekgopane/ Seboka/ Hoodia
A	<i>Harpagophytum species</i>	Sengaparile/ Grapple plant. Devi's claw
B	<i>Lippia scaberrima</i>	Mosukudu/ Fever tea
B	<i>Lippia javanica</i>	Mosukujane/ Mosukubyane/ Fever tea
B	<i>Artemisia afra</i>	Lengana/ Wild wormwood
B	<i>Terfezia pfeilii</i>	Mahupu/ Truffles
B	<i>Myrothamnus flabellifolius</i>	Gala la tshwene/ Resurrection plant
B	<i>Strophanthus kombe</i>	Kombi/ Poison Rope
B	<i>Indigofera tinctoria</i>	Mhetola/ Africa Indigo (basket dyes)
B	<i>Cassia abbreviata</i>	Monepenepe/ Long tailed cassia
C	<i>Imrassia belina</i>	Phane/ Caterpillar
D	<i>Sclerocarya birrea subsp caffra</i>	Morula
D	<i>Adansonia digitata</i>	Mowana/ Baobab
D	<i>Orphanhera jasminiflora</i>	Mosata/ Nama ya setlhare
D	<i>Mimusops zeyheri</i>	Mmupudu/ Red Milkwood
D	<i>Vangueria infausta</i>	Mmilo/ Wild medlar
D	<i>Berchemia discolor</i>	Motsintsila/ Brown Ivory
D	<i>Grewia species</i>	Mogwana/ Moretlwa
D	<i>Azanza garckeana</i>	Morojwa, Snot Apple
D	<i>Strycnos cocculoides</i>	Mogorogorwane/ Corky monkey apple
D	<i>Strycnos spinosa</i>	Morutlwa/Green monkey apple
D	<i>Phragmites australis</i>	Letlhaka/ Common reed
E	<i>Hyphane pertesiana</i>	Mokolwane/ Mokola/ Fan palm
F	<i>Eragrostis pallens</i>	Motshikiri/ Thatching grass
F	<i>Cymbopogon plurinoides</i>	Mokamakama/ Thatching grass
F	<i>Cymbopogon excavatus</i>	Mosagasolo/ Thatching grass
F	<i>Hyparrhenia hirta</i>	Thatching grass
F	<i>Hyparrhenia filipendula</i>	Thatching grass
F	<i>Hyparrhenia dissoluta</i>	Thatching grass
F	<i>Stipagrostis uniplumumis</i>	Tshikitshane/ Thatching grass
G		Dikgong/ Firewood/Fuelwood
G		Untreated poles/ plant materials for building purposes