

# **Forest Management Plan For M’Kata Community Forest**

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## Abstract

M'kata community forest is situated in the western part of Tsumkwe district in Otjozondjupa region. This area is part of the Kalahari Highlands. It is situated approximately 200 km east of Grootfontein and 100 km west of Tsumkwe.

The M'Kata Community Forest was created in 2000. The area is surrounded by settlements with a population of approximately 650 people, which consists 70 households (Maseka, pers. comm., 2003). Local people from adjacent settlements utilize community forest resources for subsistence needs (grazing, wood and non-wood forest products) and income generation. These resources should be managed in a sustainable way to continue and provide these needs of the local community.

The community has an overall objective to sustainably manage forest resources and conserve biodiversity, while deriving wood and non-wood products from the forest for own use and sales to generate income.

Currently, the community harvests about 1,200 poles from their surroundings, which includes the community forest. The estimated sustainable allowable annual yield is 18 mature trees from *Pterocarpus angolensis* and *Burkea africana*. Annually about 1,300 poles can be harvested from the forest for both own consumption and sales. However, they intend only to harvest 150 poles for selling during the first year and gradually increases the harvest as demand warrants.

In addition, the community consumes 110 tonnes of fuelwood annually. About 880 dead trees can be harvested for fuelwood annually. They used about 4.6 tones of thatching grass for construction annually. The expected annual revenue from the sales of woody products is about N\$ 6,000.

The management plan is developed in close cooperation between the community of M'Kata, Directorate of Forestry (DoF) and other stakeholders. The plan is covering an area of about 1054 ha with the M'Kata community forest. This plan will be valid for 10 (ten) years from 2004 to 2013. The annual operational activities will be revised and modified annually according to experience.

M'Kata Community Forest Management Committee will implement the plan assisted by DoF. There will be a clearly defined collaboration between the FMC and DoF whereby DoF role will be to provide only technical advice.

## 1. Introduction

M’Kata was first inhabited by the old man known as Kandantu from the Vasekela tribe which originated from Angola. This old man was ran over and killed by a truck on his journey to Rehoboth (Cassey pers. comm., 2003). Shortly, after the event the current tribe from Mpunga area in Kavango occupied the area. According to Cassey (pers. comm., 2003), there are remarkable differences between the traditions of the two tribes regarding the ways they use natural resources.

The M’Kata Community Forest was created in 2000. The area is surrounded by settlements with a population of approximately 650 people, which consists of 70 households (Maseka, pers. comm., 2003). Local people from adjacent settlements utilize community forest resources for subsistence needs (grazing, wood and non-wood forest products) and income generation.

The management plan is developed in close cooperation between the community of M’Kata and the Directorate of Forestry (DoF). The German Development Services (DED) and the Namibia-Finland Forestry Programme (NFFP) provided assistance through carrying out the inventory, providing technical assistance and other logistical support. The Ministry of Agriculture, Water and Rural Development (MWARD) through the M’Kata Agriculture Development Center, also provided logistical support towards the development of the plan.

The plan is applicable to an area of 1054 ha on the M’Kata community communal land area. This plan will be valid for 10 years, 2004 to 2013. The annual operational activities must be revised by 1st of August of each year.

This plan is focused on forestry activities, which will enhance the output of forest resources from the intensive management units. It takes into consideration the utilization of the forest for many different reasons other than the extraction of timber resources only. The community collect lots of medicinal and edible plants from the forest, therefore all activities must ensure that these needs are met and enhanced upon continuously.

The M’Kata Community Forests is managed by 12 members of the Management Committee. The Management Committee receives technical advice from DoF, DED, MWARD, MLH and Parks and Wildlife.

The overall goal for the management of the area is to sustainably manage forest resources and conserve biodiversity, while deriving wood and non-wood products from the forest for own use and selling to generate income.

## 2. Ownership and management of the area

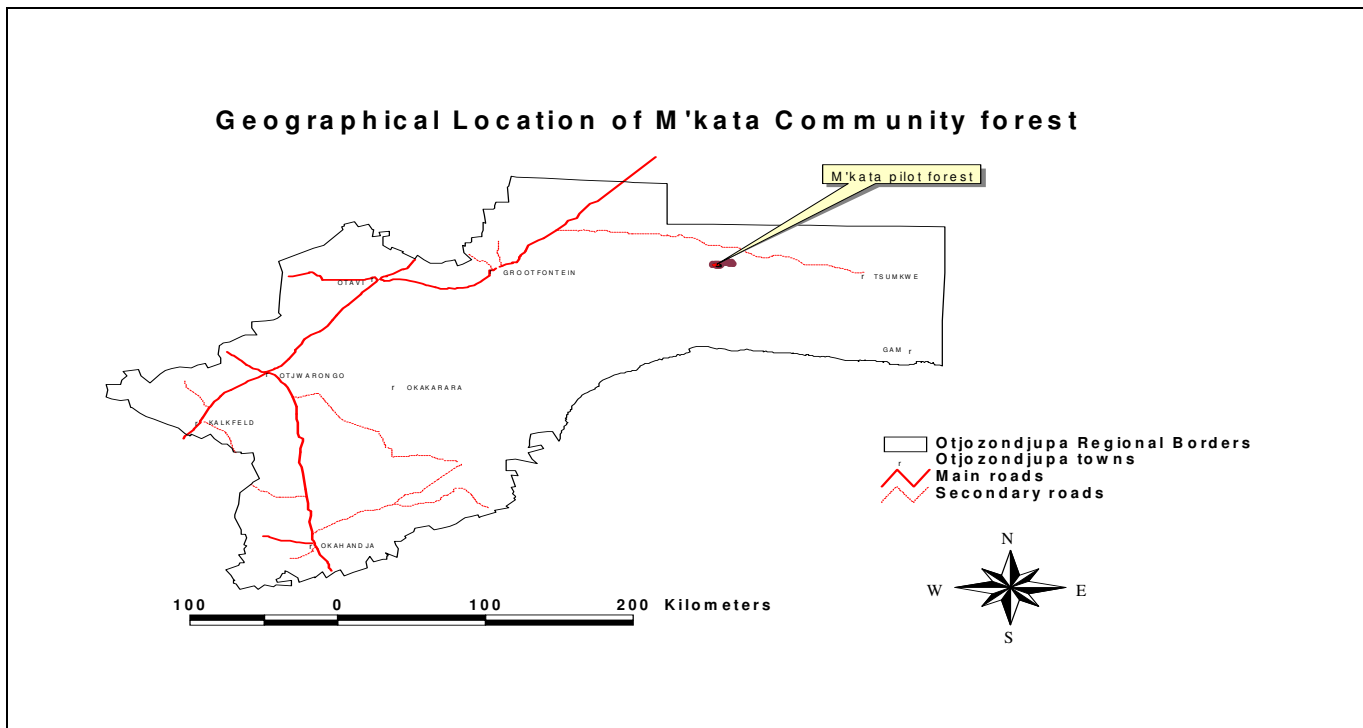
M’kata is a land communally owned under the following authorities: Chief John Arnold of Tsumkwe west, Senior traditional leader Sarasungu, the Head man and community people of M’kata. The elected members of the Forest Management Committee (FMC), for the benefit of community, will directly manage the community forest. The names of

the adults community members are attached. They also developed a constitution for the FMC. The roles and responsibilities of the Forest Management Committee and Honorary Foresters are included in the constitution for M'kata community forest.

### 3. Physical description of the area

#### 3.1 Location

M'kata community forest is situated in the western part of Tsumkwe district in Otjozondjupa region. This area is part of the Kalahari Highlands. It is situated approximately 200 km east of Grootfontein and 100 km west of Tsumkwe.



**Figure 1. Geographic location of the M'kata Community Forest**

### 3.2 Physiography (climate, topography and soils)

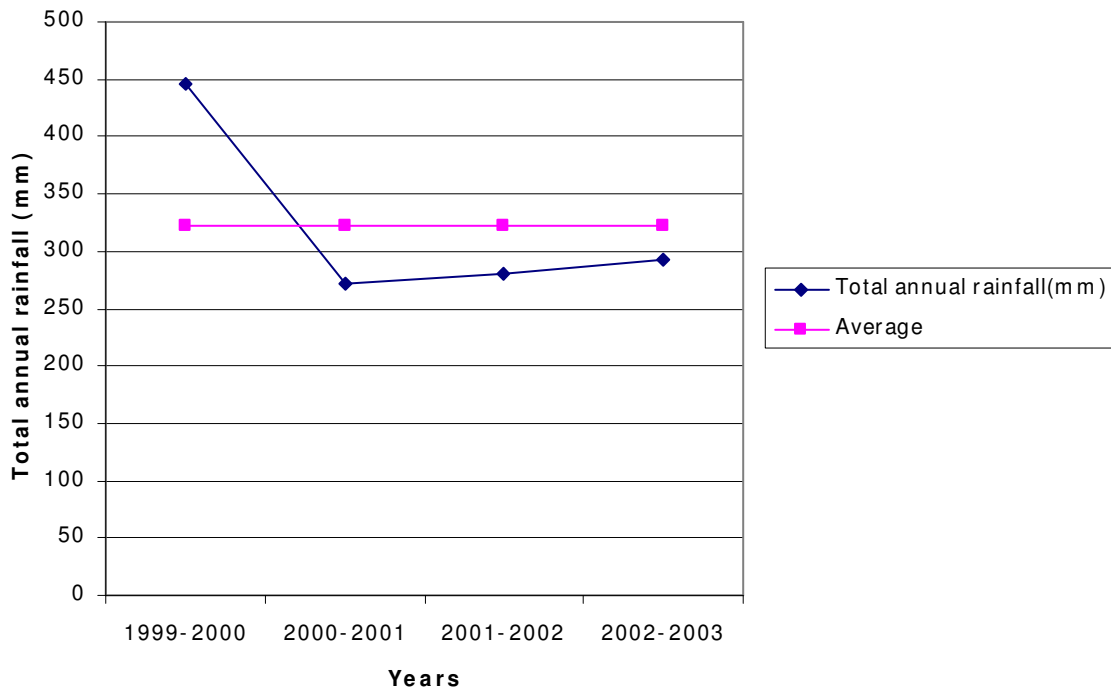
#### 3.2.1 Temperature

M'Kata is hot during the dry and wet seasons (summer) but cold in winter (June-August). Incidence of frost is common in the area during winter. Frost occurs occasionally on the bottom of low-lying valleys. The number of the days of frost varies between 5 and 10 per year in this area (Mendelsohn et al., 2002). Mean maximum temperatures vary from 30 degrees celsius in winter to 40 degrees celsius in summer (Mendelsohn et al., 2002). Average daily minimum temperatures vary between 10 and 18 degrees celsius in

summer, whereas it varies between 0 and 10 degrees celsius in winter (Dealie et al., 1993).

### 3.2.2 Rainfall

From the figure 1 below, it can be seen that the average rainfall over past four seasons sits around 320 mm in M’kata area. High rainfall of about 450 mm was recorded over 1999-2000. There was a enormous drop in rainfall in 2000-2001 but the figure shows slight rise of rainfall after that.



**Figure 2. The total annual rainfall (mm) for M’kata (Namibia Meteorological Services, 2003)**

### 3.2.3 Soils

This area is covered in thick deposits of Kalahari sands, with very little of the underlying geology exposed (Mendelsohn et al., 2002). The *Arenosols* soils type, mainly *Ferralitic Arenosols* is covering the whole area. The soil is always sandy, but the soil colour may differ due to the mineral content. It has a very high drainage. Thus it is difficult to cultivated crops in the area because the sands contain few nutrients and water percolates through it rapidly (Mendelsohn et al., 2002) .

## 4. Forest Resources

### 4.1 Forest inventory

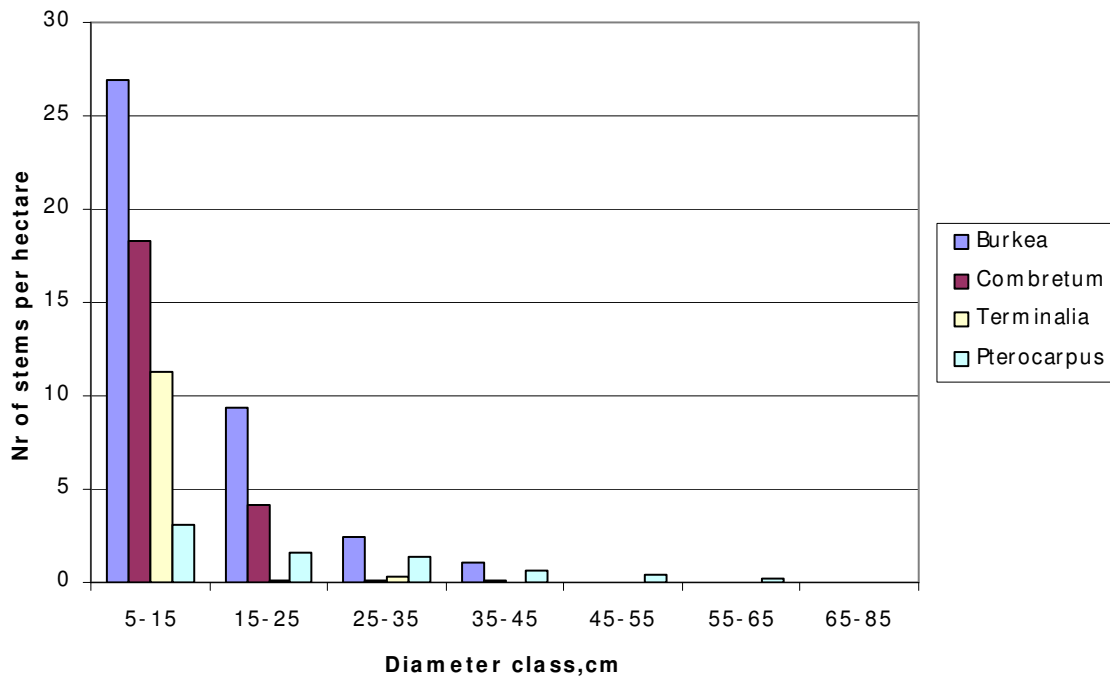
A forest inventory in M'kata Pilot area was carried out in the September 2000 as a co-operation between the DoF, DED, KfW and NFFP. The inventory and its results are described in more details in the "Inventory Report on the woody resources of M'kata Pilot Forest area (Angombe *et al.*, 2001). The report is available at the Directorate of Forestry in Windhoek.

The size of the area inventoried was 1054 hectares. A total of 26 woody species were recorded from which 13 were trees and 23 woody species were found in the shrub layer. A total of 139 shrubs were recorded in the area.

Altogether 13 tree species were identified in the inventory with a total of 90 stems per hectare. The most frequent species is *Burkea africana* with 40 trees growing per hectare. The second most common species is *Combretum collinum*, however, with only 23 stems growing per hectare, followed by *Terminalia sericea* with 12 trees per hectare. The fourth most frequent species is *Pterocarpus angolensis* with 7 trees per hectare. All other tree species have a significantly smaller number of stems per hectare (see table 1 in Annex 1).

The diameter distribution of the four most frequent species has been illustrated in figure 2 (see Annex 1). The diameter distribution of *Burkea africana* is very good, there is a big number of small trees and some big trees. About 67% of *Burkea africana* stems are less than 15 cm at breast height. This gives a potential for harvesting some poles without risking the future of the forest. The distribution of *Combretum collinum* is even more uneven because about 80% of the stems are less than 15 cm at breast height. There are very few bigger combretum trees. *Terminalia sericea* has got only small trees and a few very big trees (over 65 cm). The distribution of *Pterocarpus angolensis* is different because there are more big trees compare to the other three species as illustrated in figure 2. The possibilities for sustainable poles extraction in the area is mainly related to *Burkea africana*, *Combretum collinum* and *Terminalia sericea*.





**Figure 3. Diameter distribution of the four most frequent tree species**

The average volume of all tree species is 14.62 m<sup>3</sup>/ha. *Pterocarpus angolensis* has got the highest average volume 3.85 m<sup>3</sup>/ha (Angombe et al., 2001). The following highest average volume is being with *Combretum collinum* (1.90 m<sup>3</sup>/ha) and *Burkea africana* (1.11 m<sup>3</sup>/ha).

#### 4.2 Deadwood

Seven dead tree species were identified in the inventory with a total number of 8871 stems. Most of the dead trees were mostly found in smaller diameter classes, however dead trees with bigger dbh were found of *Burkea africana* and *Pterocarpus angolensis*.

There is a total volume of 1386 m<sup>3</sup> of deadwood in M’kata community forest (Angombe et al., 2001). More than 80% of the volumes are from *Burkea africana* and *Pterocarpus angolensis* trees. Most of dead trees are in small diameter classes: 87% of the dead trees have a dbh smaller than 15 cm. Dead trees with bigger diameter are especially *Pterocarpus angolensis* trees.

#### 4.3 Regeneration of the trees and shrub layer

Altogether 3350 shrubs and trees per hectare were recorded growing in the inventoried area. 13 different species were identified. In general, this area has very low natural regeneration for both species with only 7 seedlings per hectare for *Pterocarpus angolensis* and 130 seedlings per hectare for *Burkea africana*. There is a relatively good

number of small *Acacia erioloba* and *Terminalia sericea* saplings of 940 and 710 per hectare respectively. The number of *Combretum collinum* has 253 saplings per hectare.

Seedlings of *Pterocarpus angolensis* and *Burkea africana* were very few. This will negatively affect sustainable utilisation of these species in the future. Something has to be done to enhance the regeneration of those scarce timber valued species.

## 5. Wildlife management

The M'kata communities have several objectives for the management of their lands and forests. One of the objectives is to maintain the biodiversity (birds, animals, etc.) in the area. M'kata community forest is one of the areas for wildlife due to the fact that the area has good vegetation with multi-strata and different tree and grass species. However, due to the fact that the area is very small about 1,000 hectares, whatever is done in the community Forested area will not necessarily so much affect wildlife in the area in general.

Therefore, it is proposed that only the following basic management strategies being applied to enhance wildlife resources; exclusion of illegal hunting; reduction of wildfires; introduction of game guards system to carry out anti-poaching patrols.

## 6. Current use of resources

According to the M'Kata Community Forest Committee, people living in the area are not extracting woody resources from the proposed community forest area. There are about 70 households in the settlement adjacent to the Community Forests (FMC, 2003).

According to the interviews conducted with the community, at average about 54 poles are needed per household to construct or renovate a house. Every third year a house is constructed or renovated, which then translates into 23 houses per year. In total about 1,200 poles of the preferred species, *Terminalia sericea*, *Combretum collinum* and *Burkea africana* will be required for both renovation and construction in a year. This is just below the sustained yields of 1,300 poles estimated for the inventory area.

It seems that the proposed community forest is not the main source for construction poles. Even if it was, the harvest is still within sustainable amounts.

Also, during the two-day participatory rapid appraisal conducted by the working group, most of the interviewees confirmed that they collect a 10 kg fuelwood bundle three times per week. According to the working group's PRA results, a normal family (ten members) consumes one bundle of average 4.3 kg of fuelwood per day. This translates into 1600 kg of fuelwood per household per annum. Their annual consumption is 110,000 kg or 110 tones of fuelwood for the whole settlement. The inventory results have given about 8.4 dead trees per hectare and a total of 8871 dead trees in the inventory area (Angombe *et al.*, 2001). It is difficult to predict sustained yield for fuelwood because annual accumulation of deadwood biomass is difficult to determine accurately. Hence, it is cautiously proposed that 10% of total dead trees would be harvested for fuelwood

annually for the harvesting cycle of 10 years. This would result in 880 dead trees being harvested for fuelwood annually.

In addition, thatching grasses are used a lot in construction and renovation of houses. In a house construction a small and a large house needs on average 15 and 20 bundles respectively. An average weight of the bundles is 10 kg, thus about 4.6 tonnes of thatching grass is used for construction annually.

The information on the quantities of non-woody forest products utilized by the community is very patchy. Therefore, no prediction was made on sustainable yields for the products.

Generally, community members do not utilize resources from the smaller core area (inventoried area). However, they are using resources from the larger area as whole. According to the working group, communities collect some forest resources (woody and non-woody) as far as about seven to eight kilometer radius from their homesteads. It is easy to sustainably manage a smaller core area than the larger area as whole. Therefore, it is very important that the DoF staff and Forest Management Committee will come together and address this issue, so that the larger area as the whole will eventually be under sustainable management too.

## 7. Objectives for Forest Management in the community forest area

The major priority for management is given to harvesting of timber and poles. Secondly, high priority is given to biodiversity conservation.

### 7.1 Specific objectives for forest management

The specific objectives for this management plan were derived from the discussion with the discussion with the communities.

The objectives for forest management are:

- to maintain the biodiversity in the forests
- to maintain the structure of the forests suitable for utilization of wood and non-wood forest products
- to sustainably generate an income to the community by selling wood and non-wood forest products
- to ensure continuous grazing for livestock
- to ensure availability of poles and fire wood for domestic\commercial consumption

## 6. Sustained yield estimates of woody forest resources in M’kata Community Forests

Looking at the structure of M’Kata forest, there are some possibilities for both harvesting poles and timber. Hence, two harvesting prescriptions are proposed for the M’Kata Community Forests. Firstly, selective harvesting of mature trees can be carried out on *Pterocarpus angolensis* and *Burkea africana* only because other species do not have enough mature trees. Secondly, it is proposed that small trees can be thinned selectively. Moreover, community utilize poles for construction and fencing from small sized trees.

### 6.1 Selective mature trees harvesting

It is very important that over-mature trees (diameter class 65 and greater) should be targeted during the first 10 years of management. This is advisable because of high risks of degrading timber quality of the over-mature trees and declining regeneration potential. Timber harvesting should first focus on over-mature trees of *Pterocarpus angolensis* and *Burkea africana*.

From the diameter class 45-55 cm only half of stems should be harvested in both tree species. The remaining half should consist of trees with good vitality, crown structure, long sawable and branchless stem sections, no damage, no fungus or insect infection and marked as mothertrees for regeneration.

Table 1. Sustained yield prediction for *Pterocarpus angolensis* (Source: Sprung, 2001)

Diameter class	Nr of trees	Silvicultural adjustment	Adjusted tree nrs	Assumed mortality rate	Annual sustained yield over 10 years
45-55	472	1/2	236	10%	5
55-65	212	2/3	141	10%	3
65-85	51	1/10	none	none	5
Total annual yield					13

Table 2. Sustained yield prediction for *Burkea africana* (Source: Sprung, 2001)

Diameter class	Nr of trees	Silvicultural adjustment	Adjusted tree nrs	Assumed mortality rate	Annual sustained yield over 10 years
65-85	51	1/10			5
Total annual yield					5

Only 18 mature trees can be harvested sustainably from both *Pterocarpus angolensis* and *Burkea africana* annually (see tables 2 and 3). All other species do not have enough mature trees to be harvested sustainably.

## 6.2 Selective thinning

According to the inventory results, there are some possibilities for harvesting poles. These possibilities are with *Burkea africana* and *Combretum collinum*. A mortality rate of 10 % has been used to provide sustained yield for these species.

In practice, portion of these dying trees can be harvested. However, in the calculation this has not been taken into account.

Table 3. Sustained yield prediction for *Burkea africana*

Diameter class	Nr of stems/ha	Nr of stems/ha after 10 years	Total stems to be harvested in area	Annual cuts (10 years cycle)
15-25	9	11	2466	247
25-35	2	3	1117	112
Total			3583	359

This calculation is based on diameter growth and movement of trees to bigger size diameter classes. In the calculation, the structure of the forest is kept unchanged. Therefore, an increase of stems in a certain diameter class allows harvesting. Growth rates from a study by DoF were used (Worbes, 2001).

The calculation above results in the following proposal of annual harvest of *Burkea africana*: about 247 stems with average diameter of 20 cm and 112 stems of average diameter of 30 cm.

Similarly, *Combretum collinum*'s calculation yields 664 stems with average diameter of 10 cm, 223 stems with average diameter of 20 cm and 73 stems with average diameter of 30 cm.

Table 4. Sustained yield prediction for *Combretum collinum*

Diameter class	Nr of stems/ha	Nr of stems/ha after 10 years	Removal	Total stems in area	Annual cuts (10 years cycle)
5-15	18	24	6	6640	664
15-25	4	6	2	2234	223
25-35	0	1	1	729	73
Total				9603	960

The total harvesting potential is about 1,300 poles annually from the two species. However, due to constraints of manpower, market availability and transport, the community intends only to harvest 150 poles per annum for the first year and increase the cut gradually. This is well below the estimated annual allowable harvest.

## 9. Expected revenue estimates

The average price used in the calculation here for small sized pole is N\$ 3.00 and for a large size pole it is N\$ 6.00 (FMC pers., 2003). The annual revenue of N\$ 5,922 (664 small size poles and 655 large size) poles might be expected from selling the poles during a normal year. Whether selling of the poles is financially feasible, depends on the cost of labour required for processing of poles, and hauling them to the markets. These costs calculation has not been included here.

## 10. Structural targets

The structural target will be to introduce and increase the number of *P. angolensis* seedlings within the next ten years. This will be achieved through direct planting, planting cutting and protecting undergrowth from any form of destruction. The regeneration of *P. angolensis* is very poor to none existent in the area.

## 11. Fire management

### 11.1 Factors affecting fuelload accumulation

According to the assessment done, logs, branches and other died standing or lying trees are categorized as fuel hazards for forest fire. They burn slowly with high intensity and cause a serious damage on grass and bush swards. Heavy fuels increase extent of fire spreading when they fall across the cut lines, path or shot sparks to the unburned areas. However, the M'kata area's heavy fuels are low in most of the parts. There has been no harvesting and occurrence of fire in the area for some years now.

Grasses, twigs, leaves and annual herbs are light fuels. They catch fire easily and burn vigorously. There is little grazing in the area because of low number of livestock in the surrounding communities. Fuelload is high, and there are lots of grass and annual plants. Tall grass is growing in the sandy areas which are dominated by *Terminalia sericea*, *Combretum collinum*, *Burkea africana* and scattered *Pterocarpus angolensis*. These parts should be targeted for fire prevention because fire in tall grass has high potential to cause damage on tree regeneration and bushes. But even though, there are few parts with loamy soils dominated by *acacia* and *grewia spp* with short grasses especially on the south-eastern part of the community forest. The regenerations of bushes and grasses on the existing cut lines is too much which will possibly allow fires to spread from outside to the area in question.

### 11.2 Fire management recommendations

Action must be taken for fire management activities in community forest area, for the protection of biodiversity and forest products for the people to ensure sustainable conservation of natural resources, with the objective of reduction of fire hazard and avoid uncontrolled fires.

In community forest areas where people have several needs to be derived from the forest, schedule for prescribed/controlled burning must be in place for the reduction of fire hazards to avoid the destruction of vital products, animals, properties, human lives and locally elimination of fire sensitive biotic species by uncontrolled fire. Uncontrolled fires must be avoided/combated to reduce erosions due to the eradication of ground covers.

The areas designed for timber production within the community forest area require fire exclusion for a minimum period of five years and maximum of up to thirty years. Fire management efforts would be directed at compartmentalizing the timber protection areas. Training of the Forest Management Committees (FMC) or community as whole on fire fighting and prevention is so crucial.

Fuelload assessment should be done every year, followed by prescribed burning if necessary at the right time. Cutlines should be constructed or maintained with a reasonable width to serve their purpose of fire containment. Therefore, cut lines should be maintained before the fire season, starting in June to September.

## 11. Management proposal

Annual plan of operations are given in the annex 2. The Schedule includes all activities carried out throughout the year. However, some activities are deterred during the planting season from December to April.

### 11.1 Grazing

Livestock farming plays an important role in the culture of local community. Therefore, there is a need for livestock to be integrated into forest management planning. Generally, normally cattle does not reach fringes of M'kata Community Forest's area. Since the livestock are restricted around the settlements, they tend to destroy cropfields because latter are not fenced-off. Moreover, due to the fact that the population is in rising, settlement expansion is inevitable. Hence, grazing area has been identified and this area will be wisely grazed by controlling of the livestock's number. Also, they will introduce a system of wet and dry grazing areas where farmers will graze livestock appropriately without overgrazing the forests.

### 11.2 Preserving biodiversity

The community has seriously emphasized that the community wants to maintain existing forests structures to conserve biological diversity. The community are aware about their existence from the natural resources, hence they would like to protect and manage them in a sustainable manner. Prior harvesting, sites with rich or sensitive flora should be located in the community forest. Not all dead trees should be collected because they serve as nesting caves for mammals, birds and reptiles, etc. Only selective thinning and a certain block should be harvested annually to limit unnecessary harm to wildlife and plant species. The community expressed their interest to introduce game if necessary arrangement are made with relevant authorities. The forefathers of the local tribes were hunters and gathers. The present generation wants to stop illegal hunting of the game.

### 11.3 Extraction of wood and non-wood forest products

Through sustainable harvesting the community would receive revenue from timber, poles, crafts, firewood, and wildfruits sales. The forest management committee suggested that they only want to harvest 150 poles for sales. The number of trees to be felled for timber will be determined by demand of buyers. The community underwent training in making woodcarvings and furnitures. The community are planning to establish a marketplace where they will sell crafts and furniture along the mainroads to Tsumkwe. This fund will be used for community development and enhance livelihood of the local communities. For the manufacturing, they will mainly use deadwood. Moreover, community wants to introduce sustainable harvesting of devils' claw and other non-woody products.

### 11.4 Maintenance of wood and non-wood products for consumption and sales

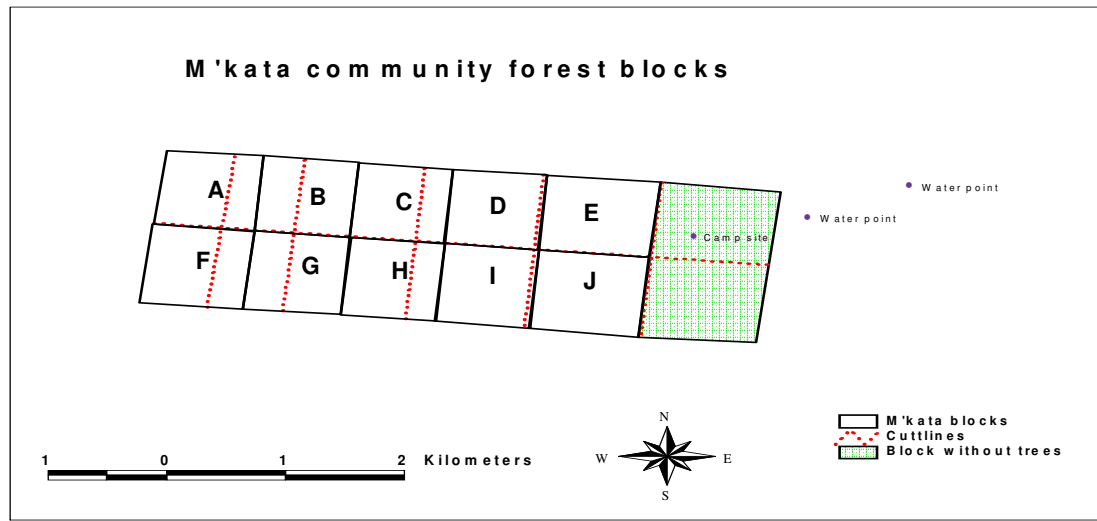
Wood and non-wood forest products play a major role in the livelihood of local communities in M'Kata. Hence, existing forest stands need to be improved through sound silvicultural practices such as, thinning and pruning of some commercially valued tree species. Also, protection should be rendered against veldfires, illegal harvesting and damages by wildlife and pests. Regular monitoring should be done through game guards or honorary foresters to protect natural resources.

## 12. Harvesting plan

In order to facilitate the practical implementation of the harvest proposal and especially controlling of it, the community forest has been divided into 10 blocks (A-K) (see Map 2 below). Block-K only has shrubs and bushes and will be conserve for biodiversity. For detailed harvesting information see table 7 in Annex 3. In the field these blocks are demarcated by the cutlines which are the outside borders of the community forest. One is proposed to be harvested annually. The aim is to keep the harvesting yield at a reasonably constant level. The amount of trees to be harvested varies from year to year because the sizes of blocks are varying. The number of stems to be cut in each block is based on the proportion of the area of each block.

The average distance that should be kept in between trees that are being cut in order to





**Figure 4. M'Kata Community forest subdivided into blocks**

reach the desired number of cut trees in total. Due to the fact that trees are growing in patches, the distances can only serve as an indicative guideline.

#### 12.1 Selection of trees for thinning

In practice, the selection of trees will differ from proposed structure. Some rule of thumb are given below to facilitate the selection of trees;

**Burkea:**

- No Burkea trees with dbh less than 15 cm and greater than 35 cm should be harvested.
- All sizes between 15 and 35 cm should be harvested
- The distance between burkea trees to be cut is specified by block and diameter class see (harvesting plan in Annex 3)

**Combretum:**

- No Combretum trees with dbh less than 5 cm and greater than 35 cm should be cut
- All sizes between 5 and 35 cm should be harvested
- The distance between burkea trees to be cut is specified by block and diameter class (see harvesting plan in Annex 3)

Damaged trees and trees with lower quality should be preferred when selecting trees. It is better to let vital trees with good quality grow into big trees. However, it is important to have dead trees available for cave nesting animals.

### 13. Implementation

M’Kata Community Forest Management Committee does not have immediate human capacity and material resources to carry out the envisaged activities in the management plan. It will definitely need technical advice from the TDFO. During each annual harvesting cycle, to get started it is expected from TDFO to render technical advice in identification of harvesting blocks (coupes) and marking of trees. TDFO should play supervisory role to ensure that proper harvesting guidelines are followed in accordance with Forest Act No 12 of 2001.

The Forest Management Committee is expecting the TDFO to assist them with training to be able to mark and fell trees. About the haulage of products they have three options. They will use donkey cart to transport little quantities of poles from the forest. However, if the large amount of trees are felled for commercial sales, they will seek assistance from MET to haul their products to nearest access point. Alternatively, DoF staff advised the FMC that most of the saw-millers have capabilities to carry out the whole harvesting process until end-products are produced. The FMC is very skeptical to consider latter options because they fear that the buyers will pay them less money.

Finally, it is strongly recommended that a plan for implementation for each year will be drafted together with TDFO. It is very important that tasks and responsibilities all stakeholders clearly being specified in the plan. Also, implementation plan should have schedule for each activity. The plan should be made on an annual basis so that the lessons learned in one year can be taken into account when planning the activities of another year.

### 14. Collaboration

M’Kata Community Forest Management Committee needs technical advice as well as other services from the Tsumkwe District Forestry Office (TDFO). They will require assistance in preparation of annual implementation plan until harvested products are marketed. However, the Committee emphasized that DoF staff will only play advisory and supervisory role. The Forest Management Committee will be entirely responsible for the actual implementation of activities on the ground.

### 15. Monitoring of the implementation

The Forest Management Committee assisted by the TDFO staff should carry out monitoring of the implementation. The monitoring should include at least following field based activities;

- whether there is practically activities happening on the ground such as identifying areas for harvesting of timber and poles.
- marking of correct trees and prescribed distances are kept between the trees.
- marketing strategies are carried out to attract timber buyers through media or other methods.
- records are kept for all activities occurring in community forests.

- monitoring would be carried out on any changes in the forest (illegal harvesting, damages by fires, wildlife, pests, etc.). This should be done by FMCs when patrolling the community forests.

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## Annex 1

Table 5. Diameter distribution of stems by species, total nr of trees

Species	Diameter class, in cm							Total	% of total
	5-15	15-25	25-35	35-45	45-55	55-65	65-85		
<i>Burkea africana</i>	28350	9895	2565	1169	53		51	42084	44.2
<i>Combretum collinum</i>	19339	4415	115	120	53	53		24043	25.2
<i>Terminalia sericea</i>	11888	120	295				53	12357	13.0
<i>Pterocarpus angolensis</i>	3247	1729	1489			212	51	7576	8.0
<i>Lonchocarpus nelsii</i>	2303	567	343					3214	3.4
<i>Ochna pulchra</i>	2323						53	2377	2.5
<i>Boscia foetida</i>	1808							1808	1.9
<i>Combretum psidioides</i>	461	576						1037	1.1
<i>Boscia albitrunca</i>			115					343	0.4
<i>Acacia erioloba</i>			295					295	0.3
<i>Acacia tortilis</i>		113						113	0.1
<b>Total</b>	<b>69720</b>	<b>17643</b>	<b>5219</b>	<b>1878</b>	<b>579</b>	<b>265</b>	<b>209</b>	<b>95247</b>	<b>100</b>

## Annex 2

Table 6. Proposed management activities for the 2003/2004

Month	Timber/poles harvesting	Fire management	Wildlife management	Crafts/tourism	Conservation
Jan	Assessment of market feasibility	Establishment of fire management committee	Feasibility study on wildlife re-introduction to the area	Identification of market place	Law enforcement & patrol (illegal cutting)
Feb	Enquiry of transport	Enquiry of fire management accessories	Re-introduction of wildlife	Construction of office or hut for selling	Law enforcement & patrol (illegal cutting)
Mar	Assessment market feasibility	Training in firefighting	Study on installment of water points	Poster & board along the road Furniture- making	Law enforcement & patrol (illegal cutting)
April	Training tree marking	Clearing of cut lines	As above	Furniture- making	Law enforcement & patrol (illegal cutting)
May	Selection and marking of trees	Education campaign	As above	Furniture- making	As above
June	Selection and marking of trees	Education campaign	mineral licks and salts disposal		Tower surveillance
July	Cutting and transporting	Education campaign	Anti-poaching patrol	Furniture- making	As above

August	Selling and assessment of operations	Tower installation for surveillance	Anti-poaching patrol	Furniture- making selling	As above
Sept	Selling	As above	Anti-patrol	Furniture- making selling	As above
October	As above	As above	Game counts	Furniture- making selling	As above
November	As above	As above	Game counts	Furniture- making selling	As above
December	As above	As above	Game counts	Furniture- making selling	As above

### Annex 3

**Table 7. Harvesting proposal for M’Kata Community Forest**

BLOCKS	DBH	Nr of stems for <i>Burkea africana</i> to be harvested	Distance between trees (meters)	Nr of stems for <i>Combretum collinum</i> to be harvested	Distance between trees (meters)
Block A, 82.7 ha (7.8% of total area) Yr: 2004	10	-	-	518	40
	20	192	66	174	70
	30	87	100	57	120
	<b>Total</b>	<b>279</b>		<b>750</b>	
Block B, 81.3 ha (7.6 % of total area) Yr: 2005	10	-	-	505	40
	20	187	66	170	50
	30	85	100	57	121
	<b>Total</b>	<b>272</b>		<b>732</b>	
Block C, 80 ha (7.5 % of total area) Yr: 2006	10	-	-	505	40
	20	187	66	170	50
	30	85	100	57	121
	<b>Total</b>	<b>272</b>		<b>732</b>	
Block D, 79.2 ha (7.4 % of total area) Yr: 2007	10	-	-	505	40
	20	187	66	170	50
	30	85	100	57	121
	<b>Total</b>	<b>272</b>		<b>732</b>	
Block E, 95.2 ha (8.9 % of total area) Yr: 2008	10	-	-	510	40
	20	219	66	199	70
	30	99	100	65	120
	<b>Total</b>	<b>318</b>		<b>774</b>	
Block F, 90.4 ha (8.5 % of total area) Yr: 2009	10	-	-	510	40
	20	210	65	199	70
	30	95	100	65	120
	<b>Total</b>	<b>305</b>		<b>816</b>	
Block G, 85.4 ha (8.0	10	-	-	513	40

% of total area)	20 30	197 89	66 100	179 58	70 120
Yr: 2010	<b>Total</b>	<b>286</b>		<b>710</b>	
Block H, 82.8 ha (7.8 % of total area)	10 20 30	- 192 87	- 66 100	518 174 57	40 70 120
Yr: 2011	<b>Total</b>	<b>279</b>		<b>750</b>	
Block I, 83.3 ha (7.8 % of total area)	10 20 30	- 192 87	- 66 100	518 174 57	40 70 120
Yr: 2012	<b>Total</b>	<b>279</b>		<b>750</b>	
Block J, 99 ha (9.3 % of total area)	10 20 30	- 229 104	- 65 100	618 207 68	40 70 120
Yr: 2013	<b>Total</b>	<b>333</b>		<b>893</b>	