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**MINISTRY OF NATURAL RESOURCES AND TOURISM
FORESTRY AND BEEKEEPING DIVISION**



**MANAGEMENT PLAN FOR KIMBOZA CATCHMENT FOREST RESERVE,
MOROGORO DISTRICT, MOROGORO REGION**

2004/05 – 2008/9

MOROGORO CATCHMENT FOREST OFFICE

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MOROGORO DISTRICT, MOROGORO REGION**



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The preparation of Kimboza Catchment Forest Management Plan was made possible by joint efforts of many people, both at head office – Morogoro Catchment Forest and the villages surrounding the forest. The team of five people was formed to facilitate preparation of this management plan. The team comprised of Mr. Yonas Mialla (RCFM), Mr. Sosthenes Rwamugira (ARCFM-Management) and Mr. Togolai Tindikali (DCFM). The team wishes to acknowledge, Mr.A.S.Kijazi from Head Office of Catchment section Dar es Salaam for devoting his time to assist the team in developing this plan.

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EXECUTIVE SUMMARY

Kimboza Catchment Forest Reserve(CFR), is among the 47 reserved forest in Morogoro region under the Ministry of Natural Resources and Tourism (MNRT). The forest is important for water and biodiversity conservation, soil erosion control, as well as for amelioration of climate. Kimboza Catchment Forest is a low land coastal forest laying on the foothills of Uluguru Mountains ,an eastern arc type of forest with species of restricted distribution and endemism. Like other forest reserves in the region, Kimboza CFR has not properly managed for quite a long time. There was no management plan meaning that execution of various forest operations were based on developed annual plan of operations (APO) to address the immediate conservation needs. This situation prompted the development of Kimboza Catchment Forest Management Plan. The development of this plan is based on the existing policies and laws, ecological and socio economic studies conducted inside and outside the reserve, information from existing documents/ files and personal communication with key stakeholders.

This document contains five main parts: General forest description is provided in chapter one (1), detailing ownership and status of the forest in terms of topography, soil geology, hydrology and biological features existing in the forest. It also describes the socio-economic activities of communities adjacent to the forest as well as land use practice such as agriculture, grazing, agroforestry. Other important uses / benefits that involve adjacent communities such as lumbering, carpentry, fuelwood gathering, carving making, beekeeping, sales of poles and weaving forest products as source of income are also described.

Chapter two (2) reports the existing management practices and implementation status for various activities. The chapter clearly discusses the existing management practice which is based on phase III (2002-2006) of the Management of Natural Resource Programme (MNRP) in the Ministry of Natural Resources and Tourism. Joint Forest Management approach is adopted as best option in management of forests of local and international values with adjacent communities' participation. Activities covered during the last five years of MNRP include forest inventory (survey of existing resources and measurement of stand parameters in terms of stocking, basal area and volume per hectare), boundary consolidation, forest protection (fire control, patrolling and law enforcement)) are discussed. There are signs of decreasing illegal activities with involvement of adjacent forest

communities. Illegal activities in the forest was declining. Forest restocking and natural regeneration has not been encouraged during the past five years but possibility do exist in terms of coppicing and saplings management.

Management directives are covered in chapter three (3) of this document. These include guiding forest management principles, policies, laws and regulations that guides the prescription of various activities leading to conservation forest biodiversity, water catchment values and soil fertility. For achievement of these activities the chapter narrates some management strategies that had been developed. Such strategies include development of alternative use of forest resources (establishment of woodlot and agroforestry plots to serve as an alternative forest resource base to supply wood and non-wood products to local communities and other stakeholders), improvement of forest management operations (resurveying and marking forest boundries with beacons and trenches and yearly maintenance) and development of alternative income generating activities (tree planting, beekeeping and fish farming) as substitute to lumbering hence reducing pressure in the forest reserve.

Chapter four (4) focused on the way forward to improve forest management from the existing state as a stepping stone. Detailed prescription of activities and their associated budgets for the next five years of implementation are indicated. These activities include enhancement of collaborative forest management through seminars and meetings, formulating and implementation of Management Agreements including by-laws and enhanced extension services (posters, brochures, leaflets, booklets, video show, home visits and study tours). Infrastructure, tools and equipments are to be improved by rehabilitation of 8 km. of feeder road to the forest reserve and adjacent villages to make it more passable and provision of basic working facilities, transport and supply of forest hand tools. Forest management operations to be done include monitoring of botanical changes in forest management zones and conducting zoological survey to identify species richness, diversity and endemism. Mapping to show forest cover and boundary will be done and consolidation of 4 km of forest boundary will be carried out by planting of boundary tree species eg. *Eucalyptus*. Forest protection which covers fire protection and combarting illegal harvesting will also be done. Annually about 11 km of forest firelines will maintained before the onset of fire season. For effective fire control a fire management plan has been developed and is also attached as an appendix to this plan. Income generation activities for forest adjacent communities include non-timber forest products, beekeeping, murrum pitting fee, agroforestry products, ecotourism and research fees and imposed

charges to installed structures inside the forest. Communities will be encouraged to promote these sources in order to reduce poverty among households.

Chapter five (5) is about the plan period, amendment and revision. The management plan of Kimboza forest reserve was built upon the current move of involving forest adjacent communities in the management of forest resources. The focus was to empower local communities in managing the forest resource so that they can take decisions in amendment and revision of the plan within the implementation period. In this chapter provision is given to allow participation of stakeholders mainly communities in proposing amendments and revision of the Management plan of Kimboza catchment forest reserve. Also local government will participate in making follow up and monitoring of on going field activities in the four (4) villages as well as participate in reviewing the plan.

The period of this management plan is 5 years from approval and its budget is TShs 98,260,000

The plan was built in an assumption that funds will be released as budgeted and that local communities will be willing to participate in implementation. Also local government and other stakeholders will be willing to co-operate for the smooth implementation of this plan.

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ABBREVIATIONS /ACRONYMES

ARCM	Assistant Regional Catchment Forest Manager
CAI	Current Annual Increment.
CBO	Community Based Organization.
CFR	Catchment Forest Reserve
DCFM	District Catchment Forest Manager.
DNRO	District Natural Resources Officer
FBD	Forest and Beekeeping Division.
FR	Forest Reserve.
GN	Government Notice
Jb.No	Job Number
GPS	Global Positioning System
JFM	Joint Forest Management
FORCONSULT	Faculty of Forestry and Nature Conservation Consulting Unit.
MAI	Mean Annual Increment
m.a.s.l	meters above sea level.
MNRP	Management of Natural Resource Programme
NGO	Non-Governmental Organization
NORAD	Norwegian Agency for International Development
PFM	Participatory Forest Management
PRA	Participatory Rural Appraisal
RCFM	Regional Catchment Forest Manager
SUA	Sokoine University of Agriculture
VFMA	Village Forest Management Areas
VNRC	Village Natural Resources Committee

PREAMBLE

Tanzania has about 33.5 million hectares of forests and woodlands. Out of this total area, about 13 million hectares are gazetted forest reserves. Forest reserves, which are under water catchment management, occupy about 1.6 million hectares. In Morogoro region, a total of 301,000 ha. fall under catchment forest reserves. Out of this gazetted area in the region, Kimboza catchment forest reserve occupies 405 hectares.

Kimboza catchment forest reserve has been threatened by various human activities including tree cutting, forest fires and encroachment. Lack of proper and systematic management of this reserve has led to such threats. To address these problems, the National Forest Policy (1998) and its implementation tools viz: Forest Act and National Forest Programme recognize forest management plans as important instruments to ensure sustainable forest management. Furthermore, the policy emphasizes the need for sharing forest management responsibilities with various stakeholders.

It is now evident that in Tanzania, the management of forest resources by the government alone has proved to be ineffective. As countrywide such there is a move towards joint management of forests through involvement of various stakeholders in order to ensure sustainable forest management. Against this background Kimboza forest management plan has been developed in a consultative and participatory manner, which involved the following relevant stakeholders: Forestry staff, District Council leaders, Village leaders and Village Natural Resources Committee (VNRC) members. This management plan is based on analysis of environmental, social and economic needs of the community and availability of human and other resources. In line with these considerations, important aspects, which have been taken into account in formulation of participatory management plan, include:

- ❖ Recognition for stakeholders' consensus on the norms,
- ❖ Recognition for decentralization and institutionalization,
- ❖ The importance of strengthening local government machinery,

- ❖ The need for reforms on power relations between the government and local communities,
- ❖ The need to recognize and utilize people's capabilities,
- ❖ The need for change of roles from management of facilitation,
- ❖ The need to recognize the existing practices,

There is a need to establish clearly defined user rights for the local communities and other stakeholders.

1.0 GENERAL DESCRIPTIONS

1.1 Title, legal status, ownership and administration

Kimboza Catchment Forests reserve was established under Government notes (GN) 417 of 11/7/1964 Boundary map JB 2073 of 1982 at scale of 1:10,000 and Topographic map 183/4 and 201/2.

The forest reserve is owned by central Government under the Forest and Beekeeping Division of Ministry of Natural Resource and tourism. The immediate in charge of the forest is District Catchment Forest Manager (DCFM) for Morogoro District under the Supervision of the Regional Catchment Forest Manager (RCFM). Under DCFM (District Catchment Forest Manager) the Kimboza F/R is under the Range in charge of Kimboza. Under the current participatory approach, Kimboza CFR is co-Managed (adjacent Villagers and Government), however ownership remains with the central government.

1.2 Location

1.2.1 Geographical Location and Size

Kimboza Forest Reserve is situated between $06^{\circ} 59' - 7^{\circ} 02' S$ and $37^{\circ} 47' - 37^{\circ} 49' E$. The forest is about 60 km from Morogoro Municipal. Access to the forest is by road from Morogoro to Kisasi between Mkuyuni and Matombo villages. The Forest reserve has an area of 405ha (1059 acres), according to JB 2073 (1:10,000) 1982.

1.2.2 Boundaries

Kimboza Forest Reserve has a boundary length of about 11km. The boundary is clearly visible on the ground marked by tree planted along the boundary line, with clean numbered beacons and directional trenches. To the North Kimboza F/R border with Changa Village, to South it borders Kibangile village. To its east Kimboza F/R it border with Mwarazi Village, and Uponda to its west. (Annex 1)

1.3 Physial features

1.3.1 Topography:

The Forest reserve is in the eastern part of Uluguru foothills, covering a Karistic plateau South of Kibungo mission at an altitude of 300 to 400 m.a.s.l.

1.3.2 Soils and Geology

Within the forest protruding metamorphosed limestone Kants are prominent feature. The soils are tropical rendizina on precambrium dolominitic mable base rocks.

1.3.3 Hydrology

There are several permanent water springs originating from within the forest. The springs supply several streamlets carrying water to Ruvu River that feed more than 3 million people in Dar es Salaam city. Forest adjacent villages i.e. Mwalazi, Changa and Uponda get their water from Kimboza and Palapala water sources. The hydrology nature of the forest has added to the splendor of the forest by support variety of vegetation experienced only in the forest as compared to the surroundings. To this effect, biodiversity of the forest is also high.

1.4 Climate

Rainfall and temperature are oceanic with, oceanic temperatures. The rainfall pattern is bimodal with short rains from October to December, and long rains from February to May. The nearest meteorological station is Kibungo and the Estimated rainfall is 1700 mm/year. The dry season is from June to August and the temperature reach a maximum of 28°C in December and minimum of 23°C in July.

1.5 Special sites and areas.

The identified special sites in Kimboza Forest Reserve include; Choka Wahawi, Dogo la njiwa Kimboza springs and Butterfly breeding site.

Choka wahawi: The area is in Kimboza Forest Reserve close to Uponda Village. During Arab colonial period the area was used for burning witch doctors and wizards. In Kiluguru the word wachawi means witch doctors/wizards and Choka means burn.

Dogo la njiwa: That is a place where doves seasonally visit for sand/soil bathing inside the cave of inclined limestone. Soil in the cave is always dry and dusty. Dogo la njiwa in Luguru means a cave for the dove. Doves used to visit the place for the months of July to October at a time between 10.00 am to 10.00 and 3.00 pm to 5.00pm. The place was used as a hide place during slave trade era.

Kimboza springs: The forest is named after this historical water spring. The spring is found close to the Roman Catholic Mission and the Forest guardhouse.

Butterfly breeding site: The site is on the way to Uponda by road crossing the forest to the left hand side. The butterfly seasonally colour the ground cover of Kimboza catchment forest reserve.

1.6 Historical Events.

In 1918 torrential rains occurred in the forest adjacent communities, which resulted into floods with subsequent famine. In 1940 great famine locally known as Kibangarazi took place, coconuts was the main food available People lived on coconuts. Kimboza forest reserve was demarcated in the same year. In 1955 forest adjacent local communities boycotted against ridge terracing as an introduced farming technique to prevent soil erosion. This made people to kill each other and the programme was slowed down. Other historical event was on landslides occurred in the forest reserve as a result of heavy rains in 1961.

1.7 Rights and Privileges

Forest adjacent communities have entered into agreement with Government to exercise access right over the forest as stipulated in Management agreement supported by village by-laws that guide implementation of developed Village Forest Management plan.

Individual people and groups enjoy the privileges of worship, collection of forest product like firewood, beekeeping and collection of local medicine and matting materials.

1.8 Biological features (Flora and Fauna).

1.8.1 Flora

Kimboza F/R has four main vegetation type based on species composition. The dominant vegetation type is lowland forest woodland. The common species to the different vegetation type in Kimboza F/R are shown on table.

Table; 1. Common species according to vegetation type – Kimboza Catchment Forest

Species	Lowland	Woodland	Teak	Cedrela
<i>Acacia polycantha</i>	√	√	–	–
<i>Albizia versicola</i>	√	√	–	–
<i>Albizia petersiana</i>	√	√	√	–
<i>Antuarus tixucarua</i>	–	√	√	–
<i>Diospyros sp.</i>	√	√	√	–
<i>Dombeya rotundilfoia</i>	√	√	√	–
<i>Sorindeia madagascariensis</i>	√	√	√	√
<i>Strichnos sp.</i>	√	–	–	–
<i>Uvaria sp.</i>	√	–	–	–
<i>Cedrela odorta</i>	√	–	–	√
<i>Deinbollia borbonica</i>	√	–	–	√
<i>Markhamis zanzibarica</i>	√	–	–	√
<i>Khaya anthotheca</i>	√	–	√	√

Source: Malimbwi et al 2002

1.8.2 Fauna:

Very little had been documented on the animal composition in Kimboza F/R, however the forest reserve provide habitat for some animals mainly primates like black and blue monkey, baboons, wild pigs, white Columbus, other species include snake, snails, birds, , fish, lizards, butterflies and other different Spp of insects.

1.8.3. Special plants and animal species

1.8.3.1 Endemic Species

Kimboza Forest Reserve is of the Eastern Arc and Coastal type with some spp of restricted distribution (Lovert & Pocs 1993). The Kimboza endemic includes: - the blue dwarf gecko (*Lygodactus williamsii*) is an endemic lizard species found only on Pandamus spp stem in Kimboza F/R.

Compared to the small area a very high number of plant species are endemic. Two Asystasia species, *Baphia pauloi*, *Chassalia discolor*, var.*grandifolia*, *Cynometra uluguruensis* (atall tree), *Garcinia bifasciculeta* (tree), *Impartiens cinabarina*, *Pavetta crebrifolia* var. *Kimbozeinsis*, *Streptocarpus Kimbozana* and *Epiphyllons liverworts*, *collolejeunea jonesii*.

1.8.3.2. Threatened Species

The most threatened species are those with a long history of been logged. Such spp include; *Melicia excelsa*, *Pterocarpus angolensis* and *Khaya anthotheca*.

1.8.3.3 Species of special concern.

By the time of developing this management plan there was no established species of special concern, therefore researches are welcome. However, the identified species of lizard, frogs and butterfly, black and white Colubus monkey may need to receive special conservation status.

1.8.3. 4 Problem Species

Introduced species through trial plots including *Cedrella odorata* and *Tectona grandis* are problem tree species threatening other indigenous tree spp due to its invasive nature in the area.

1.8.4. Buffer Zones and Corridors

There are almost 19 patches of Natural Forest in the general land, which support forest vegetation that act as buffer to the reserved forest. Firewood, withies and poles are obtained from these forests. Also there are some plots planted with exotic species adjacent to F/R, which are under private ownership.

There is no defined animal corridor in forest reserve, however the forest is connected to some of the surrounding natural forest patches.

1.9. Social economic situation

Other commercial activities are fish farming, beekeeping, livestock keeping, and tree nursery establishment.

1.9.1. Adjacent Local communities

The people around Kimboza F/R are Waluguru ethnic group under matrilineal Society and immigrants like Pare, Sambaa, Nyakyusa, Haa, Hehe and Kutu. The ratio between male and female is shown in table 2. The growth rate for Morogoro rural, the district in which Kimboza is found, is 2% annually (URT, 2002).

Table 2. Human Population around Kimboza F/R.

S/N	VILLAGE	POPULATION		TOTAL
		MALE	FEMALE	
1	KIBANGILE	700	356	1056
2.	MWALAZI	806	906	1712
3.	UPONDA	852	894	1746
4.	CHANGA	1521	1269	2790
TOTAL		3879	3425	7304

Source: census 2000

The farming system in the villages is peasantry small scale farming, with maize as major food crop. Other crops include paddy, banana, fruits and simsim crops which sieve as cash crop. The major source of income is agriculture, livestock keeping mainly poultry and goats add to the economy as well as providing protein to villagers.

1.9.2. Local land use

The land outside the forest reserve is categorized as farm and general land. Land transfer is through patrimonial. The farmland is customarily owned by men and women and makes decision on the use of the family land. Land transfer is through patrimonial, the village administers some of the general land adjacent to the Forest reserve and some of them are under clans. The main land use practices are: Agriculture, Mining, livestock keeping agro forestry and collect of forest material. Also the forest provides favorable, climate for crop production water and good habitat for wildlife.

1.9.3. Local Economy

Agriculture is the main economic activity for the forest adjacent communities. Main crops include maize, rice simsim, sorghum, black pepper, groundnuts, coconuts mangoes, oranges, sugarcane, sunflower, guinepeas and banana, However, the communities adjacent to the forest reserve are involved with other economic activities like lumbering, carpentry, mining, brick making and fuel wood selling. Mining is the second to agriculture in economical activities (Shila 2004).

The villages are connected to the market centers of Matombo, Mkuyuni and Morogoro, by earth road, which is passable through out the year. Morogoro market center is connected by Dar Es Salaam city, Dodoma and Iringa highway and railway line to Dar Es Salaam, Mwanza and Kigoma. The transport is almost reliable through all the year, thus easy transportation of crops, activity commonly done by middlemen. Only few farmers do send their crops to the market centres, otherwise they sell their crops outright from the field.

There is erratic supply of labour force and insufficient division of labour especially for middle age who prefer to go town and back during mining rush and harvesting period.

1.10 Activities related to Forest Reserve Management.

Activities such as Mining are one among the major source of income to adjacent local communities. Mining activities reduces the pressure of local people to depend on selling forest products as a source of earning money. Unfortunately are the same people who through mining destroy the riverbanks and cut building materials for temporary and permanent living huts. Kibungo mission provides employment to local communities, thereby reducing their dependence on the forest resources for income. There is no any related demonstration on the forest because the Mission themselves are good in tree planting and they have their own plots of exotic and natural forest. Local people in both Ruvu River and in their own fishponds carry out fishing. Fishing, carpentry and Beekeeping are done at a very small scale.

2.0 EXISTING MANAGEMENT

The current management of the forest is based on phase III (2002-06) of the management of National Resources programme (MNRT) in the Ministry of the Natural Resources and Tourism. The Programme advocates among others concept of community participation in the management of natural resources. Catchment forest management is a component of MNRP, which employs Joint Forest Management as part of community participation strategy. Morogoro region is among the four regions where catchment Forest Management is operational other regions are Arusha Kilimanjaro, and Tanga.

Kimboza forest reserve is one of the piloted forest reserves where JFM is being practiced in Morogoro region. Other piloted forest reserves in the region are Mamboya (Kilosa), Mkindo (Morogoro), Nyanganje (Kilombero), and Mselezi (Ulanga) and Kihiriri (Kilosa) and Ukwiva (Kilosa).

2.1 Joint Forest Management (JFM)

Joint forest Management as an approach entails involvement of local communities or non – Governmental organizations in the management and conservation of forests. In this approach the Government enters into management agreements with local communities and the two parties manage the resources in partnership. However the ownership of the forest resource remains with the government. JFM in Kimboza CFR is already underway. – (Take paper from Mialla S).

2.1.1. Community organizations

According to Tanzania Government administrative set up, the village government is the lowest legally recognized institution. However the villages are divided in to sub-village. This institution has power to formulate instruments for facilitating village development. In this jurisdiction the village government can formulate various committees deemed necessary. Each of the four villages adjacent to Kimboza forest reserve has formulated a village Natural Resource Committee (VNRC) formed by two representatives from each sub-villages bordering Kimboza CFR.

The formulation of the VNRCs has taken into consideration of gender and the composition ratio of 1:1 between men and women. Administratively the committee is

under the village government. The VNRC is responsible to supervise all natural resources management related activities in the village, such as patrols, administration of forest operations like harvesting, nursery activities and fire protection. Other responsibilities are to sensitize other village members in forestry and environmental issues. The committees prepare and submit reports to village governments and to the Forest ranger who compiles the report to the District Catchment Forest Manager (DCFM). Community based Organization include; primary schools, church and mosque organizations. There is no NGOs or ongoing projects in the villages.

.2.1.2. Instrument to facilitate community participation.

The forest policy of 1998 and Forest Act of 2002 provide room for community participation in forest management. The village act No. 7 of 1982 revised in 1999 empowers village governments to make by laws. In that line the Morogoro Catchment Forestry Project has facilitated the four forest adjacent villages to make by laws as tools in the forest management.

2.1.3. Extension services and social – Economic studies

The current extension efforts related to forest reserve management conducted around Kimboza Forest Reserve include village meetings, field, visits publicity activities, training on establishment and running of tree nurseries integrated extension services (Beekeeping, Fish farming and Agro – forestry). These are part of the means used to facilitating community participation in forest management.

PRA have been conducted to all four villages surrounding the forest reserve which facilitated to obtain information on available resources, prevailing division of labour, economic activities are done by men and women cultural aspects (a man can have 2 –3 wives, land is owned by men & women).

PRA studies in the four villages revealed that local communities living adjacent to the forest derive a number of benefits from the forest. These include collection of building poles and rafters, source of water supply and traditional medicines and collection of thatching grasses.

While there are observable harvesting activities for timber in the forest, other products are usually extracted in small amounts. Uses that require a considerable amount of wood biomass to be removed from the forest include lumbering, (charcoal extraction – very rare) and harvesting for building poles.

2.2 Institutional capacity

2.2.1 Infrastructure tools and equipment.

Buildings:

There are two staff quarters in Kimboza forest reserve where the staff incharge of the forest is living in one among two. Those two houses is not in good condition is old one and it needs some maintenances. The second house is for Assistant Range in charge currently unoccupied.

Roads:

There is a short feeder road of 0.5km, diverting from the main road to Kisaki, crossing through the forest towards Palapala area. The road is used for transporting local adjacent Communities Agricultural Crops, Social Services, Research and tourism purposes.

Tools & Equipment

There is limited number of tools and equipment at Kimboza forest reserve station and adjacent villages even at District level. Few nursery tools including, watering cans were supplied.

There are four old bicycles given to VNRCs and two old motorcycles for DCFM and Kimboza range officer in charge. There are no communication installations like radio and telephones and no office equipment like computer set, photocopy machine, TV set and one generator. Also there is no independent vehicle for carrying out different activities in the District.

2.2.2. Staff and labour

There is one staff holder of a certificate in forestry, who plays role between the District catchment forestry office and four (4) village governments in managing the forest reserve. At district level there is (1) one staff, holder of a diploma in forestry, who is in charge of all catchment forest reserves in the whole district. Paid casual labour is not a problem in the area. However there is a need to have an Assistant Range in charge, holder of a Diploma in Forestry.

2.2.3. Training

The DCFM and other District staff attended a 3 weeks, Course in Natural Forest Management at Institute of Continuing Education (ICE SUA 1997). This course was aimed at imparting the staff with relevant skill and knowledge in the involvement of local communities in the management of forest resource. The village Natural Resource Committees made exchange visits to other villages practicing Joint Forest Management to compare and learn from their colleagues. The Project organized a multidisplinary training session to the villages Natural Resources Committees and village government leaders. Training included improved agricultural practices, beekeeping, fish farming and agro forestry.

2.3. Forest Reserve Management Operations

Various forest Management Operations have been carried out in Kimboza forest reserve. These include patrol, boundary planting, tree nursery establishment and inventory.

2.3.1. Forest Resource Assessment

The Forest and Beekeeping Division had commissioned FORCONSULT SUA to conduct Forest Resource Assessment.

A report on this activity was produced which is used in combination with other sources of information to design different right prescriptions.

2.3.1.1 Biological Survey and Monitoring

The botanical survey information has established a baseline data of the forest that will enable the project to monitor species richness, diversity and endemism. From

the botanical survey 119 plant species were found in Kimboza Forest Reserve. Species enumerated in each of the four identified forest types. Kimboza forest reserves are listed in the following sub-sections as Lowland, Woodland, *Cedrella* vegetation and *Teak* vegetation. The biological survey carried out by FORCONSULT was limited to botanical survey, no zoological studies

Lowland forest.

In the lowland forest, the most dominant tree species were *cedrella odorata*, *Cymometra* sp, *Scodophleus fischeri*, *Cynometra ulugurensis*, *Pandamus rabaiensis* and *Bombax rodognofalon*. Presence of *cedrella odorata* could be a result of spread from trial plots done in the past while the domination of the rest of the species signifies a typical lowland forest (Malimbwi et al 2002).

Table 3. List of 68 tree and shrub species found in the Lowland vegetation in Kimboza forest reserve, Morogoro, Tanzania.

Botanical Name	Local Name	Botanical Name	Local Name
<i>Acacia polyacantha</i>	Muwindi/mtatula	<i>Khaya anthotheca</i>	Mkangazi
<i>Albizia petersiana</i>	mkengepori	<i>Kigelia africana</i>	Mngegea=Mwegea
<i>Albizia vesicolor</i>	Mkenge maji	<i>Lannea welwitschii</i>	Mdevelanyani/Mkolebwambwa
<i>Alchornea hitlrella</i>	Zasa	<i>Lecaniodiscus flaxinifolius</i>	Mbwewe
<i>Anthocleista grandiflora</i>	Mberuberu	<i>Lettowianthus stellatus</i>	Mkolebwambwa
<i>Bequaertiodendron natalense</i>	Mdulu	<i>Margaritaria discoidea</i>	Sakulangw'ale
<i>Blighia unijugata</i>	?	<i>Markhamia zanzibarica</i>	Mtarawanda2
<i>Bombax rhodognaphalon</i>	Msufipori	<i>Maytenus acuminata</i>	?
<i>Bridelia micrantha</i>	?	<i>Mesogyne insignis</i>	Mkuhe (sambaa)
<i>Cedrela odorata</i>	Mwerezi	<i>Milletia sp.</i>	Mfugusa
<i>Centi sp.</i>	Mnyeramondo	<i>Milletia usaramensis</i>	Mhamvi
<i>Chazaliella abrupta</i>	Mbunipori?	<i>Ochna sp.</i>	?
<i>Chrysophyllum sp.</i>	Mbalanzi	<i>Oxyanthus speciosus</i>	Mbunimwitu2/mpikito
<i>Cissus oliveri</i>	Bavu la simba	<i>Panamus rabaiensis</i>	Kangaga (mkadi)
<i>Cola natalense</i>	?	<i>Pleocarpa pycnantha</i>	Mbalanzi/mttooutomvu?
<i>Cola usambarensis</i>	?	<i>Premna chrisoclada</i>	*Mkozongo
<i>Coloncoba welwitschii</i>	?	<i>Psydrax sp</i>	Msongombwa
<i>Combretum stuhmanii</i>	?	<i>Schizogygia coffaeoides</i>	Mberuberu
<i>Cynometra sp</i>	Mkong'onolo	<i>Sclerocarya birrea sub.cp.caffra</i>	Mng'ong'o
<i>Cynometra ulugurensis</i>	Mwebegeke=Mhengele	<i>Scorodophleus fischeri</i>	Mhande
<i>Deinbollia boronica</i>	Mbwakabwaka	<i>Sorindeia madagascariensis</i>	Muhimilihili=mpikito?
<i>Diospyros sp.</i>	Nyachititu	<i>Strichnos innocua</i>	Mlungulung'ulu
<i>Dombeya natalensis</i>	Msambwa	<i>Strichnos sp.</i>	Muhamvi2Mngulung'ulu
<i>Drypetes natalensis</i>	Ntachititu2	<i>Terminalia sambeziaca</i>	Mpululu
<i>Englerophytum natalense</i>	Msambwa	<i>Terminalia sericea</i>	Mpululu
<i>Euphorbia nyikae</i>	Mngwede	<i>Trichilia emetica</i>	?
<i>Felicium decipiens</i>	Mbalanzi	<i>Trilepsium madagascariensis</i>	?
<i>Ficus altissima</i>	Mvira	<i>Uvaria sp.</i>	Mperamwitu?
<i>Ficus exasperata</i>	Msasa	<i>Uvariadendron gorgonis</i>	Mlemeleme/mlowelowe/
<i>Ficus sp.</i>	Mkoya		Kigwe
<i>Garcinia buchananii</i>	Mbogoli		Mzeza 1
<i>Haplocoelum inopleum</i>	Msagusa	<i>Combretum sp.</i>	Sugusugu
<i>Fluggea virosa</i>	Mkalagananga		Mgwena

Source: Malimbwi *et al* 2002

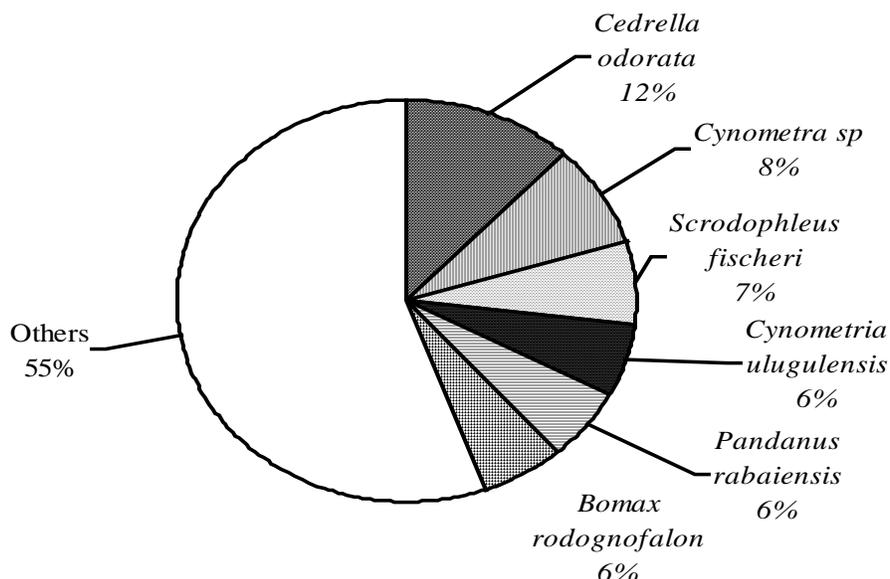


Figure: 1 Distribution of tree species in terms of volume in the lowland forest of Kimboza forest reserve

Woodland

Table 4: List of 15 trees and shrub species in the woodland of Kimboza forest reserve, Morogoro, Tanzania.

Local name	Botanical name
<i>Acadia polyacantha</i>	Muwindi/mtalla
<i>Albizia petersiana</i>	Mkengepori
<i>Albizia versicolor</i>	Mkengemaji
<i>Annona senegalensis</i>	Mtopetope
<i>Antiaris toxicaria</i>	Mbila
<i>Catunaregum spinosa</i>	Mtutuma
<i>Cobretum molle</i>	Mlamamweusi
<i>Diospyros kirkii.</i>	?
<i>Dombeya rotundifolia</i>	Msambwa
<i>Ficus sycomorus</i>	Mkuyu
<i>Sclerocarya birreasub.sp.caffra</i>	Mng'ongo
<i>Sorindeia madagascariensis</i>	Mpilipili
<i>Vitex sp.</i>	Mfuru
	Kigwe
	Msukina

Distribution of tree species in terms of volume in the Miombo woodland forest of Kimboza forest reserve. *Albizia versicola*, *Antiaris toxicaria*, *Combretum molle*, *Vitex sp.* and *Sorindeia madagascariensis* are the most dominant tree species in the Miombo Woodland forest of Kimboza forest reserve. (Fig. 2)

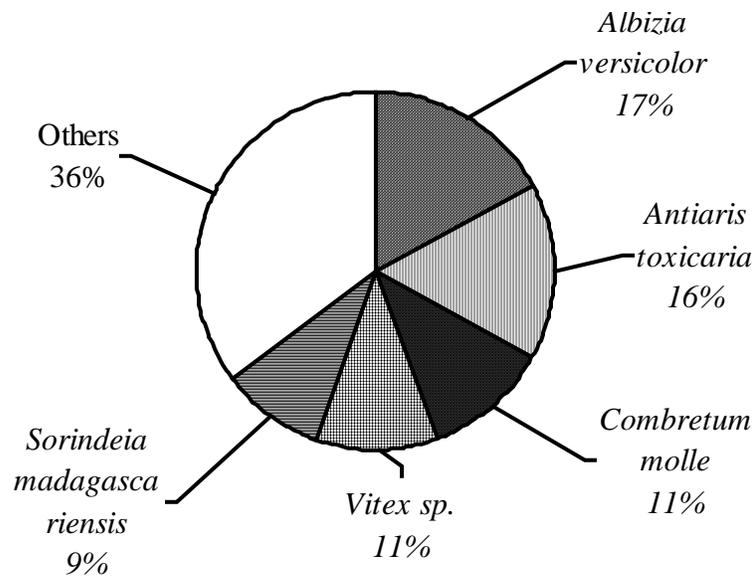


Fig. 2: Distribution of tree species in term of volume in the wood lands of Kimboza forest reserve.

Teak Vegetation

Table 5: List of eight different tree and shrub species found in Teak Vegetation.

Botanical Name	Local (Vernacular name)
<i>Albizia petersiana</i>	<i>Mkengepori</i>
<i>Antiaris toxicaria</i>	<i>Mbila</i>
<i>Diospyros sp.</i>	<i>Nyachititu</i>
<i>Dombeya rotundifolia</i>	<i>Msambwa</i>
<i>Khaya anthotheca</i>	<i>Mkangazi</i>
<i>Strichnos sp.</i>	<i>Muhamvi2</i>
<i>Tectona grandis</i>	<i>Mtiki</i>
<i>Uvaria</i>	<i>Mperamwitu</i>

Cedrella vegetation:

Twelve different tree and shrub occurs in this vegetation (table 6) as it was the case with Teak vegetation, the part of the forest is enriched with *cedrella odorata* (Malimbwi *et al*, 2002).

Table 6: List of twelve different tree and shrub species found in Cedrele Vegetation in Kimboza forest reserve.

Botanical Name	Local (vernacular name)
<i>Cedrele odorata</i>	<i>Mwerezi</i>
<i>Chrysophyllum sp.</i>	<i>Mbalanzi</i>
<i>Deinbollia borbonica</i>	<i>Mbwakabwaka</i>
<i>Grewia sp.</i>	<i>Mkole</i>
<i>Hippotrachea sp.</i>	
<i>Khaya anthotheca</i>	<i>Mkangazi</i>
<i>Markhamia obtusifolia</i>	<i>Mtarawanda</i>
<i>Markhamia zanzibarica</i>	<i>Mtarawanda2</i>
<i>Oncoba spinosa</i>	<i>Mkwangwasale</i>
<i>Sorindeia madagascariensis</i>	<i>Mpilipili</i>
<i>Xylopia parvifolia</i>	<i>Mlawilila</i>
	<i>Mlembelezua</i>

As the names implies these forests are dominated by *Tectona grandis* and *Cedrella odorata* respectively. The occurrence of other species of *Khaya anthotheca*, *Antiaris toxicaria* and *Sorindeia madagascariensis* in these vegetation suggests that formally the area was occupied by lowland forest.

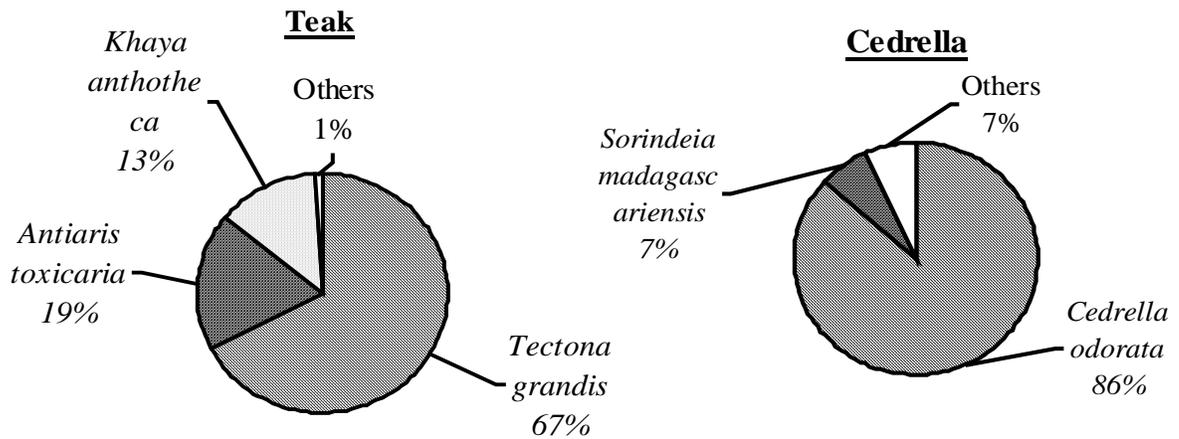


Fig 3: Distribution of tree species in terms of volume in *Teak* and *Cedrella* vegetation of Kimboza Forest reserve.

2.3.1.2. Inventory

The inventory results are mainly discussed under this section.

Stand Parameters.

The stand parameters in terms of stocking, basal area and volume per hectare at 5% probability levels based on the 26 plots measured are shown in table

Note: The size of the outer part circle of the plot was 0.07ha

Table 7. Stand parameters of all tree ≥ 1 cm Dbh for Kimboza Forest Reserve.

Forest type	Stocking (stem/ha)	Basal area (m ² /ha) + SE	Volume no. 3/ha +SE
Lowland	1063 \pm 399	18 \pm 3.8	281.7 \pm 61.5
Woodland	405 \pm 301	11 \pm 16.1	86.3 \pm 139
Teak	607 \pm 396	30 \pm 15.4	362.1 \pm 243
Cedrela	1419 \pm 486	32.8 \pm 19	350.6 \pm 208

Source: Malimbwi *et al* 2002

The average number of stems per ha. were 1063 \pm 399, 405 \pm 301, 607 \pm 396 and 1419 \pm 486 in lowland, woodland, Teak and Cedrela forest types respectively. Cedrela forest type has higher greater number of stems compared to other vegetation types. The woodland, which is open, and discontinuous, had few stems numbers. However, the distribution of the stem numbers per hectare in these vegetation types generally follows the usual expected reversed J-shaped trend curve. This is an indication of good forest regeneration and recruitment trend. In the woodlands, grassfires might interrupt the regeneration and recruitment (Malimbwi *et al*, 2002).

Basal area and wood volume

The average volume and basal area were 281.7m³ ha⁻¹ and 86.3m²ha⁻¹ for the lowland, 86.3m³ha⁻¹ and 11m²ha⁻¹ for the woodland, 362.1m³ and 30m²ha⁻¹ for the teak vegetation and 350.6m³ha⁻¹ and 32.8m²ha⁻¹ for the cedrella vegetation respectively (Table 8).

The basal area of 11m² ha⁻¹ in the woodland is consistent with that obtained in woodlands elsewhere (Malimbwi, 1999,2000 in Malimbwi *et al* 2002).

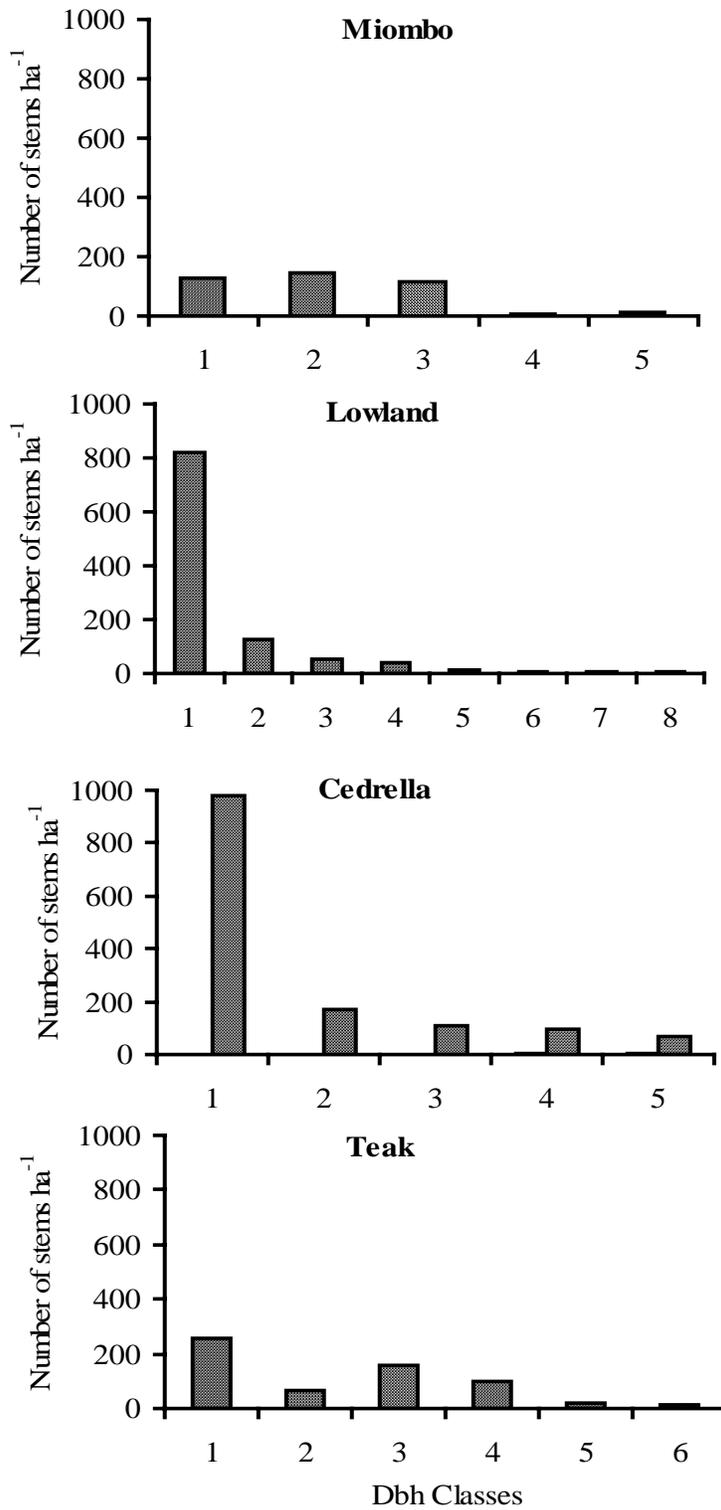


Fig. 4: Forest tree stocking (stems/ ha) distribution at Kimboza Forest Reserve.

Harvesting levels

Local communities adjacent to the forest reserve derive a number of benefits from the forest. These include: lumbering; collection of fire wood and charcoal; cultural place; collection of building poles and rafters/reeds, collection of medicines; collection of wild fruits, mushrooms, vegetables and insects; source of water supply and collection of thatching grasses.

Uses that require a considerable amount of wood biomass to be removed from forest include lumbering, charcoal extraction and harvesting for building poles. Field observation revealed that illegal timber and building poles harvesting from the forest reserve is problem. Wood fuel in terms of firewood is also collected from fallen down branches. Charcoal extraction in this area seems to have no potential.

Since harvesting is banned in catchment forest reserves, felling trees for timber, firewood and poles from the forests is illegal, though is common in the northern part of the reserve. Obviously, this compromises the relationship between forest officers and the public. .

Millable timber

Before recommending millable timber harvesting levels, it is important to make a critical examination of the growing stock in terms of timber species available and their size distribution in both woodland and lowland parts of the forest. A total of 7 timber species were encountered in the forest inventory at Kimboza Forest Reserve (Table 8). The woodland has 2 timber tree species while lowland; *cedrela* and teak vegetation have 5,2 and 3 species respectively. The valuable timber species such as *Milicia excelsa* (Mvule) and *Khaya anthotheca* formerly *K. nyasica* (Mkangazi) were once (in the 1960's) common. Currently only Mkangazi wa spotted and Mvule has almost undergone local extinction.

Table 8. List of timber species and their location at Kimboza forest reserve, Morogoro,

Sp. Code	Botanical name	Local name (vernacular)	Woodland	Low land	Cedrela	Teal
3	<i>Albizia versicolor</i>	Mkenge maji	x	x		
7	<i>Antiaris toxicaria</i>	Mbila	x			x
10	<i>Bombax rhodognaphalon</i>	Msufipori		x		
12	<i>Cedrela odorata</i>	Mwerezi		x	x	
43	<i>Khaya anthotheca</i>	Mkangazi		x	x	x
71	<i>Tectona grandis</i>	Mtiki				x
73	<i>Terminalia sericea</i>	Mpululu		x		

Experience shows that most timber harvested from natural forest these days has higher proportion of sapwood due to over exploitation of mature trees. In a recent study in Rufiji district, Malimbwi (2000) observed that pit sawyers felled trees with minimum timber tree sizes have been adopted in this report. For the planted species of *Teak and Cedrela* minimum size adopted is 40 cm Dbh.

The numbers of stems and timber volume for both vegetation types are shown in Table 12. The calculation of net volume is based on two assumptions (Malimbwi, 2000).

Twenty percent of the area is left untouched due steep slopes (more than 40%) and / or is located along water courses

Only 60% of the tree is merchantable.

Under these assumptions, 3,050m³ of timber can be realized in the lowland forest. There are also 301m³ of Teak and 1,829m³ of *Cedrela odorata* from *Teak and Cedrela* vegetation respectively.

Table 9. Potential timber available in Kimboza Forest Reserve, Morogoro, Tanzania

Dbh Class	Spp code	5		7		8		Total		Area of the forest	Total		Net values	
		N	V	N	V	N	V	N	V		N	V	N	V
Lowland														
40	<i>Khayax rimolokhneaphalon</i>			1	4.3	1	11.2	1	432	309.7	230	3,332	184	6,469
73	<i>Terminalia sericea</i>			1	5.0			1	5.0		230	1,545	184	742
								2	20.5		689	6,355	551	3,050

Teak

71	<i>Tectona grandis</i>	21	40.7					21	40.7	15.4	323	627	259	301
								21	40.7		323	627	259	301

Cedrela

12	<i>Cedrela odorata</i>	61	140.1					61	140.1	27.2	1,659	3,810	1,327	1,829
								61	140.1		1,659	3,810	1,327	1,829
											2,671	10,791	2,137	5,180

Source: Malimbwi et al 2002

Building poles

Markhamia zanzibarica (Mtarawanda) and *Scorodophelus fischeri* (Mhande) are two potential poles species (Malimbwi, 2000; Malimbwi and Mugasha 2001 in Malimbwi et al 2002). The stocking of these species in Kimboza is one and 21 stems per hectare respectively (Table 10). Both of the species have been spotted only in the lowland forest. Due to the location of lowland forest (at the top of the hill and along river courses) it is recommended that these areas be exempted from pole harvesting. An alternative species that can be harvested for pole is *Cedrela odorata*. The species has logs that are very easy to split, and the wood has a natural durability with service life of 5 – 10 years (Bryce, 1967 in Malimbwi et al 2002)

Table 10. Harvestable species building poles* in Kimboza forest for only trees > 10cm Dbh.

Species Name		Area (ha)	Stems/ha	Total Number of stems
<i>Markhamia zanzibarica</i>	Mtarawanda	309.7	1	309.7
<i>Scorodophelus fischeri</i>	Mhande		21	6503.7

* The number of poles is underestimated since sometimes there are big trees which are normally split into smaller dimensions suitable for poles.

2.3.1.3 Zonation

Four villages namely Mwarazi, Kibangile, Changa and Uponda border Kimboza Catchment Forest reserve already. Village environment Committees working under village government to oversee all environmental issue in the Village are already in place. Among other things these committees are responsible for making patrols in all public and state owned forests in collaboration with other villages including the Kimboza forest reserve. Administrative village boundaries have been projected into the forest and are thus recognized by each Village. These boundaries designate VFMA's used for Joint forest Management between the Villages and the Forestry and Beekeeping Division. However the Concept of JFM between these partners cannot be realized without proper zonation of the forest reserve so that the use of each portion is understood between both parties.

Thus Kimboza Catchment Forest Reserve has been zoned into two Management zones.

Biodiversity Zone

The forest reserve has characteristics of the eastern and mountain rainforest and lowland coastal forests ranked in high biodiversity values. There are species of restricted distribution like *hygodactylus williamsii* that is endemic lizard species found only on stems *pandanus spp.*

Production Zone

About 61 ha of the forest area is invaded by invasive exotic tree species, which are *cedrela odorata* and *Tectona grandis*. This zone termed as production zone by means that the spp. will be removed to allow natural regeneration.

The removal of these spp will be done under proper Management that will be prepared jointly by the project and adjacent villages.

2.3.1.4 Mapping

Kimboza Catchment Forest Reserve was mapped during the forest Inventory exercise by FORCONSULT and the resulting was Management map shown (Appendix 6). The map also shows Management units distributed per village with common center where both villages share boundaries.

The forest reserve is managed for potential of water catchment area and biodiversity values. However about 61ha of the forest area is invaded by invasive exotic tree species, which are *Cedrella odorata* and *Tectona grandis*. Demarcation of the forest management areas has been undertaken.

2.3.2. Boundary consolidation

Total of 11 km of boundary had been cleared directional trenches and beacons are well installed. The whole boundary has been planted with trees. All these operations have been undertaken through paid labour. There is no serious encroachment.

2.3.3. Forest Protection

The forest is threatened by tree cutting for timber, poles and other domestic uses.

To protect the forest, village by laws and Management Agreement has been formulated and signed between the Government and four villages adjacent to Kimboza Forest Reserve. On going protection activities are jointly carried out at village level between villagers and FBD staff. Regular organized patrols are carried out twice (2) a week. However adhoc patrol are carried out, whenever there is a need to do so. Occasionally informers are used as a source of information to effect patrols.

To draw participation of villagers and other stakeholders awareness and consultative meetings are carried out twice a year. Fire prevention and fire suppression are carried out jointly with forest adjacent villagers. Forest patrols are intensified during dry season (July – December) in order to spot out as soon as possible if there is any sign fire.

Once fire is spotted out and become out of control from the patrol crew an alarm or signal was sent to the village leaders to mobilize and organize other villagers and stakeholders to fight and suppress fire. Pangas, Jembes and fire bitters are commonly used for firefighting. Jembe and Pangas mainly from villager and fire beaters from FBD. Normally there is no experience of fierce fire in the forest reserve.

Most of the fire incidences were under the control of villagers and other stakeholders. Nature of forest and type of vegetation may be a limiting factor.

Most of the fire incidences occur in drier grassy part of the forest. Regularly maintained boundaries act as firebreak for prevention of fire since the inception of JFM the degradation and forest disturbance through illegal activities have been declining. For this plan year one person, was court and sentenced to a five-year imprisonment for causing fire in the forest. At this initial stage of JFM most of offenders were warned before their village leaders. Thus illegally obtained products such as firewood withies, poles, were freely given to their respective villages, thus there is no revenue collected.

2.3.4 Forest Restocking and Natural regeneration.

Planting have been carried out in Kimboza Forest reserve with natural tree *Spp* such as *Khaya*, *anthotheca* in degraded part at Changa village near Mbehombelo sub-village total area planted were used 5ha. Nursery stocks from VNRCs were used as a source of seedling regeneration by coppicing and seedlings in open areas has been encouraged through protection against fire, grazing and tree cutting. (The inventory study has shown that regeneration is also possible through budding).

2.3.5 Nurseries

Currently there are 10 Nurseries, which are owned and managed by Individual groups and primary schools. Species raised include *Khaya nulonge*, *Grevellia*, */Afzelia guenzensis*, *Carica papaya* and *eucaluptus*.

2.3.6. Management of Buffer Zones and Corridors

Patches of Natural forests outside Kimboza forest reserve have been identified although ownership status is not yet established. These patches are not properly managed because they have frequently affected by fire and subjected to rampant exploitation. Sensitization of the forest adjacent local communities to the need to manage and own some patches of Natural forests that are found in the vicinity of Kimboza forest reserve has been undertaken by the local communities. These are regarded by the local communities as areas for agricultural expansion, extraction of various forest products.

The local communities obtain their benefits through regulated use of the forest. i.e. allowed and non-allowed use. Kimboza forest reserve is connected to other three forests patches of Natural forest; the connectivity of this forest is not properly managed.

Tree planting outside of the forest reserve is practiced through woodlots, home garden and own farm tree planting as agroforestry common Spp preferred by villagers include: *Khaya anthotheca*, *Cedrela*, *G. robust*, *Tgradia*, *Tectona*, *milonge*, *Semro siamea*, *eucalyptus* etc. Individuals CBOs including church, primary school are involved in tree planting.

2.3.7 Water Shade Management areas.

Many water sources and springs that contribute water to Ruvu River intercept Kimboza CFR. The springs and water source are taken care in general management of the forest. However water river outside of the forest reserve, do receive special attention. No human activity are allowed to river bank at an area of 50m of both sides of the river soil erosion on farm land is managed by advocated proper agricultural practices including Agroforestry intercropping terracing and contouring which is not clearly followed.

2.4 Initiative for revenue generation.

Establishing and manage of off farm alternative income generating activities to villagers facilitated and supported by the government. Such as fingerlings, Beehives fishnet, nursery tools, seeds and technical advices were supplied to provide demonstration to villages to add more to copy from this knowledge. As a result 6 Fishponds 15 Beehives have been established and adjacent communities have started selling fish and bee products. Academician and research fees contributed to earn some amount of money.

2.5. Intersect oral Linkage and Co-operation

Sectors related to land, which have interest in Kimboza F/R, are CBOs like Religion groups (KKKT), Precision blood sisters (RC), and Schools, Research Institutions, Beekeeping Department and Fisheries department.

2.6 Finance

The total amounts of 22,000,000/=Tshs. were spent in different activities including Forest Inventory botanical survey boundary maintenance. Forest Inventory and botanical survey were the activity, which spent more money to 18,000,000 Tsh out of total amount. Source of fund are Forest and Beekeeping Division of the Ministry of Natural Resource & Tourism Norwegian for International Development (NORAD).

3.0 MANAGEMENT DIRECTIVES

3.1 Framework for management planning

The preparation of Kimboza Catchment Forest Management plan is based upon the National Forest Policy, Forest Act and other land use policies.

3.1.1 National Forest policy

The Management plan for Kimboza Forest reserve is in line with the provisions of the National Forest Policy of 1998. The policy specifically puts forward the following statements that necessitate the need for preparation of Kimboza Forest Reserve Management plan.

- *Policy statement (1):* To ensure sustainable supply of forest products and services and environmental conservation all types of forest reserves will be managed for production and/or protection based on sustainable management objectives defined for each forest reserve. The management of all types of forest reserves will be based on forest management plans.
- *Policy statement (3):* To enable Participation of all stakeholders in forest management and Conservation, joint management agreements with appropriate user rights and benefits will be established. The agreements will be between the central government, specialized executive agencies, private sector or local government as appropriate in each case and organized local communities or other organization of people living adjacent to the forest.
- *Policy statement (15):* New forest reserves for biodiversity conservation will be created in areas of high biodiversity value. Forest reserves with protection objectives of national strategic importance may be declared as nature reserve.
- *Policy statement (16):* Biodiversity Conservation and management will be incorporated into the management plans for all protection forests.
- Involvement of local Communities and other stakeholders in conservation and management will be encouraged through joint management agreements.
- *Policy Statement (17):* Biodiversity research and information dissemination will be strengthened in order to improve biodiversity conservation and management.
- *Policy statement (20):* Watershed management and soil conservation will be

included in the management plans for all protection and production forests. Involvement of local communities and other stake holders in watershed management and soil conservation will be encouraged through joint management agreements.

- *Policy statement (21):* Research and information dissemination will be strengthened in order to improve watershed and soil Conservation.
- *Policy statement (22):* Management of forest reserves will incorporate wildlife conservation wildlife resource assessment will be intensified.

The policy there fore emphasizes among other things the involvement of other stakeholders in the management of forest resources and it takes into account changes in socio-economic, environmental, cultural and political changes

3.1.2 Forest Act

The Policy is backed up by the National Forest Act (2002), of which part III gives mandate to manage the forest resource in accordance with the prepared management plans. The preparation of the management plan should take into account the views and expectations of other stakeholders,

3.1.3 National Forest Programme (NFP)

National forest programme (NFP) as one of the tools for implementing forest policy supports the need for a management supports the need for a management plan for effective management of the forest resource. Among its coverage it advocates the following with respect to the preparation of management plans.

- Protective buffer Zones around gazetted forest reserves with biodiversity and amenity values will be demarcated and managed in collaboration with local communities through JFM and CBFM. The purpose of the zones is to protect the respective forest reserves and provide benefits for local communities and they will be managed in accordance with the forest management plans.
- Devolving management responsibilities to communities and specialized executive agencies and the private sector using updated management plans of plantation and natural forests, multipurpose forests management plans should

be prepared based on reliable inventory data covering all different uses of the forests.

3.1.4 Other Sector Policies and Strategies

Among other things, the current government reforms emphasize decentralization of the authority to the local level and promotion of community involvement in the provision and management of social services through increased Cost-sharing. These reforms are in line with the village Act of 1984 that require a village to be registered and mandated to manage the resource in its area of jurisdiction.

3.1.5 Effects of old Policy on forest management

The old Forestry Policy of 1953 did not take into account involvement of other stakeholders in the management of forest. Also the Forest ordinance of 1957, which was amended in 1959, was based on policing rather than participatory forest management. The Policy did not consider social, economic, environmental, cultural and political changes neither did it take into account involvement of adjacent communities and other stakeholders in the management of forests. These led to poor and ineffective management of forest resources, as these stakeholders perceived that these forests are the property of the government.

3.2 Potential Values of the Forest

Potential values for Kimboza Catchment Forest Reserve have local, national and international importance.

3.2.1 Wood and Non-wood Products.

Wood products that are derived from Kimboza Forest Reserve include timber poles & firewood. Non-wood products/Service include mushroom vegetables, medicines, and ropes employment of Casual laborer, ritual practices and improvement Microclimate. In this management plan harvesting will be done mainly for the purpose of removing *Tectona grands* and *Cedrela odorata* due to its frequently interruption of natural vegetation.

Forest adjacent communities will be given the first priority in harvesting and in consultation with the forest officers, they will discuss and endorse those applying for harvesting. Whenever possible, extraction of wood and wood products will be directed to the general land outside the reserved forest. Non-commercial wood products such as fuel wood, building and withies will be conditionally harvested for local use.

3.2.2. Catchment Values

Water springs originating from the forest contributes it is water to Ruvu river, water it used for domestic and Industrial purposes in the Villages adjacent to Kimboza F/R where the river passing and Dar Es Salaam City. To safe guard water originating from the forest reserve, areas along river courses, streams and wetland will be excluded from harvesting and other human interference to ensure enough supply of clean water for the wildlife domestic and industrial purposes.

3.2.3. Biodiversity

Kimboza Forest Reserve is among the forests that are found in the Eastern Arc Mountains. Forest in these mountains has a global interest as a biodiversity hotspot. The forest is rich in biodiversity in terms of flora and fauna. Plants range from lower to higher plants. The forest harbour lower animal with limited number of large animals. Variety of Birds species and insects contribute.

3.2.4. Cultural Sites

There are no specific cultural sites identified in the forest. In case the local people will identify their site that was their cultural sites before the forest gazetted as forest reserve, the sites will be respected and preserved as ritual and historical sites. Activities such as research and ecotourism will be allowed.

3.2.5. Amenity

The forests provide scenery in terms insulating topography, panorama provided by the forest cover and traditional by farming of food and commercial crops and attraction in the area. These areas should be properly managed to promote ecotourism.

3.3 Management goals, objectives and strategies.

3.3.1. Management goals

Effective implementation, monitoring and control of this plan will lead to achievement of following goal *‘To enhance ecosystem conservation and management of the catchment forest and sustainable utilization of resources for the benefit of the present and future generations’*.

3.3.2. Management Objectives

- To ensure sustainable supply of forest products and services to all stakeholders under efficient management.
- To ensure ecosystem stability.
- To ensure effective management of buffer zones.
- To effectively manage the forest so as to contribute to local and national economy.

3.3.3. Management Strategies.

In order to achieve the goals and objectives the following strategies will be affected: -

(i) Development of Alternative use of forest resources.

Natural forest patches, woodlots and Agro forestry plots will serve as an alternative forest resource base to supply wood and non-wood products to local communities and other stakeholders.

The planted trees will provide building poles fruits, timber for commercial poses, traditional herbs and wood fuel. For sustainable supply of planting stock use of locally available nursery materials will be emphasized.

(ii) Improvement of Forest Management Operations

Forest reserve boundaries will be established and maintained in order to prevent fires escaping into the forest reserve. Fire management plan should be prepared and operational zed.

Indigenous tree species like *Khaya antothea* and other original species according to the place will be encouraged part even village adjacent to forest reserve will be encouraged to

manage part of their general lands bordering the forest as a buffer zone. For improved management, the whole zoned as biodiversity zone, Teak and *Cedrella* plots will termed as production zone as how will be planned.

(iii) Enhancement of Collaborative Forest Management

For proper conservation and sustainable utilization of the forest reserve collaboration among different stake holders/Institutions in highly emphasized.

Various stakeholders/Institutions are in place (Central government, district authority, local communities, school and religion groups).

Village by-laws and management agreement among these stakeholders will be put in place so that duties, rights and responsibilities of each partner are well understood.

To affect joint Forest Management Agreement has been prepared and signed between the central government and the adjacent communities. This is defining user rights and management responsibilities for each stakeholders of the forest reserve.

(iv) Development of alternative income generating activities.

Short-term income generating activities are important for local people as a substitute source of income, which relate with the destruction of forest reserve. With the increasing population and demand of wood product conservation could be jeopardized.

Development of short-term income generating activity can help the local communities to meet their needs. Among these activities are beekeeping, tree planting and fish farming. These activities will lead to production of honey, bee wax, fruits, timber, fish for food supplement and other products which can be used for substance and sale.

Some forms of cost sharing in forest management activities will ensure self-sustaining forest management. A reasonable price will be gradually introduced for the various products and services given to the local communities until they are used to pay for them.

3.4 Forest Management Zones

The purpose of this zone is to provide maximum protection possible for soil and water conservation and at the same time protecting the Ecosystem habitat, genetic materials and species areas 50 meters on either side of stream on the upper part of the catchment to the watershed ridge and high slopes will be included in the catchment zone. In this area no harvesting or other disturbance of natural vegetation except for rehabilitation of forest cover under prescribed management practices.

3.4.1 Biodiversity Zone

This zone is defined on the basis of high biodiversity. Within this zone there should be no harvesting or disturbance of Natural Vegetation or wildlife other than for non-destructive research and educational programme.

3.4.2. Amenity Zone

The amenity zone is defined as areas of unusual natural features. There should be no forest products exploitation within this zone that are linked to educational or research activities.

3.5 Management Units/Area.

Kimboza Forest reserve divided into 4 Village Forest Management Areas (VFMA) which is extended to include administrative boundaries of the four bordering villages.

3.6. Management Map

Management maps have been already prepared showing management units and zones in relation to the village adjacent to the forest reserve (Appendix 6)

4.0. MANAGEMENT PRESCRIPTIONS

This part of the plan prescribes activities and targets that will be carried out to improve the situation of the Kimboza Catchment forest reserve. It is envisaged that proper and effective implementation of these activities will improve the management of the forest reserve. The activities categories and budget for Kimboza forest reserve during the planning period are indicated in appendix 4 detailing 4 major activities viz: Enhancement

of collaborative forest management, Improvement in institutional capacity, Plan for forest management operations, Alternative for revenue and income generation, Intersectional linkage and collaboration.

4.1.1 Community Organizations

The VNRC's from four villages will be used as a link between the local people and other stakeholders of Kimboza forest reserve. They are representatives of the villagers in different decision-making occasions and represent the comprehensive views and resolutions of meetings to and from their fellow villagers.

VNRC's, Community based organizations, local government leaders and Non-governmental organizations will be trained on laws and policies guiding community participation and their rights and responsibilities in forest management. For the planning period 40 seminars will be conducted.

4.1.2 Instruments to facilitate community participation.

The Implantation of the developed Village Forest Management plans was backed by the formulated village by-laws and signed Management agreements between the FBD and 4 Villages adjacent to Kimboza CRF. At this early stage of implantation, villagers in collaboration with forest staff will put into use these tools and provide experiences. As a learning process, learning by doing, provision will be given to review the by-laws and agreements through negotiation. For supervision and monitoring purposes, record books will be established and maintained for each village. Facilitation team comprised of legal officer and Community Development Officer, accompanied by forest officer, will make a visit to the four villages quarterly.

4.1.3 Extension services and socio-economic studies

Extension services

Extension services are categorized into two:

- (i) Extension organized at Village level, commonly and frequently done by forester in charge of Kimboza Catchment forest.
- (ii) Extension organized at district level: Workshop / Seminars and study visits. For this plan period 20 workshop to 4 Villagers will be conducted and 20 study visits

involving 4 villagers will be done. The following extension and publicity material will be prepared and distributed to key stakeholders.

Social-economic studies.

In order to know the social economic in the Villages surrounding Kimboza Forest Reserve four (4) socio – economic studies will be conducted in the four villages viz: Mwarazi, Uponda, Changa and Kibangile by applying participatory Rural Appraisal (PRA) Approach.

4.2. Improvement in institutional capacity

4.2.1 Infrastructure, tools and Equipment

Two (2) staff quarters will be repaired so as to improve accommodation for staff also to improve accessibility to and from Kimboza forest reserve, five 5 km of the road will be maintained.

For proper forest management to be effected various tools and equipment will be purchased. These include 40 fire beaters, 16 watering cans, and 48 pairs of overalls, 45 pairs of gun boots, 16 rakes, 16 hoes, 16 spades, 8 wheelbarrows, 4 knapsack pumps, 8 bicycles and 2 motorbikes.

In order to improve secretarial services and communication one computer and Radio calls will be put in place. A set of TV and a generator will also be purchased in order to improve publicity activities.

4.2.2 Staff and Labour

The present staff with a certificate in Forestry will be upgraded to a Diploma level and one diploma holder in Forestry will be recruited to assist the existing one. Training and recruitment will follow government procedures.

Casual laborers will be required in maintaining the forest boundaries and directional trenches on payment basis.

4.2.3. Training

One staff with Diploma in Forestry serving at district level will be upgraded to a degree level. One staff that has a certificate in Forestry will be upgraded to a Diploma level. Both training will be under the sponsorship of the Government of Tanzania.

Forest adjacent local communities, NGO CBO's and other stakeholders will be trained on techniques on income generation activities (e.g. Fish farming, bee-keeping, improved stoves) and JFM, also fire prevention and suppression techniques, tree planting and management training will be conducted, 40 training sessions in four (4) villages surrounding the forest and stakeholders will be undertaken during the plan period.

4.3 Plan for forest management operations

4.3.1 Biological survey and Monitoring.

Biological surveys will be conducted. There will be collection and identification of specimen to know species richness, diversity and endemism, so that their status and dynamics over time are determined. To rephrase total counting method will be used while trapping will be used for small animals.

The species, age group, number, sex condition of the animals encountered will be all recorded together with the background information on the animal found. Data on soil, rainfall, run-off, evaporation, water storage, number, capacity and state of water points, type of vegetation cover will be collected since they determine the condition of wildlife in a given site/habitat. For plants, continuous collection of samples for identification and further analyses will be maintained. Different plants associations and their status and ecological significance will be determined. FORCONSULT and Frontier – Tanzania will be commissioned to undertake this operation and other researchers encouraged.

4.3.2. Forest Reserve Zonation

Kimboza forest reserve will be managed for protection of both water catchment and biodiversity values. However, utilization will be undertaken in order to eliminate invasive, exotic tree species i.e. *Tectona grandis* and *Cedrella odorata*.

4.3.3. Inventory

Multiple use forest inventories will be carried out in the forest reserve. Data required from the Catchment zone will be, water points, and soil cover. For the case of biodiversity zone spp. Richness, diversity, endemism and stocking will be determined. Under utilization zone, it is necessary to know the stocking (Vol/ha, BA/Ha, stem/ha) the growth dynamics of the resource (CAI, MAI) and regeneration capacity. However, this will be done in collaboration with TAFORI who owns the trial plots

4.3.4. Mapping

Satellite imageries will be used in map production for management purposes. The forest cover and boundary map will be regularly up dated and reviewed at the end of the planning period.

4.3.5. Boundary Consolidation.

About 11 km of the boundary length will be maintained. Beacons and directional trenches will be maintained also about 4 km of boundary length will be planted with *Tectona grandis* at a spacing of 5m – 6m.

4.3.6 Forest protection

Kimboza Catchment Forest Reserve is threatened by various human activities including tree cutting and forest fires.

In order to curb this problem, the following strategies will be carried out;

- Forest patrols will be conducted twice a week by staff in collaboration with forest adjacent local communities.
- Law enforcement will be intensified.
- Posters will distribute to all four villages.
- VNRC's forest staff and forest adjacent local communities will be responsible for fire prevention and suppression.

- Patrols will be regularly undertaken and intensified during the dry season in order to spot any fire for suppression once it occurs.
- Fire prevention and suppression tools and equipment will be made in place.
- The forest reserve boundary will be regularly maintained so that it may act as a fire line.

4.3.7 Forest restocking and natural regeneration

In order to ensure restocking of the Forest reserve, enrichment planting will be conducted in parts of the forest that are poorly stocked. About 10ha will be planted with. *Khaya anthotheca* and other indigenous tree species similar to the ones existing in the forest reserve will be used.

Intensifying protection of the forest reserve and freeing of seedlings/saplings from stranglers will be used to encourage natural regeneration.

4.3.8. Nurseries

In order to ensure enough planting stock in the forest reserve and in the farmland forest adjacent local communities, CBO's, NGO's and other stakeholders will be encouraged and sensitized to establish and own tree nurseries. The projects will provide nursery materials and equipment, seeds, technical expertise and practical guidance for them. Emphasis will be put on growing tree species that provide forest products such as timber, traditional medicines, firewood and fruits.

About 60,000 tree seedlings will be raised during the plan period.

4.3.9 Management Of Buffer Zones and Corridors.

Patches of natural forests surround Kimboza forest reserve. Villagers partly derive wood and non-wood requirements from these patches.

Sensitization of the villagers will be undertaken on the need to properly manage these natural forests so that ownership and status are established. The need to practice agroforestry will be emphasized in the farmland areas while woodlots will be encouraged to individuals with enough land or be directed to marginal land. Identification in terms of

ownership and number of natural forest patches outside the reserved forest will be carried out. The activity will be followed by survey and mapping of the forest.

4.3.10. Watershed Management and Soil Conservation.

In order to have well-managed watershed areas all destructive human activities will be strictly prohibited. In case of rivers no activities will be allowed within 50m on either sides of the riverbanks. No human activities will be allowed in steep slopes of >40%. (Planting catchments tree spp will control no human – rephrase activities. Like *Khaya antiotheca*). *Albizia spp etc*). For monitoring purposes, water quantity and quality will be measured in one of the rivers originating from Kimboza. One gauging station will be established and villages will be involved in protecting the installed equipment and collecting water samples in a regular basis. Analysis and interpretation of the data will be done by staff from water department in collaboration with forest, labour charge will be paid. In collaboration with agriculture sector, land outside the forest will be protected from soil erosion by practicing agro forestry and contour farming.

4.4 Alternative for revenue and income generation.

Beekeeping activities will be maintained and intensified by increasing the number of beehives from the present 15 to 100 by the end of the plan period. Fish farming will also be insisted where by the number of fishponds is envisaged to shoot up from present 6 – 10 during the plan period.

Eco-tourism will be promoted to contribute to household economy through sharing of revenue as well as through a multiplier effect. Under this, the forest adjacent local communities will benefit from tourists visiting interesting/ Historical sites like Dago la njiwa by providing services including guiding and sides of handcraft materials.

Researchers academicians etc will pay fees for carrying out activities in the forest reserve that will be consulted.

On going activities in promoting ecotourism will be carried out such activities include:

- Survey and Identify more valuable ecotourism sites in and around the reserve.
- Prepare and disseminate publicity materials for more and each ecotorism site.
- To establish more walking trails to various sites

- Prepare and place more appropriate signboards on walking trails, rest places and other areas heading description.
- Maintain existing trails, camping site and resting places
- Identify and train local guides and artisans.
- Build transit banda in Campsites and cultural banda in the near by villages.
- Marketing and promotion of the Identified and existing sites.

4.5. Intersect oral linkage and collaboration.

In managing Kimboza forest reserve, collaboration with other sectors such as fisheries, beekeeping, mineral department, community development and agriculture will be maintained and strengthened. This collaboration will focus on income generating activities to provide expertise.

For research purposes, FORCONSULT – SUA, TAFORI and FRONTIER – Tanzania will be consulted.

4.6. Finances

The Government of Tanzania (GOT) and the Government of Norway (GON) are the major source of funds for managing Kimboza forest reserve. Other possible sources of funds are Eastern arc Endowment Fund, W.W.F, Eastern Arc Project and Contribution fund and labour from forest adjacent local communities.

4.7 Constraints

Assuming the condition which provide the management functioning will hold success of the management plan will depend on funding from FBD of MNRT, NORAD, Eastern arc endowment fund, W.W.F and degree of collaboration offered by forest reserve adjacent communities.

Activities such as research, inventory, survey and mapping, training and infrastructures require large sum of money. It will be difficult to implement these activities if adequate funds are not secured. Willingness of the communities to conserve the forest reserve and develop alternative sources of products so as to reduce pressure on the forest reserve is

another constraints to be considered. Thus positive people's altitude towards forestry is crucial to success of this plan.

4.8 Monitoring and Evaluation

Monitoring of the plan implementation will be carried out throughout the plan implementation period. Annual plan of operation will be prepared to direct actions in more detailed manner to ease implementation. Regular meeting involving stakeholders will be conducted. Monthly, quarterly; semi annual reports shall be prepared as a means of verification.

Regular monitoring will produce feedback information for reviewing the plan and preparing the next action plan. The means of doing implementing monitoring and evaluation is as shown in planning matrix in appendix (5).

Final evaluation of the plan will be done at the end of the planning period in year 2007/08. A multi disciplinary team consisting of members from different sectors such as FBD, Agriculture, fisheries, District Administration and villagers adjacent to the forest reserve, will do it.

Table 11: Monitoring matrix

OBJECTIVE	INDICATOR	MEANS OF VERIFICATION	RISKS AND ASSUMPTION
To ensure sustainable provision of forest produce and services	<ul style="list-style-type: none"> • Availability of forest produces • Vegetation covers increased 	<ul style="list-style-type: none"> • Inventory reports • Needs assessment the local communities 	<ul style="list-style-type: none"> • Willingness of local people to participate. • Conductive climate for tree growing.
To ensure forest ecosystem stability	<ul style="list-style-type: none"> • Area in hectare restocked. • Extend of damage by fires and illegal expatriation of forest produce reduced. 	<ul style="list-style-type: none"> • Frequency of fire occurrences. • Research reports. • Monthly reports. 	<ul style="list-style-type: none"> • Willingness of local people to participate • Demand for forest produce satisfied from other sources. • Funds available.
To ensure establishment and Management of buffer zones.	<ul style="list-style-type: none"> • Balance between growth and wood removals. • Wood stock in the buffer zones increased. 	<ul style="list-style-type: none"> • Inventory data • Field visits. 	<ul style="list-style-type: none"> • Willingness of local people to participate. • Local people establish and maintain tree lots.
To ensure availability of income generating activities from the forest reserve.	<ul style="list-style-type: none"> • Number of individual woodlots established. • Number of beehives established and managed • Number of fishponds established and managed. 	<ul style="list-style-type: none"> • VNRCs reports. • Field visits. 	<ul style="list-style-type: none"> • Local people will be willing to participate. • Financial and material support available.
Enhanced management of the forest reserve	<ul style="list-style-type: none"> • Number of people participating in forest reserve management activities. • Management costs reduced. 	<ul style="list-style-type: none"> • Reports • Financial reports 	<ul style="list-style-type: none"> • Funds available. • Willingness of the communities to participate

4.9 Planning period, amendments and revision.

The duration for this management plan will be five years (5) from 2004/2005 – to 2008/2009. Annual Plan of Operation will be developed annually based on this plan. Revision of the plan will be carried out at the end of the plan. The plan can be changed according to the weakness and strengths of this plan in order to suit the real situation. All stakeholders of the forest reserve will be responsible for amendments needed improving the management of the forest.

5.0 REFERENCES

Forest Policy (1957)

MNRT, (2002). Forest Act. Ministry of Natural resources and Tourism. Act No.14 of 2002. Dar es salaam.

Lovert and Pocs (1993). Assessment of the condition of the catchment Forest Reserves a botanical appraisal. The Catchment forest Project – Dar es Salaam.

Malimbwi *et al*, (2002). Inventory Report of Kimboza Forest Reserve in Morogoro, Tanzania.

National Census (2000)

National Forest Policy, (1998) Ministry of Natural Resources and Tourism Dar es Salaam.

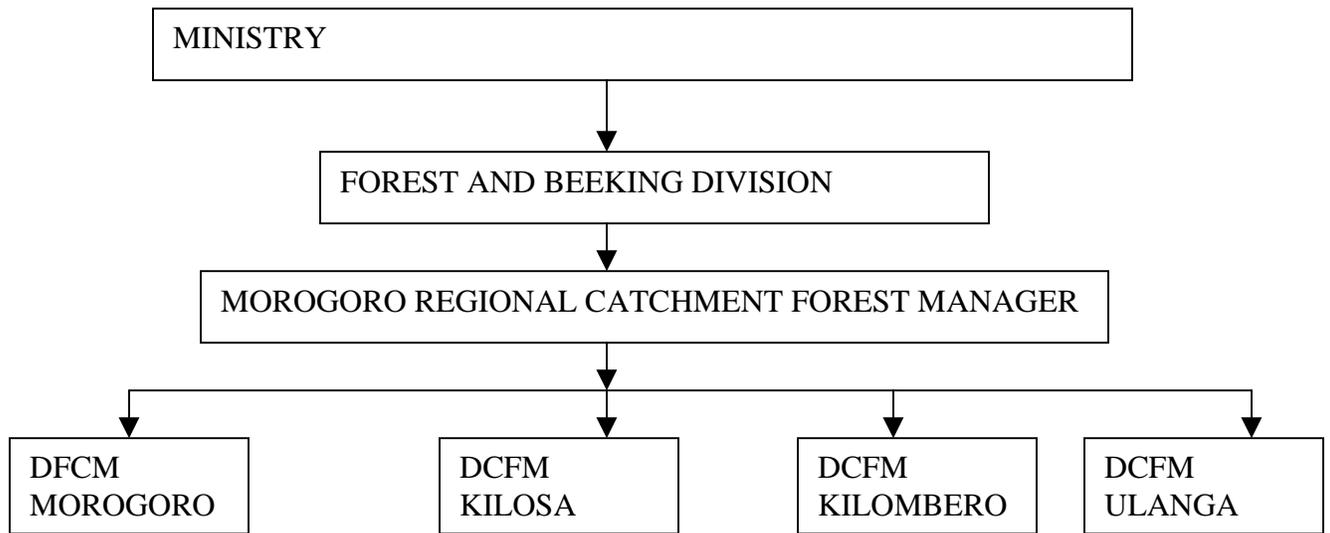
United Republic of Tanzania (2002) Tanzania population census 2002, Regional profile, Morogoro, Bureau of Statistic Dar-Es-Salaam Tanzania.

Shilla, I. A. (2004) Assessment of the social economic incentives for sustainable Joint, Forest Management in Kimboza Catchment Forest Reserve – Morogoro.

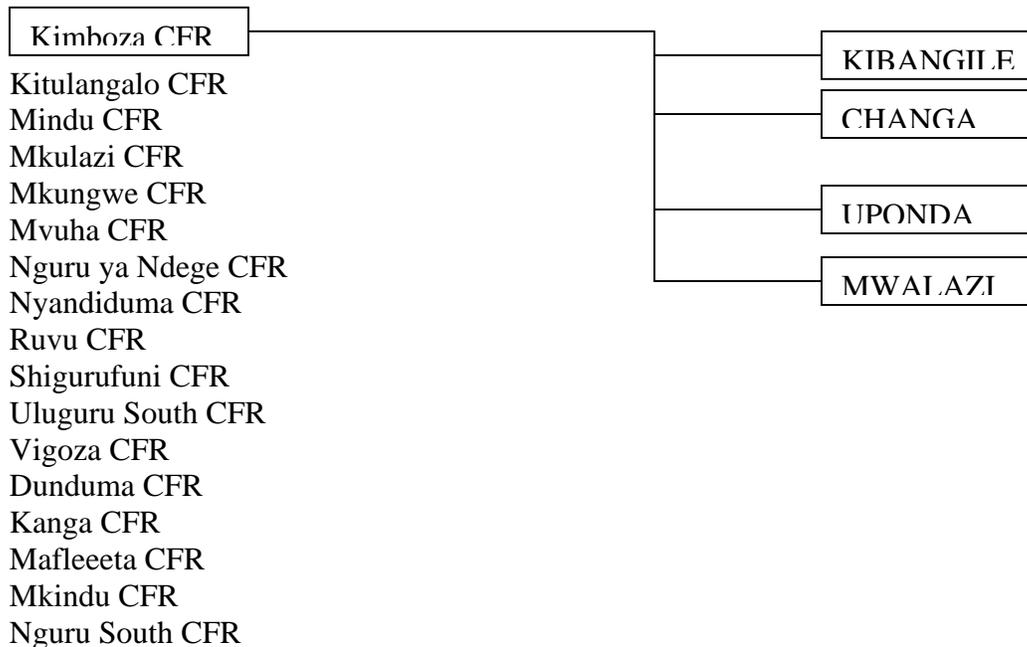
Village Act, (1999).

APPENDICES:

Appendix 1: Organization chart in the Management of Morogoro Catchment Forests, showing Kimboza forest Reserve.



Bunduki I, III, FR
Dindili CFR



Pagale CFR

Appendix 2. Tree Species Checklist for Kimboza Forest Reserves sorted by

Sp. Code	Botanical name	Local (vernacular name)
1	<i>Acacia polyacantha</i>	Muwindi/mtalula
2	<i>Albizia petersiana</i>	Mkengepori
3	<i>Albizia versicolor</i>	Mkenge maji
4	<i>Alcholnea hiltella</i>	Zasa
5	<i>Annona senegalense</i>	Mtopetope
6	<i>Anthocleista grandiflora</i>	Mberuberu
7	<i>Antiaris toxicaria</i>	Mbila
8	<i>Bequatiodendron natalense</i>	Mdulu
9	<i>Blighia unijugata</i>	?
10	<i>Bomax rodognofalon</i>	Msufipori
11	<i>Bridelia micrantha</i>	?
12	<i>C. odorata</i>	Mwerezzi
13	<i>Catunaregum spinosa</i>	Mtutuma
14	<i>Centis sp.</i>	Mnyeramondo
15	<i>Chazaliella abrupta</i>	Mbunipori?
16	<i>Chrysophyllum sp.</i>	Mbalanzi
17	<i>Cissus oliveri</i>	Bavu la simba
18	<i>Cola natalense</i>	?
19	<i>Cola sp.</i>	Unknown2
20	<i>Cola usambarensis</i>	?
21	<i>Coloncoba welwistchii</i>	?
22	<i>Combretum molle</i>	Mlamamweusi
23	<i>Combretum stuhmanii</i>	?
24	<i>Cynometra sp</i>	Mkong'onolo
25	<i>Cynometria ulugulensis</i>	Mwengele=Mhengele
26	<i>Deinbollia borbonica</i>	Mbwakabwaka
27	<i>Diospyros kirkii.</i>	?
28	<i>Diospyros sp.</i>	Nyachititu
29	<i>Diplorynchus condilocarpon</i>	Mtogo
30	<i>Dombeya rotundifolia</i>	Msambwa
31	<i>Drypetes natalensis</i>	Nyachititu2
32	<i>Englerophytum natalense</i>	Msambwa
33	<i>Euphorbia nyikae</i>	Mngwede
34	<i>Feliciium decipiens</i>	Mbalanzi
35	<i>Ficus altissima</i>	Mvira
36	<i>Ficus cycomorus</i>	Mkuyu
37	<i>Ficus exasperata</i>	Msasa
38	<i>Ficus sp.</i>	Mkoya
39	<i>Garunia buchananii</i>	Mbogoli
40	<i>Grewia sp.</i>	Mkole
41	<i>Haplocoelum inopleum</i>	Msagusa
42	<i>Hippotracea sp.</i>	?
43	<i>Khaya anthotheca</i>	Mkangazi
44	<i>Kigelia africana</i> 45	Mngegea=Mwegea

Botanical name.

Sp. Code	Botanical name	Local (vernacular name)
45	<i>Lannea welwitschii</i>	Mdevelanyani=Mkolebwambwa?
46	<i>Lecaniodiscus flaxinifolius</i>	Mbwewe
47	<i>Lettowianthus stellatus</i>	Mkolebwambwa?
48	<i>Manilkara sansibarensis</i>	Msambwapori
49	<i>Margaritaria discoidea</i>	Sakulangw'ale
50	<i>Markhamia obtusifolia</i>	Mtarawanda
51	<i>Markhamia zanzibarica</i>	Mtarawanda2
52	<i>Maytenus acuminata</i>	?
53	<i>Mesogyne insignis</i>	Mkuhe (sambaa)
54	<i>Milletia sp.</i>	Mfugusa
55	<i>Milletia usaramensis</i>	Mhamvi
56	<i>Ochna sp.</i>	?
57	<i>Oncoba spinosa</i>	Mkwangwasale
58	<i>Oxyanthus speciosus</i>	Mbunimwitu2/mpikito
59	<i>Pandanus rabaiensis</i>	Kangaga (mkadi)
60	<i>Pleiocarpa pycnantha</i>	Mbalanzi/mtomvutomvu?
61	<i>Polysphaelia multiflorum</i>	Mbunimwitu/msakulakw'ale
62	<i>Premna chrisoclada</i>	*Mkozongo
63	<i>Psyrax sp</i>	Msongambwa
64	<i>Schizogygia coffaeoides</i>	Mberuberu
65	<i>Schlerocarya birrea sub.sp caffra</i>	Mng'ongo
66	<i>Scrodophleus fischeri</i>	Mhande
67	<i>Sorindeia madagascariensis</i>	Muhilihili=mpikito?
68	<i>Strichnos innocua</i>	Mngulung'ulu
69	<i>Strichnus sp.</i>	Muhamvi2
70	<i>Syzygium cumini</i>	Mzambarau
71	<i>Tectona grandis</i>	Mtiki
72	<i>Terminalia sambeziaca</i>	Mpululu
73	<i>Terminalia sercea</i>	Mpululu
74	<i>Trichilia roka</i>	?
75	<i>Trilepsium madagascariensis</i>	?
76	<i>Uvaria sp.</i>	Mperamwitu
77	<i>Uvariadendron gorgonis</i>	Mlemeleme/mlowelowe/ Mkenene/nyakitombo?
78	<i>Uvariadendron sp.</i>	Mkenene
79	<i>Vitex sp.</i>	Mfuru
80		Kigwe
81	<i>Xylopiia parvifolia</i>	Mlawilila
82	<i>Ziziphus mucronata</i>	Mlagala
83		Mlemelezua
84		Mnyanza
85		Msukina
86		Mzeza
87	<i>Combretum sp.</i>	Sugusugu

Appendix 2.	Continued	
88	<i>Breonadia salicina</i>	Mgwina
89		Mkalagananga
90	<i>Acalypha fruticosa</i>	Mfulwe
91	<i>Albizia gummifera</i>	Mkenge
92	<i>Allophylus sp.</i>	
93	<i>Chassalia sp.</i>	
94	<i>Chassalia umbraticola</i>	
95	<i>Cissus rotundifolia</i>	
96	<i>Cola microcarpa</i>	
97	<i>Commelina benghalensis</i>	Nkongo
98	<i>Culcasia scandens</i>	Luhambamti
99	<i>Dalbergia boehmii</i>	Mzeza
100	<i>Desmodium velutinum</i>	
101	<i>Dichapetalum ruhlandii</i>	
102	<i>Dioscorea sansibariensis</i>	Dendego
103	<i>Diospyros natalense</i>	Nyachititu 1
104	<i>Diospyros mespiliformis</i>	Nyachititu/ mtitu
105	<i>Dorstenia sp.</i>	Kitomvutomvu
106	<i>Flueggea virosa</i>	Mkalagananga
107	<i>Hyparhenia sp.</i>	
108	<i>Ipomea sp.</i>	
109	<i>Justicia sp.</i>	Jumwidumwidu
110	<i>Macphersonia gracilis</i>	Mkengemdogo
111	<i>Milletia dura</i>	Mhanvi
112	<i>Oplismenus hirtellus</i>	Kokwa
113	<i>Pillaea sp.</i>	Lichavichavi
114	<i>Psychotria sp.</i>	Mlengwelengwe
115	<i>Saba florida</i>	Mabungo
116	<i>Sansevelia sp.</i>	Kongepori
117	<i>Steganotaenia aratiacea</i>	Mmogola
118	<i>Synaptolepsis altenifolia</i>	
119	<i>Tacca leontopetaloides</i>	Mpamungu

Source: Malimbwi et al 2002

Appendix 3. Schedule of activities for Kimboza Forest Reserve. A five year plan

ACTIVITIES / OUT PUT	YEARS			
	2004/05	2005/06	2006/07	2007/08
2008/09				
Boundary clearing	_____			
Boundary planting		_____		
Beating up		_____		
Boundary weeding	_____			
Boundary maintenance	_____			
Forest Patrolling	_____			
Nursery establishment		_____		
Enrichment planting in F/R		_____		
Beating up in F/R		_____		
Initiative for Income G.D	_____			
Extension services	_____			
Biological survey		_____		
Institutional capacity bailing	_____			
Infrastructure, tools and equipment	_____			
Training (seminars, workshop	_____			
Monitoring				_____
Evaluation				_____

Appendix 4 FIVE YEAR PLAN AND BUDGET 2004/05 - 2008/09										
Activity	Five year	Unit	CPU	Cost year (000)					Total	Remarks
	Target			2004/05	2005/06	2006/07	2007/08	2008/09		
ENHANCEMENT OF COLLABORATIVE FOREST MANAGEMENT										
1.1 Community Organizations strengthened										
1.1.1 Conduct Seminars to Village Govt. and VNRC'S	40	Seminars	250	2000	2000	2000	2000	2000	10000	
1.1.2 Conduct Seminars to Schools	20	Seminars	200	800	800	800	800	800	4000	
1.1.3 Hold Village general assemblies	20	Meeting	30	120	0	0	0	0	120	
SUB-TOTAL				2920	2800	2800	2800	2800	14120	
1.2 INSTRUMENTS TO FACILITATE COMMUNITY PARTIC. IN PLACE & OPERATIONAL										
1.2.1 Operationalize of by-laws	4	By-laws	46	184	0	0	0	0	184	
1.2.2 Management agreements	4	Agreements	49	98	98	0	0	0	196	
SUB-TOTAL				282	98	0	0	0	380	
1.3 CONDUCT EXTENSION SERV & SOCIO-ECONOMIC STUDIES.										
1.3.1 Prepare posters and distribution to stakeholders	400	Posters	2.5	200	200	200	200	0	800	
1.3.2 Prepare leaflets and distribution to stakeholders	400	Leaflets	2.5	200	200	200	200	200	1000	
1.3.3 Prepare calendar	400	Calendar	2.5	200	200	200	200	200	1000	
				600	600	600	600	400	2800	
1.4 IMPROVE INSTITUTIONAL CAPACITY										

1.4.1 IMPROVE INFRASTRUCTURE										
1.4.1.1 Construct access road to the forest	0.5	km	500	250	0	0	0	0	250	
1.4.1.2 Procure Motor Vehicle	1	Vehicle	40,000	40,000		0	0	0	40,000	
1.4.1.3 Procure Motorbikes	2	Motorbike	4,000	8,000	0	0	0	0	8000	
1.4.1.4 Procure bicycles	4	Bicycles	75	300		0	0	0	300	
1.4.1.5 Procure Computer		Comp.	800	800	0	0	0	0	800	
1.4.1.6 Radio communication		Phone	150	300	0	0	0	0	300	
1.4.1.7 TV set		TV	300	300	0	0	0	0	300	
1.4.1.4.8 Generator		Gen.	400	400	0	0	0	0	400	
1.4.1.9 Maintenance of staff quarter	2	Building	1000	1000	1000		0	0	2000	
1.4.1.10 Procure fire beaters	40	each	1.5	60	0	0	0	0	60	
1.4.1.11 Procure Wheel barrows	8	Number	15	60	0	60	0	0	120	
1.4.1.12 Uniforms	50	Pairs	18	900	0	0	0	0	900	
1.4.1.13 Watering Cans	16	Each	5	0	80	0	0	0	80	
1.4.1.14 Procure polythene tubing	20	Kg	2	8	8	8	8	8	40	
SUB - TOTAL				3828	1088	68	8	8	5000	
1.4.2 STAFF & LABOUR										
1.4.2.1 Recruitment to staff	1	Number	0	0	0	0	0	0	0	
1.4.2.2 Staff Salaries			0	0	0	0	0	0	0	
1.4.2.3 Casual Labour			0	0	0	0	0	0	0	
SUB TOTAL				0	0	0	0	0	0	
2.2 TRAINING OF STAFF & COMMUNITIES										
2.2.1 A/ces to 10 trainers-c/king stores and ecotourism	300	Days	15	0	4500	0	0	0	4500	
2.2.2 Conduct short courses		Number	0	0	0	0	0	0	0	

2.2.3 Conduct seminars to staff		Number	0	0	0	0	0	0	0	
2.2.4 Conduct Study Tours to Staff	10	Number	250	500	500	500	500	500	2500	
2.2.5 Workshops	20	Number	100	400	400	400	400	400	2000	
SUB-TOTAL				900	5400	900	900	900	9000	
2.3 FOREST OPERATIONS										
2.3.1 Conduct biological survey/study and Monitoring	1	Study	5000	0	0	5000	0	0	5000	Zoological Surv.
BOUNDARY CONSOLIDATION										0
2.3.2 Boundary planting	4	Km	25	100	0	0	0	0	100	
2.3.3 Boundary Maintenance	11	Km	25	75	50	50	50	50	275	
FOREST PROTECTION										0
2.3.4 Carry-out joint patrols	40	Patrols	11	55	55	55	55	55	275	
2.3.5 Fire line maintenance	11	km	25	75	50	50	50	50	275	
2.3.6 Gap/ Enrichment Planting	267	Ha	25	1,675.00	1,250.00	1,250.00	1,250.00	1,250.00	6675	
2.3.7 Nurseries	60,000	Seedlings	250	3000	3000	3000	3000	3000	15000	
Buffer zone/ corridors Mgt										
2.3.8 Identification of forest patches	4	seminars	85			210	210		420	
2.3.9. Survey work	15km.	km	42	210	210	210	0	0	630	
SUB-TOTAL				5190	4405	9405	4615	4405	28650	
2.4 INITIATIVES FOR REVENUE GENERATION										
2.4.1 Facilitate Making of improved beehives	80	Beehives	35	560	560	560	560	560	2800	
2.4.2 Facilitate construction of fish ponds and planting	8	Ponds	45	90	90	90	90	0	360	
2.4.3 Conduct 10 consultative meetings to enhance cooperation	10	Meeting	50	100	100	100	100	100	500	
Ecotourism										

2.4.4. Survey and Identify valuable ecotourism sites in and around the reserve	5	Survey	20	100	100	100	100	100	500	
2.4.5. Prepare and disseminate publicity materials for more and each ecotourism sites	25	Leaflets	100	500	500	500	500	500	2500	
2.4.6. To establish more walking trails to various sites	5	Trails	100	100	100	100	100	100	500	
appropriate signboards on walking trails, rest places and other areas needing description.	10	Sign boards	25	50	50	50	50	50	250	
2.4.8. Maintain existing trails, camping sites and resting places	15	Maintanance	100	300	300	300	300	300	1500	
2.4.9. Identify and train local guides and artisans	8	Training	200	1600					1600	
2.4.10. Build tourist banda in camp site and cultural bandas in the near by Villages.	6	Cultural Tourist Bandas	200	12000					12000	
2.4.11. Maintanance of Bandas	6	Tourist & Cultural Bandas	100			600	600	600	1800	
Marketing and promotion of the Identified and existing sites										
2.4.12. TV	30	Programes	100	600	600	600	600	600	3000	
2.4.13. Radio	30	Programes	120	720	720	720	720	720	3600	
2.4.14. Web sites	1		2000	2000					2000	
SUB TOTAL				18720	3120	3720	3720	3630	32910	
GRAND TOTAL				32440	17511	17493	12643	12143	92860	

Appendix 5: FIRE MANAGEMENT PLAN FOR KIMBOZA FOREST RESERVE 2004/05 – 2008/09

Appendix 5: FIRE MANAGEMENT PLAN FOR KIMBOZA FOREST RESERVE 2004/05 – 2008/09								
Prone areas	Source of fire	Season	Freq.	Activity	Unit	Unit cost	Target	Total Cost (THS)
South and of the forest Reserve	Game hunters	July - Dec		Fire line Maintanance	Km	25	11km	275
	Honey collectors			Boundary Maintenance	Km	25	11km	275
	Peasant farmers			Meetings on awareness raising	No.	50	10	500
				Distribution of Publicity materials				
				Stickers	No.	2.5	400	1,000
				Leaflets	No.	2.5	400	1,000
				Regular patrols	No.		15	450
							Tshs.	3,500

Appendix 6. MANAGEMENT MAP FOR KIMBOZA FOREST ESERVE

