

KARURA FOREST

Strategic Management Plan



2016-2020



APPROVAL

This Strategic Management Plan is hereby approved; its implementation will be guided by the signed Forest Joint Management Agreement between KFS and the Friends of Karura Community Forest Association and will be based on approved annual work plans.

The plan may be amended as need arises through mutual agreement of both parties.

Emilio N. Mugo

Director, Kenya Forest Service

Date _____

DEDICATION

This management plan is dedicated to the late Professor Wangari Maathai, Nobel Peace Prize laureate and founder of the Green Belt Movement. Professor Maathai is internationally recognized for her persistent struggle for democracy, human rights and environmental conservation. In the 1990s, Professor Maathai challenged a planned settlement in Karura Forest Reserve, risking jail and bodily harm to preserve the forest for generations to come. If not for Professor Maathai's vindication and bravery, the trees and their ecosystem would not be there.

"I have invested 20 years of my life in this campaign for the environment and I'm still only scratching the surface. I am confident of winning. Nobody will build anything [in the forest] as long as we live. We cannot dignify theft."

Prof. Wangari Maathai, rededicating herself to the fight to save Karura Forest,
Nairobi, 2001

By the Local Plan Revising Committee

FOREWORD

Karura Forest Reserve is situated in the outskirts of Kenya's capital city, Nairobi. This remarkable geographical location gives the forest a unique role in Nairobi and Kenya. The dense population surrounding the forest, including two informal settlements and several more affluent areas, has led to high demands on forest resources. These demands include; fuel wood, water, bee keeping, ecotourism and recreation. The Forests Act 2005 and the draft Forest policy have ushered in a new era in forest management in Kenya, with a dispensation that allows the involvement of forest adjacent communities in their management. This follows a similar shift in legislative change in other East African countries, such as, Tanzania and Uganda. Contrary to past practice where management was centralised, many countries around the world have embraced a participatory approach to the management of forests, and the practice is now widely regarded as the acceptable way of managing natural resources.

A key requirement of the new dispensation is that all forests will henceforth be managed in accordance with a management plan. In the Participatory Forest Management context, stakeholders are expected to prepare a Participatory Forest Management Plan to guide the process of managing the resources of the forest. This is a process that involves a planning team drawn from all key stakeholders. Kenya Forest Service (KFS), Friends of Karura Forest CFA (FKF) and the Nairobi Conservancy Forest Conservation Committee (NCFCC) had collaborated in order to prepare the first management plan for Karura forest as they have to draft this second management plan

It is hoped that by its adoption, sustainable management of the Karura Forest Reserve will continue to be realized. I thank FKF for the tremendous strides that have been made in conserving Karura Forest and giving a sterling example of proper forest conservation and management. I look forward to even more cooperation and growth under the joint management plan with FKF. My vision for the Service under my stewardship is to promote cooperation and collaboration particularly under the devolved County structures to ensure smooth operations in management of forestry resources, while focusing on increasing net forest cover. It is my hope that the FKF experience will be replicated in other forests.

Emilio N. Mugo

Director, Kenya Forest Service

ACKNOWLEDGEMENTS

The development of this Strategic Management Plan has been a combined effort of different stakeholders that included the Kenya Forest Service (KFS), the community and Friends of Karura Forest CFA (FKF).

The Local Plan Revising Committee(LPRC), would like to appreciate the contribution of Mr. John Macharia, the Head of Management plans section, whose office provided the guidelines for revising management plans and also for organizing and improving the initial draft. The LPRC would also wish to acknowledge the efforts of Mrs. Charity Munyasya, Head of Nairobi Conservancy, Mr. Stephen W. Kahunyo, Ecosystem Conservator Nairobi , his Deputy, Mrs. Joyce Nthuku and Mr. John Orwa, the Forest station manager for their invaluable advice throughout the planning process.

Special mention goes to Mr. Dzimuji Kambarage from the Management plans section, Mrs. Cristina Boelcke and Mrs. Chantal Mariotte from the Friends of Karura CFA (FKF), who put up invaluable time and effort to make the production of this plan a success.

While it would be difficult to mention each and every stakeholder who in one way or the other took part in this noble work, all their efforts are highly appreciated and acknowledged.

EXECUTIVE SUMMARY

This is the second strategic management plan for Karura Forest covering an area of 1041.3ha and is comprised of two blocks namely Karura (including Mazingira) and Sigiria. It will be implemented over a period of five years. This is an urban forest and caters for a wide clientele whose demands range from subsistence needs to recreation and aesthetics, for the poor and affluent respectively. Most of the objectives of the first strategic management plan have been successfully achieved.

The vision of the plan is to keep Karura Forest safe and secure, and a world class example of sustainable forest management and conservation.

The goal of the plan is to achieve and sustain a well conserved Karura Forest through stakeholder's participation for provision of recreational and ecosystem goods and services for the city residents and beyond.

The plan is justified in that it will be the framework to moderate the participation of stakeholders, besides ensuring that the implementation leads to sustainable management of the forest. In order to achieve these, the forest has been divided into four zones namely; natural forest, wetlands, plantations and developed areas, each of which is put under a different management regime.

The threats and constraints to the conservation of the forest include:

- d) Due to the prime location of Karura Forest, there has been, and continues to be pressure from developers to claim forest land for building;
- e) The threat posed by greedy potential developers claiming parts of the forest;
- f) The forest is susceptible to forest fires during dry periods; and,
- g) *Lantana camara* and other invasive weeds grow too vigorously, endangering indigenous plants and trees.

The overall objective of the plan is to have Karura Forest managed and sustainably conserved for provision of recreational and ecosystem goods and services to Nairobi residents and beyond. The specific management objectives that will guide the implementation of the plan are:

- 1) To continue to rehabilitate degraded parts of Karura Forest to a healthy and productive closed canopy forest as well as ensuring achievement of sustainable management;
- 2) To provide a world class example of sustainable participatory forest management;
- 3) To keep the forest safe and secure for the enjoyment of all through the continual protection of the forest from any high impact development other than forestry activities and, ensuring ecotourism proposals are in the best interest of the forest;
- 4) To contribute to the improvement of the livelihood of the local communities;
- 5) To promote environmental education, ecotourism and research in forestry;
- 6) To have in place the necessary infrastructure, vehicles machinery and equipment; and,
- 7) To provide for optimum human resources for implementing the management plan.

The plan further provides for monitoring and evaluation of the planned activities, and its revision.

LIST OF ACRONYMS/ABBREVIATIONS

AFEW	African Fund for Endangered Wildlife
Art.	Article
BIEA	British Institute in Eastern Africa
BP	British Petroleum
CBOs	Community Based Organizations
CFA	Community Forest Association
CID	Criminal Investigation Department
CSR	Corporate Social Responsibility
FCC	Forest Conservation Committee
FKF	Friends of Karura
FMA	Forest Management Agreement
ICIPE	International Centre of Insect Physiology and Ecology
ICRAF	International Centre for Research in Agroforestry/World Agroforestry Centre
IUCN	International Union for Conservation of Nature
JMC	Joint Management Committee
KEFRI	Kenya Forestry Research Institute
KFEET	Karura Forest Environmental Educational Trust
KPMG	Klynveld Peat Marwick Goerdeler
L.N.	Legal Notice
M&E	Monitoring and Evaluation
NBEs	Nature Based Enterprises
NMK	National Museums of Kenya
Proc.	Proclamation
SMP	Strategic Management Plan

SUB-COMP	Sub Compartment
UN	United Nations
UNEP	United Nations Environmental Programme
UNON	United Nations Office, Nairobi

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INTRODUCTION

This is the management plan for Karura Forest covering an area of 1,041.3 Ha. The forest comprises two blocks, namely Karura (which includes Mazingira) and Sigiria, and houses the Kenya Forest Service Headquarters. The forest comprises of both natural forest and plantations and is an urban forest in the capital city of Nairobi.

1. TITLE OF THE PLAN

The title of the plan is: Karura Forest Strategic Management Plan (2016-2020).

2. VISION

To make Karura Forest a world class example of a sustainably managed and conserved forest reserve which is secure and safe.

3. GOAL

To achieve and sustain a well conserved Karura Forest through stakeholder's participation for provision of recreational and ecosystem goods and services for the residents of Nairobi and beyond. .

4. PURPOSE

Forests provide essential services to Kenya and the world, including soil and water conservation and the production of wood. The first strategic management plan for Karura was drafted in collaboration with local communities and relevant stakeholders. This added value to forest services enhanced cooperation with the local communities and led to better conservation of this important natural resource. The second Strategic Management Plan 2016-2020 is intended to outline the activities to be carried out in compliance with key regulatory and policy documents, such as the Forests Act, Sessional Paper 9, 2005, the conservation and management of forests bill 2015. In addition, this management plan will be in line with, and contribute to the Kenya Forest Service's three year Strategic Plan (2014-2017).

5. JUSTIFICATION

For the last 5 years, Karura Forest Reserve has been very successfully managed according to its first strategic management plan. Previously the Forest Department, the precursor of KFS, was responsible for all management actions and was not obliged to consult with other stakeholders. This was because there was no legal provision to allow for the active involvement and participation of stakeholders in forest management. It is during this period (in the 90s) that attempts were made to excise vast areas of the forest due to lack of stakeholder participation. The first strategic management plan has indicated that the management of the forest should be driven towards achievement of a defined long-term vision for the forest, and the management decisions shouldn't be made based on current

considerations, or influenced by factors other than the long term sustainability of the resource.

According to the Forests Act section 35, all forests must be managed in accordance with a management plan and Karura Forest Reserve is a prime example of a well-designed and successfully implemented strategic management plan.

This SMP identifies all the stakeholders, their roles and responsibilities. To date, a wide number of stakeholders have worked with KFS and FKF in the forest. They have committed themselves to the goals and vision outlined in this second management plan. By creating a management plan that is agreed upon and developed in an on-going process, an efficient and cohesive management of the forest can be achieved. This approach also ensures the sustainability of the forest, as activities are geared towards the achievement of defined objectives in the short-term and the planned future.

6. IMPLEMENTATION OF THE PLAN

The SMP shall be implemented by the KFS and FKF. All activities in the forest must be approved by the KFS/FKF Joint Management Committee.

7. PLAN PERIOD

This plan covers a five year period starting from 2016-2020.

8. AMENDMENTS AND REVISION OF THE PLAN

A consultation process was undertaken in the development and revision of the second management plan, with key stakeholders contributing to its final form. Any development or project outside this plan must be approved by the FCC and the KFS board.

9. FUNDING FOR THE PLAN

The funding of the SMP will come from accrued revenue, KFS and donor support.

1. DESCRIPTION OF THE FOREST

1. LEGAL STATUS

Karura Forest Reserve was originally gazetted in 1932 through Proclamation No. 44. The Forest became a Central Government Forest Reserve in 1964, through Legal Notice 174. Karura Forest Reserve is jointly managed by the Kenya Forest Service and FKFCFA under the Forests Act of 2005 through the joint management committee.

1. Excisions and Additions

Since its establishment in 1932, the forest has been affected by 5 excisions totaling approx. 114 Ha.

Table 1: History of alteration of boundaries of Karura Forest Reserve

Year	Proclamation / Legal Notice	Action	Area affected	Total area
1932	Proc. 44/1932	Establishment of Karura Forest Reserve	1062.7 Ha	1062.7 Ha
1951	Proc. 15/1951	Excision	- 1.6 Ha	1061.1 Ha
1954	Proc. 30/1954	Addition	+1.6 Ha	1062.7 Ha
1956	L.N. 289/1956	Excision	-18.6 Ha	1044.1 Ha
1964	L.N. 174/1964	Declaration as central forest		1044.1 Ha
1986	L.N. 310/5.12.1986	Excision	- 2.78 Ha	1041.3 Ha
1993	L.N. 301/24.9.1993	Excision.>Exchange Addition>	- 5.86 Ha + 5.63 Ha	1041.3 Ha

(Source - As per KFS survey records)

Over the years, gazetted forestland in Karura has been allocated to national and international public institutions. They include:

- Criminal Investigation Department (CID) headquarters (9.0 Ha);
- National Security and Intelligence Service (NSIS) headquarters (5.8 Ha); and,
- World Agroforestry Centre (ICRAF) headquarters (3.0 Ha).

Forestland has also been leased to corporate entities:

- Muthaiga Golf Club (21.8 Ha); and,
- BP Shell Sports Club (6.0 Ha).

The Karura Forest is the host to the headquarters of the Kenya Forest Service and KFS residential area.

2. GEOGRAPHIC LOCATION

Karura Forest Reserve is situated in the northern part of Nairobi Municipality. It forms part of the Nairobi river basin.

The Forest comprises three sections separated by the Limuru Road and the Kiambu Road. The southern boundary of the forest lies mainly along the Getathuru River (although the western section of the three parts includes an area below this river).

The Western Section (known as Sigiria) is delineated by a cut and beacons line along its boundary with the residential area of New Muthaiga to the West, the residential areas of Gigiri/Rosslyn to the North (along the Thigiru River - a tributary of the Getathuru River), Limuru Road to the East and the Getathuru River to the South.

The Middle Section is bounded by a cut and beacons line along Limuru Road, the residential area of Muthaiga North and Runda to the west, RuiRuaka River, Huruma village, a road, and farmland to the north, Kiambu Road to the east and Getathuru River¹ to the south.

The Eastern Section(Mazingira) is bounded by the Kiambu Road to its west, Thika Road to the east, and Muthaiga Golf Club to the south (to which it yields an extension).

1. Forest management units

The forest is divided into two blocks jointly managed by KFS and FKF via the forest management committee. There used to be three outposts. Only one remains at Limuru gate while two were abandoned, namely the one in Sigiria due to old age and the other next to BP Shell Club due to insecurity.

Table 2: Distribution of the area of Karura Forest

Block	Area (Ha)	Remarks
Karura & Eastern Salient (Mazingira)	797.3Ha	This is the largest block and houses the KFS Headquarters
Sigiria	244Ha	This block has a large marshland. It is well protected by the adjacent up-market residential areas.
Total	1,041.3	



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The area of the forest is further subdivided as shown in Table 3 below. The "Other" category also covers all the area occupied by buildings, tree nurseries and other facilities.

Forest Block	Indigenous Forest (*)	Exotic Plantation	Degraded Indigenous (unstocked)	Planted Abandoned	Planted Managed	Grassland Wetland	Other	Total
Karura	212	266	35	45.8	63.5	11.5	59.2 (**)	693.0
Masingira	25	0	0	0	0	0	79.3 (***)	104.3
Sigiria	20	195	8.5	0	8.7	11.8	0	244.0
Total	257	461	43.5	45.8	72.2	23.3	138.5	1,041.3
Percent	25%	44%	4%	4%	7%	2%	13%	100%

Table 3: Karura Forest Areas based on the KFS-FKF Rapid Proportional Survey, 2010, and detailed map feature updates from GoogleEarth 2015. Note that the main Karura block and the Masingira (Eastern Salient) block sum to 797.3 ha in total.

(*) These areas include patches of *Lantana camara*.

(**) Includes the areas occupied by buildings, tree nurseries, the 7.0 ha Ranger Village as well as 4.7 ha of indigenous Muhugu with the KFS Headquarters enclave.

(***) Includes Muthaiga Golf Club, CID headquarters, NSIS, Mada Hotel, etc.

3. BIOPHYSICAL DESCRIPTION

1. Topography

The topography of Karura is gently rolling, occasioned by shallow valleys. Drainage is generally in the southerly and eastern direction. Susceptible depressions in the Western Section of Karura (previously called Sigiria forest) hold small local swamps which are threatened by eucalyptus trees.

2. Climate

The climate of Karura Forest is characterised by two wet seasons: April-June and October-December. July to August is a cold, cloudy but dry period. From August to October is a sunny and dry period. January, February and early March are hot, dry months.

The average annual rainfall at Karura Forest Station was recorded over the past 10 years as 928.3 mm with a maximum of 1,239.9 mm and a minimum of 345.0 mm. In November 2015, Karura experienced the highest November monthly rainfall recorded since 1945 at 590 mm.

Temperatures remain constant throughout the year and vary roughly with the times of cloud and sunshine between 8 and 28C.

3. Geology

The Karura Forest lies over tertiary volcanic rocks. Volcanic tuffs with intercalated flows of basaltic lava are the common forms. Both types are occasionally exposed in the deeper river valleys, and the tuffs yield the common grey building stone of the Nairobi district. Occasionally

"Chimneys" of larva are found exposed on the tops and sides of ridges as in the both the Western section and Middle section of Karura.

4. Soils

The area has suffered very little tectonic or other disturbances since tertiary times, and thus the parent rocks have been weathered to great depths and giving very even soil profiles. Under natural forest the resulting soil is very deep; reddish brown clayey loam with slow but free profile drainage. Such soils become very sticky when wet but dry very quickly and tend to shrink and crack. The upper few inches of soil are usually stained dark brown with incorporated humus, but no deep litter layer develops.

Under grassland in freely drained areas, the soil is very similar to that under forest stands, but in the low lying areas a different soil is found. These low lying areas are intermittently water logged, and the water table fluctuates greatly, and a small amount of fine soil material is usually carried in from neighbouring higher ground. Under such conditions, the soil is usually very heavy, dark grey clay, often stained black with un-decomposed humus "Black Cotton Soils". At varying depths below this clay layer, from 2" to 3ft. below the surface, red brown laterite is found. It is a recementation product, rich in iron compounds, associated with swampy areas having a shifting water table.

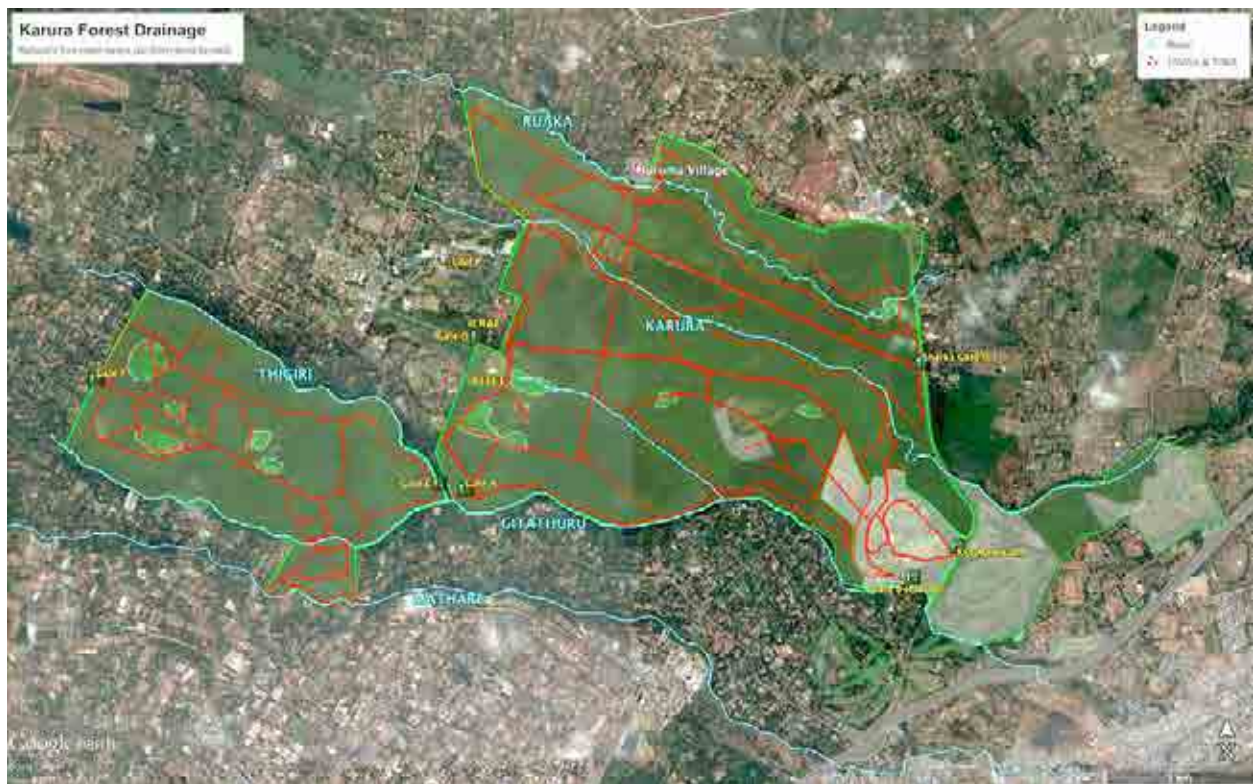
Laterite, locally known as 'murram' is a useful gravel for road maintenance. Another form of 'murram' is partially decomposed parent rock, and may be found at the foot of nearly all soil profiles where the rock is sufficiently near the surface for it to be excavated. This form of 'murram' is also popular for road surfacing, but is less satisfactory than laterite.

Generally speaking, Karura Forest soils are eminently suited to tree growth, with assisted drainage in the case of swampy sites.

5. Hydrology and Drainage

Five tributaries of Nairobi River pass through Karura Forest Reserve. These are:

1. The Ruaka River which separates Karura River and the Runda Residential area;
2. The Karura River which traverses through the forest;
3. The Gitathuru River which borders the Forest along its Southern edge with Muthaiga Residential area;
1. The Thigiri River (a tributary of Gitathuru River) which traversed through the western section of Karura Forest; and
2. The Mathare river which is part of the Southern boundary of the Sigiria block.



1. Flora

Forest plantations cover 461Ha and are comprised species such as *Araucaria cunninghamii*, *Eucalyptus saligna*, *E. globula*, *Brachylaena huillensis*, *Grevillea robusta*, *Cupressus torulosa* and *Cupressus lusitanica*. The area under plantations was more extensive in the past but decreased when a big portion of it was targeted for excision in 2004 leading to premature harvesting. As consequence this area was invaded by *Lantana camara* and has been the main focus of rehabilitation effort in the forest mainly with indigenous species.

Almost all the plantations in the forest have passed their economic rotation age. The *Eucalyptus* sp. range from 38-93 years, *Araucaria cunninghamii* (44-56 years), *Cupressus torulosa* (34-56 years). Most of these plantations will therefore start succumbing to age-related dying in the near future.

Indigenous trees cover 257Ha and are comprised of species such as *Olea europaea* var. *africana*, *Croton megalocarpus*, *Warburgia ugandensis* (Muthiga), *Brachyleanahuillensis* (Muhugu), *Uvaridendronanisatum*, *Markhamialutea*, *Tecleanobilis*, *Juniperus procera* (Cedar), *Craebeanbrownii*, *Newtoniabuchananii*, *Salvadorapersica*, *Ficusthonningii*, *Trichiliaemetica*, *Calondendrumcapense* and *Dombeyagoetzenii*.

Additionally a number of shrubs are also found which have wide local medicinal use and include *Strychnoshenningsii* (Muteta), *Erythrococcabongensis* (Muharangware), *Vangueria madagascariensis* (Mubiro), *Rhamnus prinoides* (Mukarakinga), *Caesalpinia volkensii* (Mubuthi), *Solanum* spp. (Mutongu), *Elaeodendron buchananii* (Mutanga) and *Rhus natalensis* (Muthigio).

The riparian belts along rivers Gitathuro and Ruaka are partly covered by *Arundinaria alpina*, the Kenya native bamboo species. The exotic giant bamboo *Dendrocalamus giganteus* is mainly found growing within the area of the tree nursery along Karura River where it may have been introduced in the past. Additionally there are three wetlands which occupy 10.5 Ha. These serve as important habitats for birds and therefore are ideal areas for bird watchers.

Degraded indigenous: there are 43.5 Ha of degraded indigenous, not stocked.

72.2 Ha have been replanted with indigenous and are managed and 45.8 Ha have been planted but have not been managed.

2. Fauna

The motion activated karuracams have shown that the forest hosts around 20 different varieties of mammals. These include Harvey's duikers, suni, bush bucks, bushpigs, genets,

civets, bushbabies, porcupines, sykes monkeys, squirrels, hares, epauletted-bat, giant pouched rats, white tailed mongoose, clawless otters, jackals. *Colobus guereza kikuyense* (Colobus monkey) have been translocated to the forest from rapidly disappearing habitats.

Reptiles include cobras, pythons, green snakes and monitor lizards among others.

3. Avifauna

Some 113 bird species have been observed in Karura Forest. They include African crowned eagle, Ayres Hawk-eagle, crows, owls, sparrows, doves, weavers, Hartlaub's Turaco and Narina Trogon.

4. Forest attractions

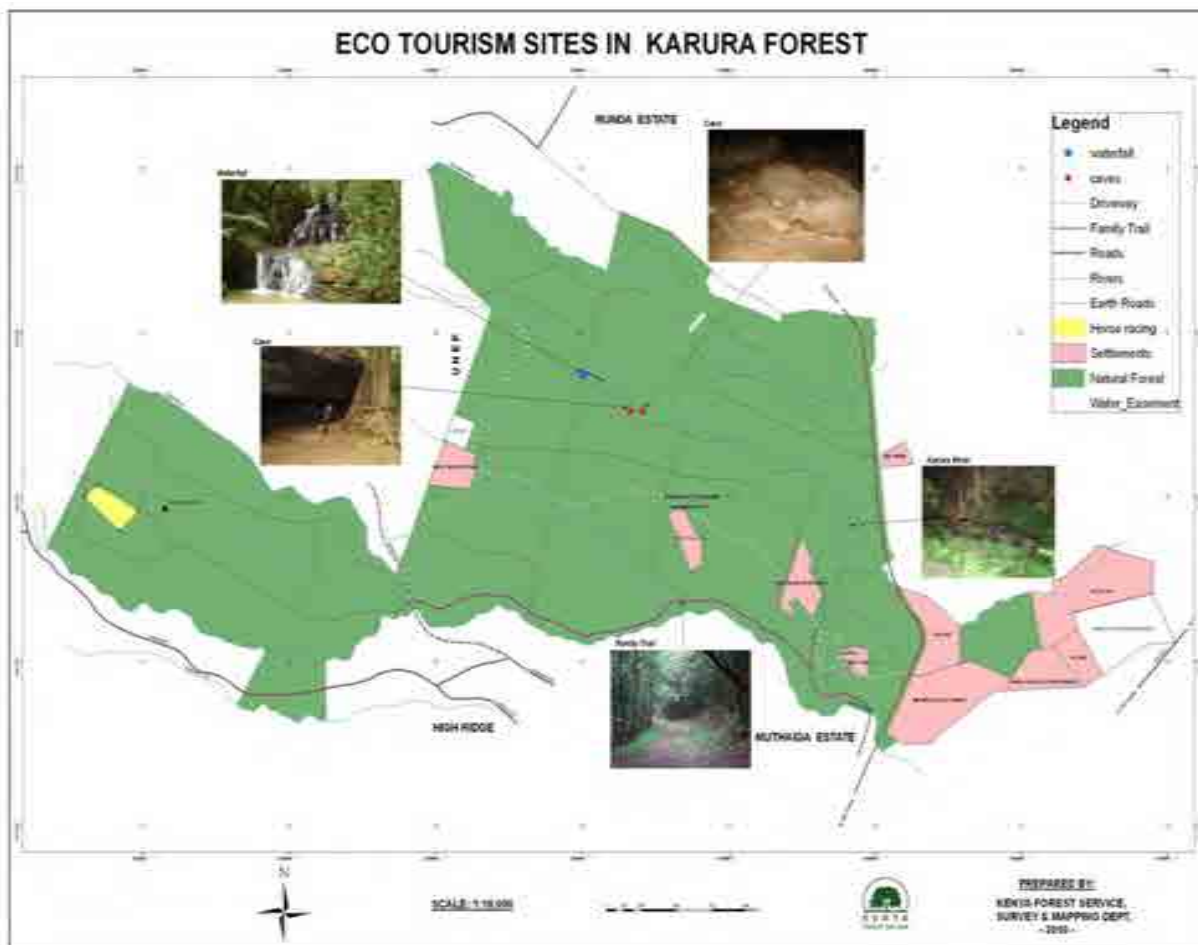


Figure 4: Some attractions in Karura Forest

The forest features a 50 foot waterfall, caves that are considered sacred by many and have historic value because of their use during the days of the Mau Mau. An archaeological survey of the caves carried out by NMK has revealed stone tools and other artefacts dated 4 500 years old and others estimated at between 50 and 300 000 years old, the middle stone age period. There are also marshlands which attract birdlife, a wide diversity of indigenous trees, Lilly Lake, Amani garden, old notes incinerator, beautiful nature trails and Wangari Maathai corner. Karura Forest is also the place where Professor Wangari Maathai (Nobel Peace Prize winner) was attacked for standing up to the developers hoping to grab the area of land to the north of the Karura river.

2. HISTORY OF KARURA FOREST

1. Pre-gazettement

During the pre- colonial period, Karura Forest is believed to be have claimed by the various Gikuyu families. The forest was surrendered to the British Government at the time of colonization allegedly on condition that it remained forest land.

Post-gazettement

Karura Forest was gazetted in 1932 and was one of the earliest to be recognised as such.

The first experimental plantations in Karura were made in 1906. At that time various species of Eucalyptus and some Cypress were tried. In the initial stages, the Forest was comprised principally of a natural forest of *Brachylaenahuillensis* (Muhugu), *Croton megalocarpus* and *Warburgiaugandensis* (Muthiga). Up to 1935 it was fashionable to plant a certain proportion of indigenous species, either pure or in mixture with Eucalyptus. However, when Eucalyptus was found to grow at extremely fast rates, the natural forest was reduced over the years and re-planted with this species (Eucalyptus provided fuel wood at a rotation age of twelve (12) years whilst it was estimated that the natural forest would require seventy years to reach an equivalent girth and volume). This wood was used to provide fuel wood for the railways, poles to carry electrical wires, and for the construction industry.

With time and on the basis of the ever pressing demands for fuel from the adjacent and fast growing metropolis of Nairobi, Eucalyptus became the principle species planted almost to the exclusion of all others. Another species *Araucaria cunninghamii* was established, made good progress and proved a possible alternative to Eucalyptus for planting in Karura, but its fuel-wood rotation of fifty (50) years seemed too long in comparison.

Demand for fuel and construction material in Nairobi from 1950 - 1970 increased with a growing African and Asian population despite the existence of other forms of fuel such as electricity and paraffin.

The plantations in Karura were established through the 'shamba' system. Kenya's 'shamba' or Taungya system has been generally defined as a form of agroforestry, where farmers are encouraged to cultivate primary crops (maize, cabbages, potatoes, beans and carrots) on previously clear cut public forest land on the condition that they replant trees. Since the mid-20th century, Kenya adopted this system to establish tree plantations by means of cheap or free labour, in order to meet the demand for timber.

3. SOCIO-ECONOMIC STATUS AND ASSESSMENT OF THE FOREST COMMUNITY

1. Forest adjacent community

Karura Forest is surrounded by communities of very different extreme socio-economic status comprising of both affluent and less affluent communities.

Affluent communities include:

- Muthaiga residential area
- New Muthaiga residential area;
- Gigiri residential area;
- Ridgeways residential area;
- Runda residential area;
- Whispers; and
- Peponi.

All the above residential areas have Residents Associations which are represented on the FKF board.

Less affluent communities include:

- Deep Sea informal settlement in the Westlands area has benefited from employment from the forest.

- Huruma and Githogoro informal settlement, to the North of the forest. This informal settlement has several registered groups which benefit from the Karura Forest. These community is involved in clearing invasives and planting trees. Members of this settlement have also been allowed to keep bee hives in the forest.

4. STAKEHOLDER ANALYSIS

There are various stakeholders with interest within the forest. Their impact on forest management and conservation has been significant thanks to the efforts made to involve them in participatory forest management activities.

1. Range Of Stakeholders

Karura Forest Reserve stakeholders are numerous and broad ranged. They include:

- a) Kenya Forest Service;
- b) Private and business Sector
- d) Communities and residents Associations;
- e) Donors - donations have been received from organizations and individuals with an independent interest in preserving the forest;
- f) Non-governmental organizations.

The integration of stakeholders promotes:

- A sense of ownership of the forest.
- Sustainable and long term management of the forest.
- Strengthening social security protect traditional user rights and access to forest resources.
- Communal risk adjustment strategies.
- Complementary rather than competitive activities in forest management.

2. Roles and Responsibilities of Stakeholders

Table 4: Stakeholders' roles and responsibilities

Stakeholders		
1. Government Departments	Roles and responsibilities	Level of influence
Kenya Forest Service	1. Forest administration, tree	High

	planting, protection of the forest, revenue collection, creation of employment 2. Tree planting, controls felling (harvesting), enforces forest by-laws 3. Revenue collection from sale of forest produce 4. Licensing and regulation of exploitation of forest products 5. Clear felled areas re- forestation and rehabilitation of degraded areas 6. Maintenance of plantation forests 7. Collaboration with stake holders on ecosystem management 8. Forest fires prevention and suppression	
National Land Commission	1. Revocation of illegal titles 2. Issuance of titles	High

Stakeholders		
Government Departments	Roles and responsibilities	Level of influence
National Government Administration Office	1. Enforce forest laws 2. Help community in advice and security 3. Help in education to the community in forest conservation 4. Provision of enabling political goodwill	High

Water Resources Management Authority (WRMA)	<ol style="list-style-type: none"> 1. Implementation of the Water Act 2. protect catchment and riverine areas 	Low
	<ol style="list-style-type: none"> 3. Development, control, conserve and regulation of water resources 4. Assessment and Monitoring of water resources (quality and levels) 5. Conservation and protection of water catchment through collaboration with other stakeholders 	
Government Departments		
Kenya Forestry Research Institute (KEFRI)	<ol style="list-style-type: none"> 1. Undertake research issues on trees, forest diseases, tree breeding, species trials and their documentation and dissemination 2. Technical orders development in conjunction with KFS 3. Supplying certified seeds to KFS, stakeholders and community members 	High
National Museums of Kenya (NMK)	<ol style="list-style-type: none"> 1. Karura Forest conservation, education programmes preparation and presentation through films, video shows and documentaries 2. Provide reference material on the Karura forest ecosystem 3. Conduct research on the past use of cultural sites within Karura Forest 4. Plant identification through preparation of herbariums 	High

National Environment Management Authority	1. Responsible for the management of the environment, and environmental policy	High
Kenya Wildlife Service	2. Management of wildlife	High
Institute of Primate Research	3. Management of primates	High
Kenya Tourism Board	4. Promotion of tourism in	High
	Kenya	
5. International Organizations		
UNON, UNEP, UNDP, World Agroforestry Centre ,ICIPE	1. Funding and capacity building	High

Stakeholders		
3.Civil Society (NGOs and CBOs)	Roles and responsibilities	Level of influence
AFEW, Oshwal Community, Sukuma Twende, Drews Foundation, BIEA, Friends of City Park, Nature Kenya, Green Belt Movement, residents association for Muthaiga, Gigiri, New Muthaiga, Peponi, Runda, Whispers, Huruma Vision, Huruma New Dawn, Huruma Mushroom, Karuma, Deep Sea community	2. Afforestation and rehabilitation	High
4.Friends of Karura (CFA)		

	3. Partnership with KFS in co-managing the forest through the joint management agreement 4. Stakeholders in Forest management (e.g. forest regeneration, forest development and maintenance, infrastructure building and maintenance, education, research, community patrols, monitoring) 5. Establish income generating activities (IGA)/projects e.g. bee keeping to reduce over dependence on the forest resources	High
	6. Liaise with key conservation agencies through memoranda of understanding (MoU) 7. Ecotourism ventures establishment 8. Indigenous conservation technologies/ knowledge dissemination to the present generation 9. Cooperation in fire prevention and suppression activities 10. Undertake conservation-related activities	
5 Nairobi County Government	1. Provision of enabling goodwill 2. Provision of licenses, wayleaves, water etc	High
6.Private sector		
G4S, Bins, Davis & Shirliff, EABL, Yellowpages, Pelican, H&Young, APA Insurance, KPMG, Oscho Chemicals, Steel Structures, Vivo Energy, Alliance media, Ovidian and I&M Bank among many others	1. Funding afforestation rehabilitation and other activities	High

During the five years of this new management plan, KFS and FKF aim to encourage current stakeholders to be involved further in the execution of the management plan and to seek additional stakeholders.

To date Karura Forest Reserve is co-managed by KFS and FKF through the joint forest management committee. However, there are opportunities for partnerships to be established. A 'Friends of Karura Community Forest Association' (FKF) has been registered according to the Forests Act 2005. FKF provides the platform that facilitates the collaboration of key stakeholders. It has a joint management agreement with the KFS to sustainably manage the Karura Forest for the benefit of local and wider communities and ensure Karura Forest is protected for future generations. Currently, it includes representation from all surrounding communities (both affluent and impoverished).

1. THREATS FACING THE FOREST

No major threats persist however there are still some developers who continue to claim ownership of parts of Karura.

Challenges are still there which include:

- The forest is susceptible to forest fires during dry periods; and,
 - *Lantana camara* and other invasive weeds grow too vigorously, endangering indigenous plants and trees
2. Pests and diseases

3. PLANNING CONSIDERATIONS

1. BACKGROUND

Forest conservation in Kenya has faced many challenges over the last three decades that have been linked to weakness in policy and market failures. However the new Forests conservation and management bill 2015 focuses on forest development, conservation, participatory management in Kenya and responsiveness to stakeholder needs and priorities, thus fostering a positive attitude towards forest conservation. The new legislation promotes environmental sustainability through public participation, cooperation and a more sustainable forest management approach.

The broad objective of forest legislation (Forests Act 2005, Forest Policy 2007 and Forest Conservation and Management bill 2015) is to provide continuous guidance to all Kenyans on the sustainable management of forests. This involves taking cognizance of other existing policies relating to land and land use, tenure, agriculture, energy, environment, mining, wildlife and water. The need for greater cooperation and linkage among resource owners, users, and resource planners, is recognized and recent policy incorporates forest-related values of the people of Kenya, as well as international concerns. Indigenous forest management, farm forestry, industrial forest development, dry land forestry, forest health and protection, private sector involvement and PFM are all seen as key components of forest management. Policy recognizes that there are benefits arising from the involvement of local communities and other stakeholders in forest management. Poverty reduction is identified as a goal with the forestry sector in the mainstream of economic recovery strategies. Most importantly, policy emphasizes the importance of forests for water and biodiversity conservation, and addresses cost and benefit sharing.

2. RELEVANT POLICIES AND LEGAL FRAMEWORK

1. The Constitution of Kenya 2010

The constitution of Kenya (2010) provides ground for formulation of adaptation and mitigation legislation, policies and strategies by guaranteeing the right to a clean and healthy environment under the bill of rights.

2. Forest Policy and Forests Act 2005

The Forests Act 2005 identifies critical areas to be addressed if the forest sector is to be revamped and provides the appropriate legal and institutional framework for sustainable forest management in Kenya. The goal of the policy is to enhance the contribution of the forest sector in provision of economic, social and environmental goods and services while some of the specific objectives relevant to Karura Forest are:

- To contribute to poverty reduction, employment creation and improvement of livelihoods through sustainable use, conservation and management of forests and trees;
- To contribute to sustainable land use through soil, water and biodiversity conservation, and tree planting through the sustainable management of forests and trees;
- To promote the participation of the private sector, communities and other stakeholders in forest Management to conserve water catchment areas, create employment, reduce poverty and ensure the sustainability of the forest sector; and,

- To promote forest research, training and education to ensure a vibrant forest sector.

In respect to these objectives, some of the degraded areas of the forest have been rehabilitated and others will follow; partnership for conservation and development of the forest will continue to be promoted while research training and education will continue to be supported.

In response to Section 13 of the Act - a Forest Conservation Committee has been established for the Nairobi Conservancy, the functions of which are:

- To gather the ideas and opinions of the local community within and surrounding forest conservation areas and report these to the KFS. With specific reference to conservation and utilisation of the forest;
- To monitor the implementation of the forest act and other forest regulations within the stated area;
- To review and recommend to the KFS Management Board applications for licenses and renewals thereof;
- To regulate the management of Karura Forest Reserve, including the setting of charges and retention of charges and income;
- In consultation with the KFS Management Board, to assist local communities to benefit from income derived from flora and fauna traditionally used or newly discovered by the communities; and,
- To perform such other functions as the KFS Management Board may require or delegate to it.

In response to Section 41 of the Act - Karura Forest shall be managed on a sustainable basis for the purposes of:

- Conservation of water, soil and biodiversity;
- River line protection;
- Cultural use and heritage;
- Low impact recreation and eco-tourism;
- Sustainable production of wood and non-wood products;
- Carbon sequestration and other environmental services;

- Education and research purposes; and,
- Habitat for wildlife.

The above can be achieved by:

- Promoting involvement of the private sector, communities and other stakeholders in forest management and conservation to create employment, reduce poverty and ensure the sustainability of the forest;
- Contributing to sustainable management of the forest through soil water and biodiversity conservation and tree planting; and,
- Promoting forest education and research to enable forest stakeholders to be made aware of benefits and ecosystem services offered by the forest.

In response to the Forests Act 2005, section 45, a Community Forest Association (CFA) has been established, namely Friends of Karura Forest Community Forest Association. The functions of the CFA are to:

- Protect, conserve and co-manage such forest or part thereof pursuant to the approved joint management agreement entered into under this Act and the provisions of the strategic management plan for the forest;
- Formulate and implement forest programs consistent with the traditional forest user rights of the community concerned, in accordance with sustainable use criteria;
- Protect sacred groves and protected trees;
- Assist the Service in enforcing the provisions of this Act and any rules and regulations made pursuant thereto, in particular in relation to illegal harvesting of forest produce;
- With the approval of KFS Management Board, enter into partnerships with other persons for the purposes of ensuring the efficient and sustainable conservation and management of forest;
- Keep KFS informed of any developments, changes and occurrences within the forest which are critical for the conservation of biodiversity;
- Help in fire fighting; and,
- Do any other that is necessary for the efficient conservation and management of the forest.

In response to the Forest Policy 2005, A Karura Forest Joint Management Committee has been established to support the sustainable management of the forest.

3. The Forest Conservation and Management bill 2015

This bill once passed into law will replace the Forests Act 2005, and usher in a new era in forest management as it will incorporate the issue of devolution of various forestry functions to the County Governments as per the constitutional requirements. The Forests Act 2005 will be repealed once the Forest Conservation and Management bill 2015 is signed into law.

4. The Natural Resources Benefits Sharing Bill 2014

This bill once passed into law will provide the legal guidelines on how revenues accrued from the exploitation of any natural resource (forests included), would be shared among the National Government, the County Governments and the local community surrounding these resources.

5. The Wildlife (Conservation and Management) Act 2013 and Policy

Kenya's wildlife policy is embodied in the Sessional Paper No. 3 of 1975 entitled "A Statement on Future Wildlife Management Policy in Kenya". This policy was a radical departure from the previous approach to wildlife conservation, which emphasized protected areas. The key elements of this Policy may be summarized as follows:

- It identified the primary goal of wildlife conservation as the optimization of returns from wildlife defined broadly to include aesthetic, cultural, scientific and economic gains, taking into account the income from other land uses;
- It pointed out the need to identify and implement compatible land uses and fair distribution of benefits derived from wildlife including from both non-consumptive and consumptive uses of wildlife;
- It underscored the need for an integrated approach to wildlife conservation and management in order to minimize human-wildlife conflicts; and,
- The Government assumed the responsibility of paying compensation for damages caused by wildlife.

The Wildlife (Conservation and Management) Act of 1976 subsequently established the legal provisions for the implementation of the Policy. This Act amalgamated the then Game Department and the Kenya National Parks to form a single agency, the Wildlife Conservation and Management Department (WCMD), to manage wildlife. Subsequently, through an

Amendment to the Act in 1989, the Kenya Wildlife Service (KWS) was established to replace WCMD. A new Wildlife (Conservation and Management) Act 2013 was subsequently enacted and became operational, and thus the wildlife (conservation and management) Act 1976 and the 1989 amendment to the act were therefore repealed.

There are no large wildlife species in the Karura Forest Reserve and therefore there are no human-wildlife conflicts that are associated with the presence of large mammals such as elephants etc. There is, nevertheless, a large wildlife presence in Karura Forest Reserve, including an increasing monkey population.

The variation of the population is fairly well known thanks to the use of 3 motion activated Karura_cams but the exact size is yet to be established. There is need therefore to undertake a study detailing the wildlife in the forest.

6. Environmental Management and Coordination Act (1999)

EMCA (1999) is an act of Parliament to provide for the establishment of an appropriate legal and institutional framework for the management of the environment, and for matters connected to it. The environment constitutes the foundation of national economic, social, cultural and spiritual advancement. The requirement for environmental impact assessment and audits will be observed as necessary in conformity with the requirements of the Act.

7. Water Policy and Water Act (2002)

The Water Act (2002) provides for the management, conservation, use and control of water resources and for the acquisition and regulation of rights to use water; provides for the regulation and management of water supply and sewerage services. The Act mandates the minister responsible for water resources to ensure that certain water catchment areas are protected. The Minister is also mandated to declare such areas as water catchment areas. A number of rivers dissect Karura Forest whose flow will be enhanced by its protection and rehabilitation.

8. Water Bill (2014)

This Bill once signed into law will replace the Water Act (2002). It addresses the regulation, management and development of water resources.

9. River Authorities Act (Cap. 443)

This Act empowers all existing river authorities to, inter alia, construct any works necessary for the protection and utilization of water and soils on areas along river- banks. Fallow land acts as

a reservoir of terrestrial carbon, while trees and vegetation growing along riverbanks sequester carbon dioxide. Efforts will be made to protect the riparian belt by planting of appropriate species like bamboo.

10. The Agriculture, Fisheries and Food Authority (AFFA) Act 2013

This Act consolidates the laws on the regulation and promotion of agriculture and makes provision for the respective roles of the national and county governments in agriculture and related matters.

11. Land Registration Act, 2012 (Cap. 300)

This is an Act of parliament that revises, consolidates, and rationalizes the registration of titles to land, gives effect to the principles and objects of devolved government in land registration, and for connected purposes.

12. Science, Technology and Innovation Act 2012

This Act facilitates the promotion, coordination and regulation of the progress of science, technology and innovation in the country. It aims to assign priority to the development of science and technology and entrench technology and innovation into the national production system.

13. The Energy Act 2006

The Act mandates the Government to promote the development and use of renewable energy including biodiesel, bioethanol, biomass, solar, wind, hydro-power, biogas, charcoal, fuel wood, tidal, wave, municipal waste among others. It established the Energy Regulatory Commission to be in charge of the production, distribution, supply and use of renewable energy.

14. The Energy Bill 2015

This Bill will replace the Energy Act 2006 when signed into law. It aims to consolidate the laws relating to energy, to provide for National and County Government functions in relation to energy, to provide for the establishment, powers and functions of the energy sector entities. It aims at the promotion of renewable energy, exploration, recovery and commercial utilization of coal and geothermal energy and the production, supply and use of all energy forms.

15. Occupational Safety and Health Act 2007 No. 15 of 2007 (OSHA), revised in 2010

This Act provides for the safety, health and welfare of workers and all persons lawfully present at the workplace. It addresses the obligations of both the employer and the employee in terms of ensuring the workplace is free from any potential risks and hazards that would be detrimental to the well-being of all members of staff and visitors at any given time and at any given place within the confines of the workplace.

This Act basically addresses employees' and visitors' safety whilst at Karura Forest.

16. The Employment Act 2007 and the Regulation of Wages and conditions of Employment Act 2007

These Acts make rules governing wages, leave and rest, health and safety, the special position of children and women and the termination of employment. The latter Act, in addition, sets up a process through which wages and conditions of employment can be regulated by the Minister.

This Act addresses employment of scouts and conservation clerks by the FKF.

However, the Employment Act does not make any provisions for wages in general. The minimum wage is dealt with by the Regulations of Wages and Conditions of Employment Act.

17. The Work Injury Benefits Act 2015

This Act provides for ways through which an employee who is injured when on duty may be compensated by the employer.

3. STRATEGIES

1. Sustainable Development Goals

These are meant to replace the Millennium Development Goals which are due to expire at the end of 2015. Formal debate on these goals began in Rio de Janeiro during the 2012 United Nations conference where development goals 2015-2030 were discussed. The conference outcome called for the goals to be integrated into the UN's post-2015 agenda, and there was consensus on 17 proposed goals. The ones relevant to Karura Forest management include,

- End poverty in all its forms everywhere.
- End hunger, achieve food security and improved nutrition and promote sustainable agriculture.
- Ensure healthy lives and promote well-being for all at all ages.
- Achieve gender equality and empower all women and girls.

- Ensure availability and sustainable management of water and sanitation for all.
- Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all.
- Make cities and human settlements inclusive, safe, resilient and sustainable.
- Ensure sustainable consumption and production patterns.
- Take urgent action to combat climate change and its impacts.
- Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss.
- Strengthen the means of implementation and revitalize the global partnership for sustainable development.

2. Vision 2030

This is the country's development programme covering the period 2008 to 2030. It was launched on 10 June 2008 by former President Mwai Kibaki. Its objective is to help transform Kenya into a "newly industrializing, middle-income country providing a high quality of life to all its citizens by 2030 in a clean and secure environment, developed through "an all-inclusive and participatory stakeholder consultative process, involving Kenyans from all parts of the country." The Vision is based on three "pillars": Economic; Social; and Political.

The Kenya Vision 2030 is to be implemented in successive five-year medium-term plans, with the first such plan covering the period 2008-2012 (with the next covering the period 2012-2017, and so until 2030). Under the Vision, Kenya expected to meet its Sustainable Development Goals by the deadline in 2030.

Through this strategy, Kenya aims to build a just and cohesive society with social equity in a clean and secure environment. It, therefore, presents comprehensive social interventions aimed at improving the quality of life of all Kenyans residents.

3. Multi/bilateral and private sector funding

The joint forest management committee and FKF will seek funding from the multi/bilateral partners and the private sector for:

- An environmental education centre and forest station office block.
- Reforestation.

- Infrastructure as needed.

4. INTERNATIONAL AND REGIONAL AGREEMENTS AND TREATIES

1. Convention on biological diversity

This Convention aims to conserve biological diversity, the sustainable use of its components, and the fair and equitable sharing of the benefits arising out of the utilization of genetic resource. Kenya ratified the convention on 26 July 1994.

Kenya has undertaken activities that are consistent with the goals of the Convention, and has developed a national strategy for the conservation of biological diversity and established a system for protecting endangered species both in the protected and dispersal areas.

The management plan will contribute to the implementation of a number of provisions of the Convention, in particular with regard to:

- Identification and monitoring (Art. 7);
- In-situ conservation (Art. 8);
- Sustainable use of components of biological diversity (Art. 10); and,
- Public education and awareness (Art. 13).

The management plan will also support the objective of a Collaborative Partnership for Forests, a voluntary arrangement among 14 international organizations and secretariats, including the Secretariat of the Convention on Biological Diversity. This arrangement aims to promote the management, conservation and sustainable development of all types of forest, and strengthen long-term political commitment to that end.

2. Forest Principles

The Non-legally Binding Authoritative Statement of Principles for a Global Consensus on the Management, Conservation and Sustainable Development of all Types of Forests, also known as the "Forest Principles" were adopted in 1992. They contain 15 articles providing guiding principles for the management, conservation and sustainable development of forests.

The management plan will be in line with and further implement the Forest Principles, in particular with regard to:

- Sustainable forest management to meet the social, economic, ecological, cultural and spiritual needs of present and future generations;

- Promotion of opportunities for the participation of interested parties in the development , implementation and planning of forest policies;
- Positive and transparent action towards reforestation, afforestation and forest conservation;
- Support by international financial and technical cooperation, including through the private sector; and,
- Provision of alternative options to the urban poor who are economically and socially dependent on forest resources.

3. CITES

The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) was established in response to concerns that many wildlife species were becoming endangered because of international trade. Kenya ratified the Convention on 13 December 1978.

The only recorded endangered tree species in Karura is the *Brachylaenahuillensis*, (Muhugu). This tree species is classified as Low Risk - near threatened globally, according to the IUCN Red List. The tree is used for wood carving sold to tourists. However, this species is not listed in any of the three CITES appendices.

During the period of the plan existing trees of this species will be clearly designated for extra protection and increased planting.

4. United Nations Framework Convention on Climate Change (UNFCCC)

The ultimate objective of the United Nations Framework Convention on Climate Change (UNFCCC) is the "stabilization of the greenhouse gas concentration in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system [....]". Kenya ratified the convention on 30 August 1994.

The management plan will contribute to the implementation of the Convention by increasing carbon storage and sink, through the rehabilitation of degraded forest areas and the reestablishment of indigenous forest cover.

5. IMPORTANCE OF KARURA FOREST

1. Importance for the general public

Karura Forest receives a wide range of visitors on daily basis whose interest are variable, some of which include:

- To provide an opportunity to educate the general public on the importance of forests;
- To contribute to mitigation of climate change;
- To serve as a venue for recreation;
- To provide seedlings; and
- To provide training in environmental and natural resource management.

2. Importance for employment

At present 39 people are employed by the forest station, namely: forester (1); assistant forester (1); plant operator (1); senior clerical officer (1); subordinate staff (2); rangers (11), and 23 casuals.

The Joint Committee employs 46 people as scouts, clerks, tree-carers, administrative staff, and many casual workers for clearing and planting in the forest.

Many employment opportunities have been created particularly for the inhabitants of Huruma, Githogoro and Deep Sea informal settlements.

3. Watershed

The forest contributes to recharging the rivers that run through it. It is proposed to boost this by planting bamboo and other water conservation vegetation along all the rivers.

4. Biodiversity reservoir

Karura Forest hosts a wide diversity of fauna and flora species. Further protection of these species will be provided once a full biodiversity inventory has been completed.

5. Historical and Cultural importance

There are three caves in Karura Forest which were used by the Mau Mau during the uprising for independence. These caves have also in the past served as venues for spiritual nourishment for many people from different parts of the country. An archaeological survey of the caves carried

out by NMK has revealed stone tools and other artefacts dated 4 500 years old and others estimated at between 50 and 300 000 years old, the middle stone age period.



Plate 2: The largest cave in the Karura River valley from the inside

6. Source of Forest Products

- **Wood products**

The plantations will be zoned where necessary for conservation and production reasons. The plantations are a source of wood products like, timber, poles, withies and fuel wood.

Brachylaena huillensis (Muhugu) has been used historically for wood carving sold to tourists. This valuable indigenous tree species is now only found thinly scattered within the forest. During the plan period, the remaining specimens will be clearly designated for extra protection. Muhugu seedlings will also be planted.



Plate 3: A mature Araucaria plantation in the forest

- **Non wood forest products**

At present the Forest caters for the supply of small businesses such as beekeeping, collection of herbs and other medicinal plants.

7. Tourism and recreation opportunities for Kenyans



Plate 4: The iconic Karura River waterfall

Karura now hosts 16 000 visitors a month on average and has become the No. 3 attraction to be visited in Nairobi.

During this plan period, only ecotourism activities listed in the plan will be implemented. Any new ones will have to be cleared by the joint committee, the FCC and ultimately approved the KFS board if appropriate.

However, as Karura Forest is a small forest, surrounded by hotels, there will be no new tourism related permanent or high impact structures in the forest including camp sites.



Plate 5: Signage at Junction 16 (note rubbish bin in background)

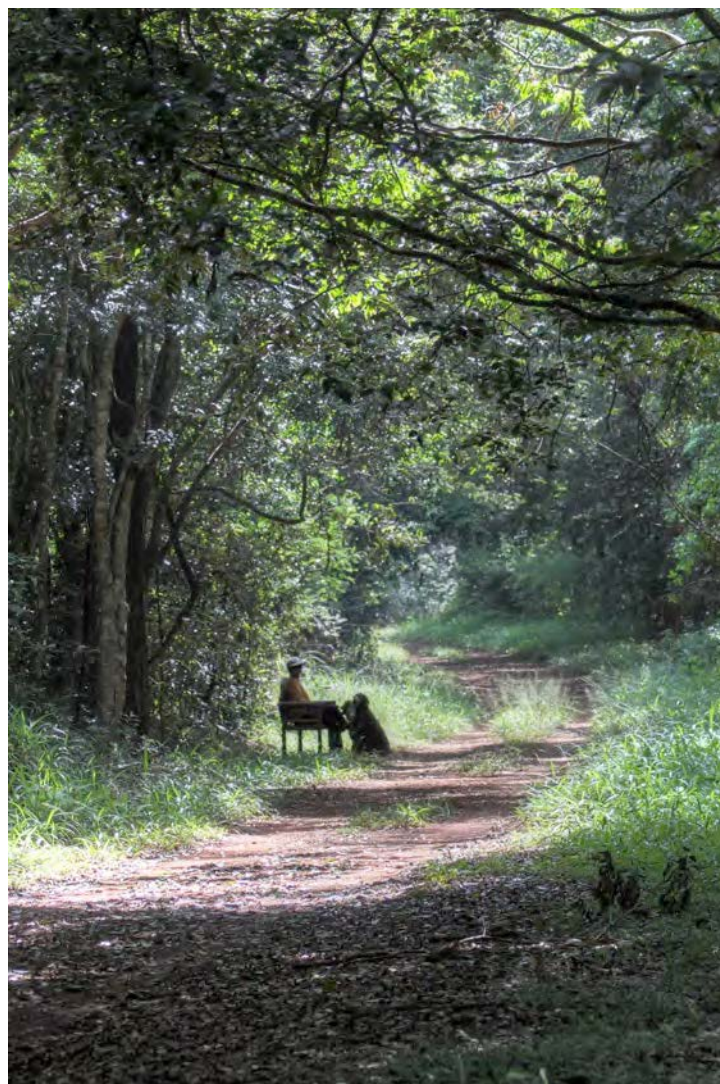


Plate 6: Visitor resting on donated bench on Kima Trail between Junctions 9 and 10

8. Research and Education Centre

The forest offers many research and education opportunities by various institutions such as NMK, universities and other organisations including KEFRI in the form of:

- Internships;
- Attachments;
- Case studies;

- Education tours; and,
- Exchange visits.

There is need to provide visitors to the forest with an opportunity to learn the importance of forests and the significant role they play in their everyday lives.

Within the five year term of this Management Plan, a new Education Centre will be developed and opened in the forest. The centre will provide opportunities for visitors to learn not only about Kenya's forests, but also about other forests around the World. The centre will draw from information and expertise from close neighbours, such as UNEP and ICRAF, but also from national/international universities and government agencies.

9. Environmental services (including carbon sinks, soil conservation)

• Carbon sink

One third of greenhouse gases build up in the atmosphere is estimated to result from changes in land use. Afforestation and conservation of forests can significantly contribute to mitigate climate change. Nairobi once had a reputation as a healthy place to live and was known as 'The Green City in the Sun'. However the increasing carbon emissions in Nairobi are attributed to the ever growing and intense industrial activity and use of automobiles. Therefore Karura Forest has a vital role to play in mitigating those negative impacts. Land use change and forestry activities during the plan period will focus essentially on the development and regeneration of indigenous forest. There is also scope for partnering in one of the carbon financing schemes.

• Soil and Water Conservation

The forest is able to retain the amount of rainfall falling over it through infiltration, only gradually releasing it to the streams flowing through the forest. It is also useful in recharging underground water streams from which the current boreholes that are being drilled get recharged. These actions contribute towards minimizing soil erosion and this protects the habitat for wildlife.

6. CONSERVATION CHALLENGES

In addition to the threats identified in section 2.7, the conservation of Karura Forest faces the following challenges:

- Forest carrying capacity in terms of number of visitors.

- Replacement of plantations with indigenous species in a recreational forest.
- Inadequate funding with relation to major infrastructure development aspects in the forest.

7. FOREST ZONATION

1. Current Situation

The forest is divided into two blocks, one of which is mainly comprised of plantations. The other block has plantations of both exotic and indigenous species and an area under natural forest.

2. Forest zones and their management

The Forest Reserve has been zoned using the multiple - use classification criteria, which considers the application of the primary use along with secondary uses of the zoned areas. The main zones identified include:

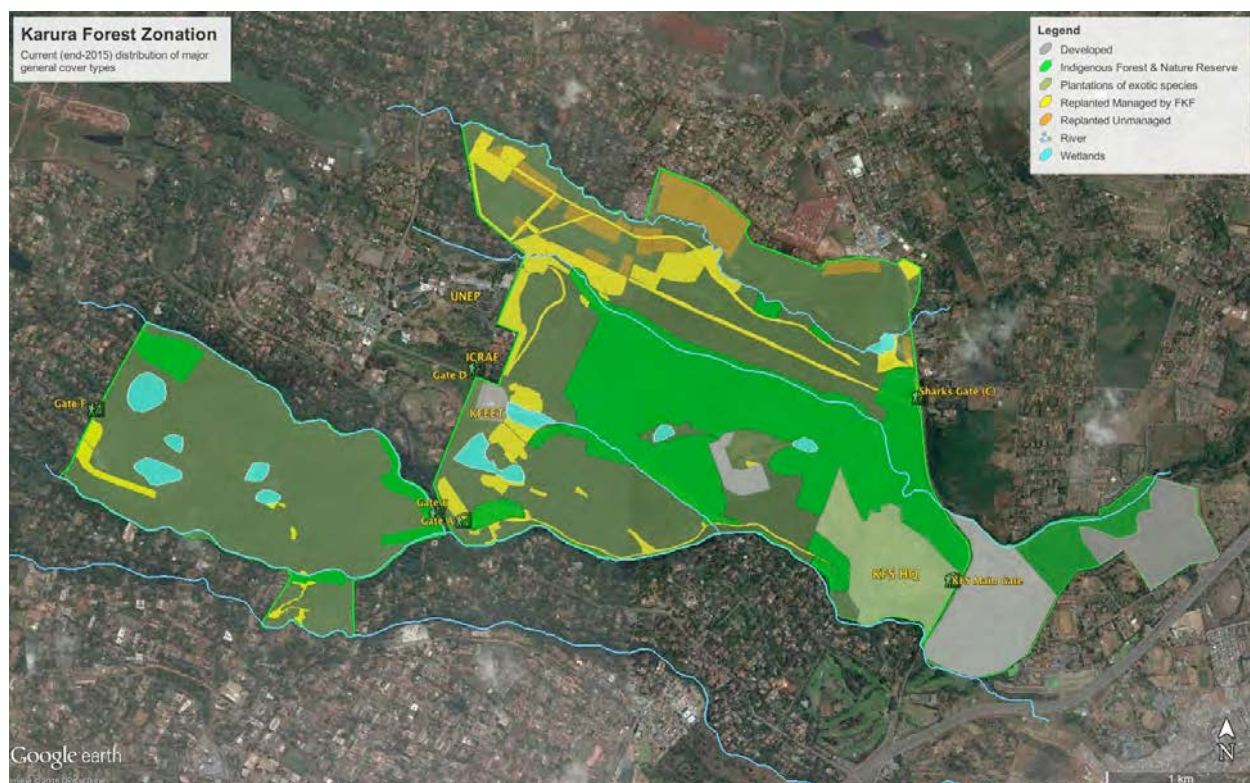
- Nature Reserve;
- Indigenous forest area;
- Wetlands and riparian areas;
- Productive forest (exotic plantations); and,
- Developed areas.

[Table 5: Zonation criteria \(2010-2014\)](#)

Zone	Criteria	Management Objectives	Management Options
Nature Reserve	High biodiversity natural forest	Total biodiversity conservation	- No extractive uses - No disturbance

Indigenous forest area	-Water catchment -Wildlife habitat -Protection of biodiversity	Conservation of biodiversity and wildlife habitat	-Conservation area -Minimum impact ecotourism
Wetlands	Swamps/ marshlands/ riparian areas	Total preservation of the wetlands	-Preservation of the area -Research and bird watching
Productive forest zone (exotic plantations)	Area under plantation of exotics species	Production of poles, timber and Xmas trees	Convert 70 ha of plantation into indigenous forest according to the station plantation management plan
Developed areas	Areas under residential and non-residential buildings, tree Nurseries etc.	-Area to continue Serving the same purpose -Generation of revenue(rent)	Status quo to Remain

Figure 5: Karura cover type zones



- 1) To continue to rehabilitate degraded parts of Karura Forest to a healthy and productive closed canopy forest as well as ensuring achievement of sustainable management;
- 2) To provide a world class example of sustainable participatory forest management;
- 3) To keep the forest safe and secure for the enjoyment of all. This would entail the protection the forest from any high impact development other than forestry activities and, ensure ecotourism proposals would be in the best interest of the forest;
- 4) To contribute to the improvement of the livelihood of the local communities;
- 5) To promote environmental education, low impact ecotourism and research in forestry;
- 6) To have in place the necessary infrastructure, vehicles machinery and equipment; and,
- 7) To provide for optimum human resources for implementing the management plan.

Implementation of the plan will be guided by the seven specific management objectives from which strategies and actions are proposed hereunder.

1. REHABILITATION AND MANAGEMENT PROGRAMME

1. Objective

To continue to rehabilitate degraded parts of Karura Forest to a healthy and productive closed canopy forest as well as ensuring achievement of sustainable management

2. Current status and management achievements

The total area of the forest is 1041.3 Ha out of which plantations occupy 461 Ha and natural forest 257 Ha. In addition there are 43.5 Ha of degraded indigenous (non stocked) and 45.8 Ha of repainted but abandoned. During the first SMP many corporate Institutions and others have teamed up with KFS and FKF in rehabilitation activities and there are additional 72.2 Ha which have been cleared of invasives and replanted.

Protection of critical water catchment

The riparian areas need to be rehabilitated with bamboo and other water friendly species.

Water resource availability

Karura Forest is well positioned for water availability as it has five rivers which flow throughout the year (not seasonally). Regrettably these rivers are heavily polluted.

Five tributaries of Nairobi River pass through Karura Forest Reserve. These are:

- The Ruaka River which separates Karura River and the Runda Residential area;
- The Karura River with traverses through the forest;
- The Getathuru River which borders the Forest along its Southern edge with Muthaiga Residential area; and,
- The Thigiri River (a tributary of Getathuru River) which traverses the western section of Karura Forest.

5. The Mathare river which borders the forest on the Eastern side of Sigiria

The Nairobi City Council also supplies water, for which a monthly charge is paid. The rehabilitated old bore hole at Amani Gardens also provides water which irrigates the picnic grounds during the dry season.

Water utilization and demand

The main indigenous tree nursery uses water from the Karura River. The small tree nursery uses water from the Nairobi City Council. The tree biotechnology nursery has its own borehole to ensure a pure water source. The forward policy for tree planting is now to always plant during the rainy season.

Ground water is recharged naturally by rain and by rivers. Recharge may be impeded somewhat by human activities including paving, development, or logging. These activities can result in loss of topsoil resulting in reduced water infiltration, enhanced surface runoff and reduction in recharge. Use of ground water, especially for irrigation, may also lower the water table. Ground water recharge is an important process for sustainable ground water management, since the volume-rate abstracted in the long term should be less than or equal to the volume-rate that is recharged.

Therefore, enrichment planting with bamboo and other species is necessary. Wetlands must also be conserved for biodiversity.



Plate 7: Rehabilitation and improvement activities (clockwise from upper left): replanting old plantation with indigenous species; repair of Karura River drift; building of handicap toilet facility at Amani Garden; leveling and landscaping of parking area near Amani.

The management achievements are as follows,

- Indigenous seedlings have been planted and 72.2 ha of degraded sites in the forest have been cleared of invasive species and replanted.
- All seedlings were purchased from the Karura nursery which maintains an ample supply of good quality suitable stock as opposed to those sourced by corporate whose quality can't be authenticated.
- The Turaco swamp and surrounding area have been cleared of eucalyptus, the stumps removed and the area replanted with indigenous trees.
- Due to the policy in place at the time of the first plan, only very limited logging activities could take place in as far as managing the plantations for providing forest products.
- However, the removal of eucalyptus stumps in the area north of the Karura River as earlier proposed has not yet been undertaken.

1. Challenges

- There is need to implement planting operations during the rainy season. However some corporate partners insist on planting at the wrong time.

- Removal of *Lantana camara* and *Ceasalpinia decapetala* (Mauritius thorn) is difficult due to the thorns along the stems, the difficulty in removing all the roots and the easy germination of the seeds, requiring frequent weeding until the ground is covered with grass.
- Quality seedlings of the right size and species are essential hence the need for them to be sourced from the Karura nursery.
- Making concrete decisions on the future of the very old plantations that are past economic rotation age in the face of unpopularity of felling trees with the public.
- Inadequate funding for supporting all operations including outreach to inform the public of management activities.
- •



Plate 8: Karura Forest Tree Nursery

2. Strategy

- Continue using available resources and leveraging additional funding from various entities to plant indigenous tree and shrub species involving clearing of invasives, replanting and tending of areas under rehabilitation.



Plate 9: Bamboo planting along the banks of the Ruaka River

3. Actions

- Adapt the KFS plantation management plan according to the requirements for reverting aging plantation stands to natural forest.
- Implement a clear set of rules for planting trees in the forest, (see appendix 4).
- Carry on clearing of *Lantana Camara*, *Ceasalpinia decapetala* and other invasives and replanting with indigenous species suitable for Karura wherever needed in the forest.
- Reduce progressively until phase out firewood collection to protect the integrity of the ecosystem and introduce alternative sources of energy.
- Raise seedlings of shrub species indigenous to Karura to plant along tracks to avoid *Lantana camara* and Mauritius thorn regrowth.
- Continue using women's groups from neighbouring community to carry rehabilitation work.

Table 6: Summary of management actions for rehabilitation and management programme

ACTION	UNIT	5 YEAR	MEANS OF	TIME FRAME (YEARS)	RESPONSIBLE
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		TARGETS	VERIFICATION	1	2	3	4	5	ORGANIZATION(S)
To continue to rehabilitate degraded parts of Karura Forest to a healthy and productive closed canopy forest as well as ensuring achievement of sustainable management									
Implement the KFS plantation management plan for managing aging plantation stands	No	1	Reports, records, maps	1					KFS/CFA
Implement a clear set of rules for planting trees in the forest to be established	No	1	Records	1					KFS/CFA
Carry on clearing of <i>Lantana Camara</i> ,	Ha	70	Site visits, photos,	1	1	1	1	14	KFS/CFA
<i>Ceasalpiniadecapetala</i> and other invasives and replanting with indigenous species suitable for Karura throughout the forest			records	4	4	4	4		
Reduce progressively until phase out firewood collection to protect the integrity of the ecosystem and introduce alternative sources of energy	Lpsm.	various	Records	x	x	x	x	x	KFS/CFA

ACTION	UNIT	5 YEAR TARGETS	MEANS OF VERIFICATION	TIME FRAME (YEARS)					RESPONSIBLE ORGANIZATION(S)
				1	2	3	4	5	

Continue using women's groups from neighbouring community to carry rehabilitation work	No	3 groups	Records, site visits, photos	x	x	x	x	x	KFS/CFA
Raise seedlings of shrub species indigenous to Karura to plant along tracks to avoid <i>Lantana camara</i> regrowth.	No.	Various	Records, site visits, photos	X	X	X	X	X	CFA

2. PARTICIPATORY FOREST MANAGEMENT PROGRAMME

1. Objective

To provide a world class example of sustainable participatory forest management.

2. Current status and management achievements

Currently KFS is working with the communities residing around the forest. A Community Forest Association, Friends of Karura Forest, has been established which encompasses the communities adjacent to the forest. The communities benefit by getting employment during tree planting, collection of firewood and also keep beehives in the forest. The involvement of the community in major decision making in regard to the forest resource is inadequate. By involving them in the development of this plan, it is expected that a good basis will have been established for their enhanced participation.

The management achievements are as follows,

- A joint management agreement has been signed between KFS and FKF.
- The KFS/FKF joint management committee meets every month to review activities, issues and take appropriate decisions including on financial matters.
- Karura forest has no title deed but a legal notice, and the KFS legal office is pursuing with the land commission to acquire it.
- FKF enjoys widespread support due to its good governance and has been able to mobilise funds to implement various projects in the forest.
- Due to the outstanding success, the partnership between KFS and FKF as embodied in the joint management agreement is used as a role model for other CFAs throughout the country.

- FKF has a representative on the FCC.

3. Challenge

- Karura Forest is a small forest (1,041.3 Ha) surrounded by high density residential areas. The communities living around Karura Forest are diverse with different needs.

4. Strategy

- Joint implementation of the management plan by KFS and FKF with the participation of all the stakeholders through established consultative mechanisms.

5. Actions

- Deepen cooperation between KFS and FKF.
- Continue to hold regular meetings of the joint management committee.
- Strengthen links with the FCC.
- Extend links with other CFAs.
- Improve outreach to the corporate sector through their CSR program.

Table 7: Summary of management actions for the Participatory forest management programme

ACTION	UNIT	5 YEAR TARGETS	MEANS OF VERIFICATION	TIME FRAME (YEARS)					RESPONSIBLE ORGANIZATION(S)
				1	2	3	4	5	
To provide a world class example of sustainable participatory forest management									
Deepen co-operation between KFS and FKF	Lpsm.	various	Minutes of JMC photos, magazines,newsletters	x	x	x	x		KFS/CFA
Hold regular meetings of the joint management committee	No	60	Minutes	12	12	12	12	12	KFS/CFA
Strengthen links with the FCC	No	20	Minutes	4	4	4	4	4	KFS/CFA
ACTION	UNIT	5 YEAR	MEANS OF	TIME FRAME (YEARS)					RESPONSIBLE

		TARGETS	VERIFICATION	1	2	3	4	5	ORGANIZATION(S)
Improve outreach to the corporate sector through their CSR program	No	20	Phone records, letters, personal contacts	4	4	4	4	4	KFS/CFA
Extend links with other CFAs	No	10	Phone records, emails, photos	2	2	2	2	2	KFS/CFA

3. FOREST SAFETY AND SECURITY PROGRAMME

1. Objective

To keep the forest safe and secure for the enjoyment of all.

2. Current status and management achievements

There is need to re-establish the boundary to ensure that all beacons are present in the correct place. Karura forest has no title deed but was established through a legal notice. The legal office is working with the land commission to acquire a title deed.

The management achievements are as follows,

- A number of illegal title deeds have been surrendered. Several court cases are on-going involving others.
- Sufficient funds were raised to fully secure the forest with a 15 km electric fence and patrols by 26 scouts and 11 rangers. There have been no serious security incidents in the forest since it has been open to the public.
- The fence is monitored and maintained on a daily basis, entry/exit points manned permanently by gate clerks, scouts and rangers.
- The systematic clearing of *Lantana camara* and Mauritius thorn has helped to minimise the risk of fire in the forest. Lighting fires and smoking are strictly forbidden in the forest. Training of all staff in fire fighting is carried out regularly.

3. Challenges

- Cancellation of title deeds illegally issued in the forest is difficult due to the opaque nature of the process.

4. Strategy

- Secure the forestland.

5. Actions

- Work with the National Land Commission and fight vigorously through the courts for the revocation of illegal titles.
- Publicize cases of land grabbing widely to leverage public opinion against land grabbing.
- Acquire the title deed for Karura.
- Secure an access to the Mazingira block.
- Continue to maintain the electric fence and river crossings in good working order.
- Ensure proper management of entry points.
- Ensure protection from fires, diseases and pests.
- Maintain the current fire breaks and create new ones if necessary.
- Establish a fire outbreaks surveillance system.
- Enhance patrols in all parts of the forest.
- Train scouts and forest guards in firefighting.

Table 8: Summary of management actions for Forest protection and security programme

Table of Summary of Management Actions for Forest Protection and Security Program									
ACTION	UNIT	5 YEAR TARGETS	MEANS OF VERIFICATION	TIME FRAME (YEARS)					RESPONSIBLE ORGANIZATION(S)
				1	2	3	4	5	
To keep the forest safe and secure for the enjoyment of all									
Work with the National Land Commission and engage vigorously through the courts for the revocation of illegal titles	No	5	Court rulings, records	1	1	1	1	1	KFS/CFA

ACTION	UNIT	5 YEAR TARGETS	MEANS OF VERIFICATION	TIME FRAME (YEARS)					RESPONSIBLE ORGANIZATION(S)
				1	2	3	4	5	
Publicise cases of land grabbing widely to leverage public opinion against land grabbing	No	5	Press releases, articles, interviews	1	1	1	1	1	KFS/CFA
Secure an access to the Mazingira block	No	1	Reports, photos, site visit	x	x	x	x	1	KFS/CFA
Continue to maintain the electric fence and river crossings in good working order	Lpsm.	various	Reports, photos, site visits	x	x	x	x	x	KFS/CFA
Ensure proper management of entry points	Lpsm.	various	Records, statistics, inspections	x	x	x	x	x	KFS/CFA
Ensure protection from fires, diseases and pests	Lpsm.	Various	Incidence reports, field visits	0	0	0	0	0	KFS/CFA
Maintain the current fire breaks and create new ones if necessary	No	5	Reports, photos, site visits	1	1	1	1	1	KFS/CFA
Establish a fire outbreaks surveillance system	No	1	report	x	x	x	x	1	KFS/CFA
Enhance patrols in all parts of the forest by the forest guards and community scouts	No	various	Reports, duty roster, photos	X	X	X	X	X	KFS/CFA
Train scouts and forest guards in fire fighting	No	5	Reports on training sessions	1	1	1	1	1	KFS/CFA
Maintain vigilance against invasive species spread in the forest	Lpsm.	various	field visits, photos	x	x	x	x	x	KFS/CFA

4. LOCAL COMMUNITIES' LIVELIHOODS PROGRAMME

1. Objective

To contribute to the needs of the local communities

2. Current status and management achievements

There are various user rights and livelihoods (water, medicinal herbs, honey, fuel wood, spiritual nourishment, among others) that accrue to communities living adjacent to Karura Forest. This is more so for the dwellers of the four named informal settlements. It is the aim of this plan to continue meeting these requirements and to ensure their sustainable supply. However no deliberate socio-economic study has been undertaken to fully appreciate this relationship. It is therefore intended to undertake such a study during the implementation of the plan so as to adequately address the livelihood matters. Many activities ranging from afforestation, visitor guiding, maintenance of tracks etc. can be implemented jointly with the communities to provide them with opportunities of eking a livelihood.

The management achievements are as follows,

- All surrounding communities both affluent and less affluent are represented on the FKF board.
- The Joint KFS/FKF committee where all decisions are made ensures all voices can be heard.
- The local communities have benefited considerably from the new management regime. The forest is no longer a place of danger for them but a source of many opportunities. The Joint Committee employs 46 permanent staff, 36 of them from the surrounding informal settlements. All forestry contract work done in the forest is farmed out to women's groups from those villages. This amounts to Kshs 300,000 per month on average.
- Funds have successfully raised for a water purification plant for Huruma village, a fish pond supplied with fingerlings, a beekeeping project involving over 100 hives, a fully equipped honey processing house, beekeeping attire and other equipment and two beekeeping and basic business management training courses.
- An entrepreneurship training course and a guiding skills course have been organised for candidates from Huruma.

- A school bag project for 800 kids from Huruma has been financed.
- A computer club for 60 children has been organised.

3. Challenge

- The expectations from the local communities are very high and are unlikely to be met in light of the small area of the forest and its location in the city.

4. Strategy

- Involvement of all user groups in livelihood activities.

5. Actions

- Continue to support forest based, ecosystem friendly, income generating activities for local communities.
- Continue to give priority as much as possible to local communities in recruitment of staff.
- Continue to give priority as much as possible to women's groups from local community when awarding clearing and planting contracts.
- Continue to create employment through the development of low impact recreational activities.

Table 9: Summary of management actions for the local communities' livelihoods improvement programme

Programme

ACTION	UNIT	5 YEAR TARGETS	MEANS OF VERIFICATION	TIME FRAME (YEARS)					RESPONSIBLE ORGANIZATION(S)
				1	2	3	4	5	
To contribute to the improvement of the livelihood of the local communities									
Continue to support forest based, ecosystem friendly, income generating activities for local communities	No	various	reports	x	x	x	x	x	KFS/CFA

Continue to give priority as much as possible to local communities in recruitment of staff	Lpsm.	various	payroll	x	x	x		x	KFS/CFA
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ACTION	UNIT	5 YEAR TARGETS	MEANS OF VERIFICATION	TIME FRAME (YEARS)					RESPONSIBLE ORGANIZATION(S)
				1	2	3	4	5	
Continue to give priority as much as possible to women's groups from local community when awarding clearing and planting contracts	No	20	Financial records	4	4	4	4	4	KFS/CFA
Continue to create employment through the development of low impact recreational activities	No	5	reports	1	1	1	1	1	KFS/CFA

5. ENVIRONMENTAL EDUCATION, ECOTOURISM AND RESEARCH PROGRAMME

1. Objective

To promote environmental education, ecotourism and research in forestry.

2. Current status and management achievements

A lot of research work has been already been conducted in Karura Forest by various organizations. Ecotourism and educational awareness programs have been launched successfully.

The following are the management achievements,

- An inventory of 558 plant species has been done. Over 200 trees have been labelled along the main tracks showing the main species to be found in the forest.
- A list of 113 bird species has been compiled and regular bird watching visits by Nature Kenya will add to the list.
- Indigenous orchids which had disappeared from the forest through poaching have been reintroduced.
- 3 motion activated day and night cameras have revealed a number of previously unknown animal species present in the forest.

- Wildlife in general has increased significantly in the absence of poaching. Animals have become much less shy of people and are easily seen adding value to a visit to the forest.
- The Colobus monkey, *Colobus guerezakikuyense* have been successfully re-introduced in the forest and constitute a new attraction.
- Due to the vast improvement in security and infrastructure, the number of visitors to the forest has grown significantly over the 5 years of the first SMP and has reached an average of 16,000 a month. Karura is now the No 3 attraction to visit in Nairobi according to Tripadvisor which has awarded it a Certificate of Excellence two years running. The vast majority of visitors are Kenyans showing that there is real national ownership of the forest which has been dubbed "the people's forest". People come in large numbers to walk, jog, cycle or just enjoy being in a natural setting.
- Forest rules have been developed and clearly displayed at all entry points to regulate visitors' behaviour in the forest.
- An attractive website has been designed and is regularly updated and populated with interesting articles. The Facebook page is also very active and has attracted so far over 13 000 page likes.
- The Joint Committee and Kfreet jointly employ an education officer who takes school parties and special interest groups on educational tours of the forest. Many thousands of school children visit the forest every year and get a chance to learn about forests and the environment thanks to a teaching program targeting different age groups.
- The old squash court has been turned into an auditorium for lectures on forests and other environmental matters.

3. Challenges

Most of the activities under this programme component are long-term. They will require sustained resources over the years.

4. Strategy

1. Improve education and research activities in the forest.

1. Actions

- Commission a study of the carbon balance in the forest.
- Complete the surveys of plants and birds in Karura.

- Commission surveys of insects, reptiles and butterflies in Karura.
- Commission a survey of mammals in the forest.
- Link up with universities and research institutions to encourage research work in the forest.
- Draft and publish a booklet of the Natural History of Karura based on these surveys.
- Design attractive informative posters about the natural history of the forest to be displayed in relevant locations.
- Set up a butterfly house.
- Create picnic sites at Ruaka swamp and Sigiria main gate.
- Organise regular scheduled educational theme walks in the forest aiming in particular at the lucrative tourist market.
- Promote as trustees of Kfreet the establishment of the education centre.

Participate in exchange visits to other forests

Table 10: Summary of management actions for environmental education, ecotourism and research programme

programme

ACTION	UNIT	5 YEAR TARGETS	MEANS OF VERIFICATION	TIME FRAME (YEARS)					RESPONSIBLE ORGANIZATION(S)
				1	2	3	4	5	
To promote environmental education, ecotourism and research in forestry									
Commission a study of the carbon balance in the forest	No	1	reports	x	x	x	x	1	KFS/CFA
Complete the surveys of plants and birds in Karura	No	1	reports	x	x	x	x	x	KFS,CFA, KWS, NMK
Commission surveys of insects, reptiles and butterflies in Karura	No	3	reports	x	x	x	x	3	KFS, CFA, NMK
Commission a survey of mammals in the forest	No	1	reports	x	x	x	x	1	KFS, NMK, KWS, CFA

Link up with universities and research institutions	No	5	Reports, contacts	1	1	1	1	1	KFS/CFA
to encourage research work in the forest									

ACTION	UNIT	5 YEAR TARGETS	MEANS OF VERIFICATION	TIME FRAME (YEARS)					RESPONSIBLE ORGANIZATION(S)
				1	2	3	4	5	
Draft and publish a booklet of the Natural History of Karura based on these surveys	No	1	Reports	x	x	x	x	x	KFS/CFA
Design attractive informative posters about the natural history of the forest to be displayed in relevant locations	No	3	Report, photos	x	x	1	1	1	KFS/CFA
Set up a butterfly house	No	1	Site visit, photos	x	x	x	x	1	KFS/CFA
Create picnic sites at Ruaka swamp and Sigiria main gate	No	2	Report, photos, field visit	1	2	x	x	x	KFS/CFA
Promote as trustees of Kfeet the establishment of the education centre	No	1	Report, photos	x	x	x	x	1	Kfeet, KFS,CFA
Organise regular scheduled educational theme walks in the forest aiming in particular at the lucrative tourist market	No	10	Reports, photos	2	2	2	2	2	KFS, CFA

2. INFRASTRUCTURE, VEHICLES, MACHINERY AND EQUIPMENT PROGRAMME

1. Objective

To have in place the necessary infrastructure, vehicles machinery and equipment.

2. Current status and management achievements

The movement of visitors in the forest requires a good, well maintained network of tracks and trails.

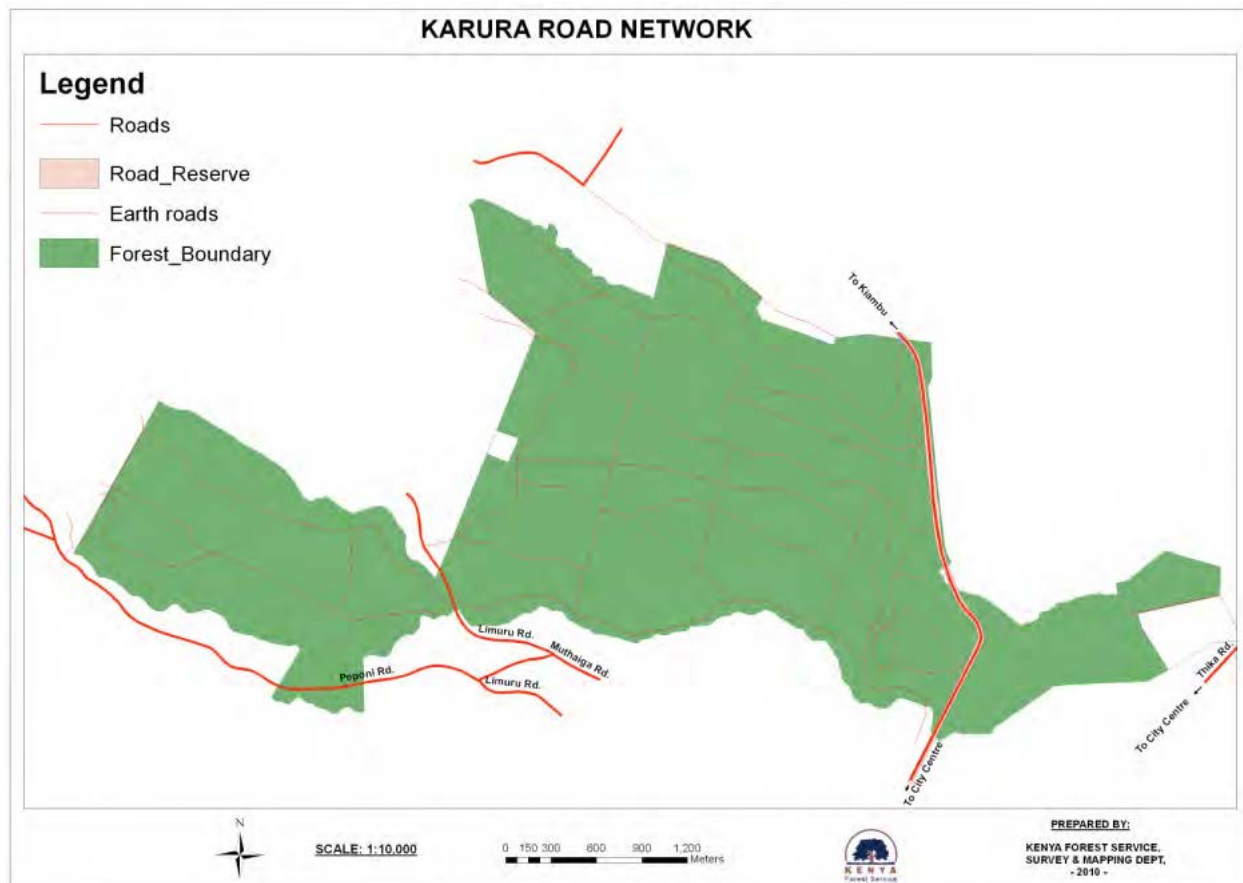


Figure 5: Karura Forest road network

Karura is unique not only in its location (so close to the centre of Nairobi) but also for other reasons such as its beauty spots, examples of good tree management and kilometres of attractive walks. The forest is already producing substantial revenue from visitors and events in the forest.

KFS buildings (office and outposts)

The forester's office and the office store are in deplorable condition. The SMP provides for the present rangers houses inside the forest to be moved to HQ and offices to be built for Karura station management staff. Proper housing for the rangers is a motivation for enhancing their performance. There is need for housing for a total of 11 rangers.

Non-KFS Buildings

Non-KFS buildings include: a school (originally constructed by the Forest Dept. but now run by the Nairobi City Council); the Tree Biotechnology Project office; the BP Shell Club; National Security Intelligence Service Headquarters; Criminal Investigation Department; a facility for the

Central Bank of Kenya; the International Earthquake Sensor for the region; and KEFRI station and residential quarters.

Vehicles, machinery and equipment

There is one tractor, but no other vehicle specifically for use at Karura.

The Ecosystem conservator and HOC have their official vehicles but they are not available for duties in the forest.

There are other pieces of small machinery and equipment which are covered in a separate tool inventory (produced quarterly and available on request).

Despite the above challenges, these are the management achievements,

- Over 50 km of track and trails have been identified, improved and are being maintained.
- 7 bridges have been built.
- Stone steps have been built to improve access to the water fall and caves.
- The whole network of tracks has been signposted including 5 circuits of different lengths.
- A map of the forest has been produced to guide visitors.
- Litter bins and benches have been put at various places along the tracks.
- Entry gates, washroom and storage facilities have been built at Limuru gate, Sharks gate, Sigiria gate and Duck farm.
- Parking areas have been created at all gates.
- Two forest guard houses have been rehabilitated at Limuru gate.
- Electricity and water have been connected at Limuru gate, Thigiri lane gate and Sharks gate.
- A picnic site has been developed opposite Kfeet with paved and lit disabled access, 35 tables and benches for 10 people each, swings and slides and washroom facilities including a disabled one.
- A new event venue has been created at the old farmhouse site and an old borehole refurbished to improve water supply. An all-weather access road and parking area for 70 cars have been built for this event venue.

- The idea of camp sites in the forest has been abandoned because of heavy footprint, the risk of fire and the very high cost of security at night.
- The idea of a horse riding stable in Sigiria has also been rejected because of the irreconcilable conflict between a few high impact horse riders and the vast majority of other users of the forest.
- FKF has bought 3 motor bikes for its staff.
- 3 ATVs have been made available by KFS but spare parts for them are difficult to come by and they are often out of order.

3. Challenges

- Inadequate funding.
- Lack of transport.

4. Strategies

- Provide and maintain appropriate infrastructure and equipment.

5. Actions

- Build an office block for Karura forest station and FKF staff.
- Renew signage as necessary.
- Build a proper entrance gate at Limuru gate.
- Secure funding to move the village houses inside the forest to HQ.
- Build a foot bridge over the Limuru road to link the main block and Sigiria.
- Build a rope colobridge over the Limuru and Kiambu roads.
- Obtain 2 4x4 pick ups to be used for forestry and patrols in Karura.
- Secure permission to use road building equipment when present at HQ for maintenance of tracks.
- Pave the main track from the Limuru road to Kfeet.
- Build a tuck shop at Limur, Sharks and Sigiria gate and Duck farm.

Table 11: Summary of management actions for the infrastructure, vehicles, machinery and equipment programme

ACTION	UNIT	5 YEAR TARGETS	MEANS OF VERIFICATION	TIME FRAME (YEARS)					RESPONSIBLE ORGANIZATION(S)
				1	2	3	4	5	
To have in place the necessary infrastructure, vehicles machinery and equipment									
Build an office block for Karura forest station and FKF staff	No	1	Report, photos, field visits	x	x	x	x	1	KFS/CFA
Renew signage as necessary	No	various	photos	x	x	x	x	x	KFS/CFA
Build a proper entrance gate at Limuru gate	No	1	photos	x	x	1	x	x	KFS/CFA
Secure funding to move the village houses inside the forest to HQ	Kshs		photos	x	x	x	x	1	KFS/CFA
Build a foot bridge over the Limuru road to link the main block and Sigiria.	No	1	photos	x	x	x	x	1	KFS/CFA
Build rope colobridges over the Kiambu and Limuru roads	No	2	photos	x	2	x	x	x	KFS/CFA
Obtain a 4x4 pick up to be used for Karura forest management activities	No	1	logbook	x	1	x	x	x	KFS/CFA
Undertake maintenance of tracks. (By securing permission to use road building equipment when present at HQ)	Km	various	photos	x	x	x	x	x	KFS/CFA
Tarmac the main track from the Limuru road to Kfeet	Km	1	photos	x	x	x	x	1	KFS/CFA
Build a tuck shop at Sharks gate, Sigiria and Duck farm	No	3	photos	x	1	1	1	x	KFS/CFA

3. HUMAN RESOURCES PROGRAMME

1. Objective

To provide for optimum human resources for implementing the management plan

2. Current status and management achievements

The current staff of Karura station is listed in table 5 below. There is also a separate trust running a tree cloning project employing approx. 70 people. It is expected that with implementation of this plan, more job opportunities for the local communities will be created and equally the strength of KFS staff will be raised to optimal level so as to meet the challenge.

Table 12: Staff strength in Karura forest

Staff cadre	Current strength	Desired strength	Variance
Forest station manager	1	1	0
Assistant Forest station manager	1	1	0
Senior Clerical Officer	1	1	0
Clerical/accounts clerk	0	1	1
Clerk	0	1	1
Store Keeper	0	1	1
Forest guards	11	14	3
Artisan	0	1	1
Plant Operator	0	1	1
Drivers	0	1	1
Subordinate staff	2	4	2
Casuals	23	30	7
	26	26	0
	0	3	3

The following are the management achievements:

- The Joint Committee employs 26 scouts to patrol the forest, collect litter, clear trails and the electric fence, man the gates day and night, ensure security during events and guide visitors, 8 clerks collect entrance fees at the gates, 10 tree carers clear, weed, water and conduct other maintenance activities in the forest including looking after the picnic site, Amani garden, Amani event venue and obstacle course.
- The joint management committee also employs : 1 accountant and 1 event manager. Kfset employs an education officer. G4S seconds an logistics and security manager

3. Strategy

Provide adequate human resources to implement the SMP.

4. Actions

- Provide regular training programs for all staff.
- Recruit staff as requirements evolve and the needs arise

Table 13: Summary of management actions for the human resources programme

ACTION	UNIT	5 YEAR TARGETS	MEANS OF VERIFICATION	TIME FRAME (YEARS)					RESPONSIBLE ORGANIZATION(S)
				1	2	3	4	5	
To provide for optimum human resources for implementing the management plan									
Provide regular training programs for all staff	No	5	Reports, photos	1	1	1	1	1	KFS/CFA
Recruit staff as requirements evolve and the need arises	No	various	payroll	x	x	x	x	x	KFS/CFA

2. PLAN IMPLEMENTATION AND FINANCIAL MANAGEMENT

1. PLAN IMPLEMENTATION AND SUSTAINABILITY

The Karura Joint Management Committee will work with the different stakeholders to ensure that the plan is implemented. Institutional arrangements for the plan implementation are given in (Appendix I).

2. FINANCIAL MANAGEMENT

Given the unprecedented success of Karura as a recreational forest, its revenue base has now expanded enough to reach self-sufficiency in recurrent expenditure. KFS provides the Karura forest station staff. Karura's excellent track record in good governance has allowed for effective fund raising for a wide array of projects which have been successfully implemented in the forest. Revenue streams have been diversified from simple gate collection to events with a new venue added, an improved picnic site and cycling circuit.

Financial supervision is carried out through the joint committee reviewing accounts monthly and approving all financial transactions. This sound financial management is a guarantee of sustainability and will continue during the second SMP according to the concept of PFM embodied in the Forests Act.

3. RESOURCE MOBILIZATION

Revenue generation within Karura for the period 2010-2015 is shown in the tables below. Proposed programmes and activities are aimed at increasing the revenue base from the forest ecosystem.

Table 14: Karura forest station revenue collection for the period 2010 to 2015

Year	Total
2010/11	1,099,530
2011/12	1,439,210
2012/13	2,883,632
2013/14	11,938,654
2014/15	9,563,565
Total	26,924,591

Table 15: Revenues from gates , picnics and other events

Year	Total
2012	7,617,495
2013	11,868,070
2014	21,154,165
2015	35,270,640
Total	40,639,730

The tables indicate an upward trend in revenue collection and are an indication of the success of the 2010-2014 SMP. A continued increase in revenue collection is expected by implementing the improvements proposed in this plan.

A brief list of the immediate foreseen cost centres and potential sources of revenue are listed hereunder:

Forestry activities:

- a) Forest regeneration
- b) Planting of bamboo along the rivers and shrubs along the tracks; and,
- c) Removal of *Lantana camara*, *Mauritius thorn* and other invasives throughout the forest.

General security:

- a) Fencing;
- b) One 4 x 4 pickup vehicle and two patrol vehicles;
- c) Fire tower ; and
- d) Offices for Karura station and FKF staff.
- e) 3 tuck shops

Educational and recreational activities:

- a) Education Centre;
- b) Picnic sites at Ruaka swamp and Sigiria;

- c) Bridge over Limuru road; and
- d) Monkey bridges Limuru and Kiambu roads.

Karura Forest office:

- a) One 4 x 4 pick-up vehicle;
- b) New/renovated housing (approx. 6 extra houses); and
- c) Moving rangers village out of the forest to HQ.

Sources of income:

- a) Entrance fees;
- b) Picnics;
- c) Events; and
- d) Guided walks.

At the present time it is not possible to provide exact figures for the above costs and revenues as the fund raising situation is very fluid.

4. FUNDRAISING STRATEGIES

Karura now has a solid reputation as a well governed, well managed forest when it comes to implementing projects large and small. Donors have been very interested in funding various low footprint activities with clear objectives and measurable results. The same fund raising strategy will be pursued according to the objectives and actions featured in this SMP.

5. GUIDING PRINCIPLES FOR THE IMPLEMENTATION OF THE PLAN

KFS and FKF through the joint management committee and the collaborating stakeholders are committed to adhere strictly to the following guiding principles for the duration of the 5 year plan:

- a) To operate and maintain an efficient running programme for the plan;
- b) To be accountable to donors, membership, and Director of KFS
- c) To be mindful of the needs of the most vulnerable members of communities using the forest

- d) To practice a transparent process for all decision making and accountability; and,
- e) To always be available for communication and discussion, open to ideas, suggestions and advice from others.

6. ENVIRONMENTAL IMPACT ASSESSMENT

Manipulation of an ecosystem results to negative impacts affecting the dynamics of the system and its ability to supply goods and services. Environmental impact assessment identifies these negative impacts and provides means of mitigation for the welfare of human and other species dependent on such ecosystems. It provides a mechanism on project planning, implementing and integrating environmental conservation, management and development. It takes cognizance of the social, physical and biological component of the environment to ensure minimal negative impacts as well as promoting environmental benefits. EIA should be carried out for all proposed major development activities within the ecosystem to identify negative impacts and their mitigation measures.

Table 16: Summary of negative impacts and mitigation measures of planned activities

Development/activity	Negative impacts	Mitigation measures
Construction of roads, buildings etc.	Environmental pristine alteration. Vegetation destruction. Noise pollution	Should blend with environment Proper disposal of building waste
Establishment of recreational sites and nature trails	Vegetation destruction Wildlife disturbance and displacement	Picnic sites should be accessed via nature trails if inside forested areas Picnic sites should have no off-road drives Along nature trails, no tree cutting should be done, except clearing of undergrowth along them Picnic sites should have litter bins or bags to be carried away by parties for disposal at litter disposal sites

Development of access roads	Vegetation destruction Soil erosion Wildlife disturbance and displacement Wildlife breeding sites destroyed	Proper road alignment must be done Reduce vegetation destruction as much as possible Old roads or tracks in the forest should be maintained with minimal environmental disturbance
		Good drainage and reduced soil erosion should be ensured

7. PLAN MONITORING AND EVALUATION

1. Background

Monitoring and evaluation of the management plan is essential since it provides a basis for correction, adjustment, and improvement to the proposed goals, targeted activities and assessment of the achievements attained. During this stage, problems encountered in implementation of planned activities are identified and strategies to address them outlined. Notwithstanding, a reflection of the past is made in a bid to making the future successful.

2. Method

A five-year Monitoring and Evaluation Plan will be formulated and reviewed regularly during the plan period. A mid and end term evaluations will be carried out to assess progress in the implementation of planned activities, achievement of objectives, and analyze and address constraints encountered in the process. It will also provide essential information that can be used in revising the management plan.

Continuous monitoring during the implementation period will be maintained through preparation and submission of monthly, quarterly, half year and annual progress reports from the JMC to the HOC.

3. Responsibilities

Monitoring progress reports should be prepared and submitted on a monthly, quarterly, half-yearly and annually. Project monitoring may be undertaken wither internally or externally. Internal monitoring should be encouraged to involve the participation of the forest adjacent communities and other stakeholders, who may assist in assessing their progress on each of the program's activity implementation levels, which can be used for project evaluation. External monitoring is preferred where technical requirements are needed and should be undertaken in consultation with the community, key stakeholders and other implementing agencies.

In order to implement the management plan efficiently, the following monitoring activities are intended to be implemented,

3. Security will be provided by the KFS rangers and community scouts on a 24 hour basis, through daily patrolling of the fence and forest.
4. Regular visits and spot checks will be organized for the security team.
5. Periodic meetings (monthly) of the Joint Forest Management Committee will be convened.
6. An annual forum will be held (to which the Karura Forest stakeholders will be invited) to assess progress made towards the goals spelled out in the management plan. A site visit will be organized every three months.

1. Success indicators

Success indicators provide a measure of assessing whether set targets are being achieved. Success indicators will be agreed upon between the lead agencies for different categories of management activities to assess the achievement of the set targets for each activity in the management plan.

2. Proposed management actions

1. Develop monitoring guidelines (monitoring team and stakeholders).
2. Monitor impact of the forest use (monitoring team and stakeholders).
3. Monitor the implementation of plan programmes (monitoring team and stakeholders).

Table 17: Monitoring indicators

Programmes	Indicators of success	Means of verification	Assumptions
Rehabilitation and management	<ol style="list-style-type: none"> 1. State/quality of the natural forest. 2. Area rehabilitated. 	<ol style="list-style-type: none"> 3. KFS and CFA records 	<ol style="list-style-type: none"> 1. The plan is implemented successfully. 2. Availability of resources.
Participatory forest management	<ol style="list-style-type: none"> 1. Income generated from sale of forest products. 2. No. of indigenous seedlings sown. 3. Area replanted by indigenous tree species. 4. Area rehabilitated. 	<ol style="list-style-type: none"> 5. Surveys. 6. KFS records. 7. Resource inventory. 	<ol style="list-style-type: none"> 8. The plan is implemented successfully. 9. Availability of funds.

Forest protection and security	1. Incidences of illegal harvesting reported. 2. No. of arrests and prosecutions in a law court. 3. Performance of the forest guards and community scouts. 4. No. of forest fire incidents.	5. KFS, CFA and community scouts records. 6. Police records.	7. The plan is implemented successfully. 8. Good working relationships among stakeholders. 9. Availability of firefighting equipment.
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Programmes	Indicators of success	Means of verification	Assumptions
Local communities' livelihoods improvement	1. No. and types of IGAs. 2. Composition of decision-making structure. 3. No. of NBEs. 4. Income generated from NBEs. 5. No. of people employed. 6. No. and type of technologies adopted. 7. No. of trainings held and exchange tours organized. 8. No. and types of forest products on the market. 9.	10. CFA records. 11. Community management committees. 12. CFA financial records. 13. Site visits. 14. Training reports, M&E reports. 15. Minutes, visitors' book records and training records. 16. Market surveys. 17. CFA records, M&E reports. 18. Site visits.	19. The plan is implemented successfully. 20. Good working relationships among stakeholders. 21. Availability of resources and markets. 22. Success in NBE development.
Environmental education, ecotourism and research	1. No. of studies and surveys commissioned 2. No. of ecotourism activities established	3. CFA records. 4. CFA financial records. 5. Site visits. 6. Training reports, M&E reports. 7. Minutes, visitors' book records and training records. 8. M&E reports. 9. Site visits.	10. The plan is implemented successfully. 11. Good working relationships among stakeholders. 12. Availability of resources and markets. 13. Success in ecotourism activities development.

Human resources	1.	No. of trainings conducted	3.	KFS and CFA records	5.	The plan is implemented successfully.
	2.	No. of new staff recruited	4.	Payroll records	6.	Good working relationships among stakeholders.
					7.	Success in human resource development.

1. Institutional Arrangements for Plan Implementation

The successful implementation of the management plan necessitates the use of appropriate and integrated institutional and organizational structures that exist in the relevant institutions. Field organization for the implementation of the plan at the forest station level will be implemented by the Joint Management Committee (see appendix 1). It brings together key stakeholders to manage the implementation process of the plan as identified in the consultative process. It will also provide a forum for dialogue, consensus building, priority setting and balancing of the various interests involved. The Joint Management committee comprises of,

- Representatives from the KFS.
- Representatives from the CFA.
- Other stakeholders in the area as the need arises.

This will assist the CFA in implementation of the JMA.

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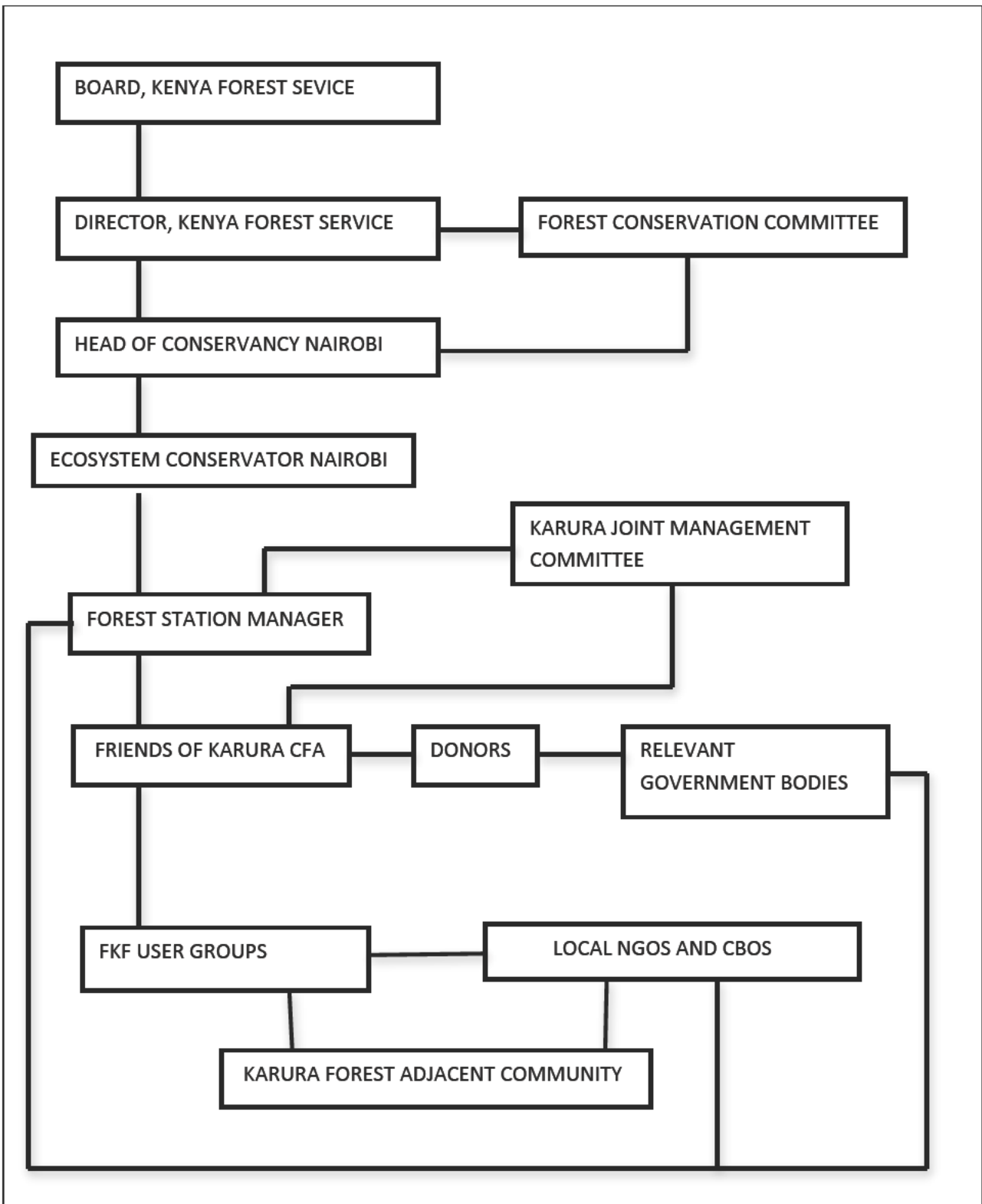
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9. APPENDICES

1. APPENDIX 1: INSTITUTIONAL ARRANGEMENTS FOR PLAN IMPLEMENTATION





2. APPENDIX 2: DETAILS OF THE PLANTATIONS WITHIN KARURA (2008 NRM DATA, PRESENTLY UNDER REVISION 2016)

BLOCK	SPECIES	SUB-COMP	AREA	AGE	DENSITY
KARURA	Cup. tororosa	17A	5.3Ha	51years	
"	Cup.lustanica	9C	2.0Ha	39years	
"	Araucariacunninghamii	18A	10.5Ha	51years	
	Araucariacunninghamii	18B	6.5Ha	51years	
	Araucariacunninghamii	18C	3.7Ha	54years	
	Araucariacunninghamii	13D	4.1Ha	49years	
	Araucariacunninghamii	29A	1.2Ha	48years	
	Araucariacunninghamii	34D	1.7Ha	58years	
	Araucariacunninghamii	27A	7.7Ha	49years	
	Eucalyptus	NearHQs Offices	4.1Ha	89years	Coppice
	Eucalyptus	12C	3.2Ha	86years	Coppice
	Eucalyptus maculata	12B	1.8Ha	46years	Coppice
	Eucalyptus paniculata	12A	2.4Ha	46years	Coppice
	Eucalyptus saligna	14A	3.0Ha	47years	Coppice
	Eucalyptus paniculata&saligna	21A	4.5Ha	55years	Coppice
KARURA	Eucalyptus saligna	24C	4.1Ha	58years	Coppice
	Eucalyptus saligna	24D	8.9Ha	43years	Coppice
	Eucalyptus saligna&maculata	30A	8.9Ha	58years	Coppice
SIGIRIA	Cupressustorurosa	43A	2.3Ha	49years	
	Cupressustorurosa	49A	6.0Ha	49years	
SIGIRIA	Cupressustorurosa	42B	11.3Ha	52years	
SIGIRIA	Eucalyptus saligna	40A	8.9Ha	57years	Coppice
	Eucalyptus saligna	44A	6.1Ha	79years	Coppice
	Eucalyptus saligna	44C	1.2Ha	75years	Coppice
	Eucalyptus mix	45A	2.0Ha	74years	Coppice
	Eucalyptus saligna	45B	2.0Ha	58years	Coppice
	Eucalyptus saligna	46A	9.7Ha	83years	Coppice
	Eucalyptus saligna	46B	4.1Ha	84years	Coppice
	Eucalyptus saligna	48A	12.5Ha	48years	Coppice
	Eucalyptus mix	51A	8.5Ha	52years	Coppice

3. APPENDIX 3: MANDATE OF THE KARURA JOINT MANAGEMENT

COMMITTEE

1. Promote the sustainable development of the forest for climate amelioration, soil, and water and biodiversity conservation;
2. Carry out inventories and evaluation of forest resources and their potential utilization, in order to generate accurate information for decision making;
3. Empower local communities to manage the forest through Community Forest Association;
4. Ensure that forest plantations are sustainably managed to realize their maximum potential;
5. Support forest management which will embrace preservation of religious and cultural sites, traditional medical sources, water catchments, and habitats for endemic and threatened species of flora and fauna;
6. Promote good governance in the forest sector;
7. Ensure that Karura Forest Reserve, being largely indigenous, remains reserved;
8. Determine and appropriate the status of the forest, and take restoration measures;
9. Promote participatory forest management approaches to ensure the participation of communities and other stakeholders in the management of Karura Forest Reserve;
10. Ensure that users benefiting from the forest contribute to the conservation and management through the user pay principle;
11. Promote insect farming and other sustainable, non-harmful uses of forest;
12. Ensure that forest plantations are efficiently managed and operated on a commercial basis;
13. Ensure that degraded and over exploited areas are rehabilitated by community associations with government support;
14. Develop low impact recreation and ecotourism facilities;
15. Liberalise seedlings production;
16. Promote value added forest products;

17. Application of forestry research findings;
18. Support public awareness creation with regard to forest conservation management and utilization;
19. Protect traditional interests of local communities customarily resident within or around a forest;
20. Respect cultural practices that are compatible with sustainable forest management;
21. Enhance more opportunities for women and youth in the forest through training and education; and,
22. Promote HIV/AIDS awareness.

1. APPENDIX 4: KENYA FOREST SERVICE (KFS) AND FRIENDS OF KARURA FOREST (FKF) - STAKEHOLDER ENGAGEMENT POLICY FOR TREE PLANTING IN KARURA FOREST

1. Context

KFS and FKF are looking for greater stakeholder participation in Forestry conservation and tree planting. KFS and FKF have established guidelines to engage stakeholders at various levels to ensure a win-win situation where the goals of stakeholders are met at the same time recognizing KFS /FKF inputs

2. KFS and FKF Authority, Branding and Recognition

23. All engagements of the set guidelines will be covered, if necessary, by a signed agreement
24. KFS and FKF will be consulted and involved at all times on planned arrangement and progress thereafter.
25. KFS and FKF will delegate technical KFS and FKF staff to provide all technical support for intended tree planting engagements
26. All publicity activities e. g press release, media briefings etc on engagement must involve all entities to the engagement and information circulated prior to events
27. For launch activities, KFS and FKF must be involved in the entire process and provided with a platform to contribute in the event e.g. Director KFS and Chair FKF make a speech. KFS and FKF exhibit its products. KFS and FKF logo and slogan must be used in all communications regarding engagement by example in brochures, fillers, billboards, banners and all forms and types of communications related to the event including mentions on radio and other electronic media communication.

1. KFS and FKF Contribution

1. KFS and FKF shall arrange to undertake all necessary measures to ensure success of the agreements.

1. Tree planting

2. KFS and FKF will make available a site for the tree planting exercise, will prepare the site for tree planting, will provide the trees for planting (from the Karura Nursery) and will ensure after care of trees (for no less than three years) to guarantee their survival.

The cost to do all the above will KSH 350 per tree to be revised from time to time. Cheques to cover the tree planting expenses need to be made out in advance to Friends of Karura Forest.