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Study of Challenges Facing Sustainable Management of the Urban Forest
Khartoum Sunt Forest- Sudan

التحديات التى تواجه الإدارة المستدامة للغابات الحضرية
غابة السنط - ولاية الخرطوم

A thesis submitted for partial fulfillment of the requirement for the M.Sc. degree in Environmental Forestry

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Dedication

This is work dedicated

To the soul of my father,

To my glorious mother,

To my sisters, brothers and friends

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I would like to thanks my mother for her patience and encouragement.

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List of acronyms:

IUCN	International Union for the Conservation of Nature
FN C	Forest National Corporation
SFM	Sustainable Forest Management
SECS	Sudanese Environmental Conservation Society
SPSS	Statically Package for Social Sciences
SPHC	Sudan population & Housing Census
UNESCO	United Nation for Education Science &Cultural Organization
NTFPs	Non-Timer Forest Products
RSS	Republic of South Sudan
SPLM	South Sudan Liberation Movement
SPLA	South Sudan Liberation Army
HHs	House holds
FGDs	Focus Group Discussions

Abstract

This study was conducted at Khartoum Sunt Forest with an objective of understanding challenges facing urban forest management and best means to address them. Data and information collected covered history of the forest management in addition to ongoing management activities administrative arrangement and prevailing uses including recreation related activities.

Tools used included a questionnaire to collect data and information from forest visitors. In additions to checklists to collected information related to Forest National Corporation units and staff in addition to key informants.

The study showed that the number of visitors was increasing, majority of them were student and other came for recreational purposes. They stated that the forest is a good place for recreation and it provides shades, and reduced air pollution.The results indicated that the gathering in the forest represent an opportunity for disseminating awareness messages and involving stakeholders in a research work that promote urban forest management.

According to the result, FNC may need to promote management plan to accommodate services for visitors, including shade trees at areas less covered by water, in addition to involving private sectors for services provision and other partners for joined studies and research work.

According to the main study findings that forest visitors come to the forest as for recreation site that should be conserved and properly management. The period when there was no functioning management plan (1987 - 2003) has led to negative impacts on the forest health and plans should be made and implemented without gaps. The forest has significant ecological environmental and social roles that should be maintained.

The study recommended on the necessity of making forest management plan that accommodate visitors interest including recreation facilities and services. In addition to involving private sector for service provision. It also recommended for taking measures to avoid contamination by sewage and illegal housing, In addition to trees cutting. Management plan will contribute to enriching experience and help for scaling up urban forest plantation. Also

the study recommended enhancing and establishing infrastructure to make the forest more comfortable and convenient location of recreation for Khartoum urban population. In addition to planting ever green shade trees in areas less covered by water.

ملخص البحث

أُجريت هذه الدراسة في غابة السنط بالخرطوم بهدف فهم التحديات الت يتواجه ادارة الغابات الحضرية وأفضل الوسائل للتعامل معها. البيانات والمعلومات التي جمعت غطت تاريخ الادارة المستدامة للغابات بالإضافة إلى الأنشطة الإدارية الجارية والترتيبات الإدارية والاستخدامات السائدة بما في ذلك الترفيه والأنشطة ذات الصلة.

الأدوات شملت استبيانا لجمع المعلومات والبيانات من زوار الغابة. بالإضافة إلى قوائم مراجعة لجمع المعلومات المتصلة بوحدات الهيئة القومية للغابات والجهات ذات الصلة والموظفين، إضافة إلى شخصيات رئيسية.

أظهرت نتائج الدراسة أن عدد الزوار في ازدياد، غالبيتهم من الطلاب وغيرهم جاء للأغراض الترفيهية. وذكروا أن الغابة هي مكان جيد للترفيه يوفر الظل ويقلل تلوث الهواء. أكدت النتائج أن التجمع في الغابة يمثل فرصة لنشر الوعي وإشراك أصحاب المصلحة فيعمل بحثي عن تعزز إدارة الغابات الحضرية.

وفقا للدراسة ،قد تحتاج الهيئة القومية للغابات إلى تعزيز خطة ادارة الخدمات لاستيعاب الزوار، بما في ذلك المناطق التي ليس بها أشجار ظل، وكذلك إلى اشراك القطاع الخاص والشركاء في توفير الخدمات المساعدة في عمل الدراسات والابحاث.

حسب نتائج الدراسة الرئيسية ينجذب الزوار إلى موقع الغابة لغرض الترفيه، لذلك يتعين صونها وإدارتها بشكل صحيح. الفترة التي لم يكن يوجد منها خطة إدارة فاعلة للغابة (١٩٨٧ - ٢٠٠٣) قد أدت إلى اثار سلبية على الغابة فينبغي وضع خطط وتنفيذها دون ثغرات. فللغابة دور بيئي وإجماعي مهمين لذا وجب المحافظة عليها.

وأوصت الدراسة على ضرورة إعداد خطة لإدارة الغابة لاستيعاب الزوار تتضمن المرافق الترفيهية والخدمات. بالإضافة إلى إشراك القطاع الخاص في توفير الخدمات. وأوصت الدراسة أيضا باتخاذ تدابير لمنع التلوث والمساكن غير القانونية، إضافة إلى قطع الأشجار. خطة إدارة الغابات سوف تساهم في إثراء الخبرة والمساعدة في دفع زراعة الغابات الحضرية. كما أوصت الدراسة إلى تعزيز وإقامة بنى تحتية تجعل الغابة أكثر راحة وملائمة للترويح عن النفس لسكان الخرطوم. بالإضافة إلى زراعة أشجار الظل في المناطق التي تغطيها كمية اقل من المياه.

CHAPTER ONE

Introduction

1.1 Background:

Urban forests refers to any vegetation effort including the planting of trees and shrubs whose design is intended to improve the environmental quality, economic opportunity, or aesthetic value associated with city's landscape.

Urban forests play an important roles for human well-being in many dimensions in the world. The significance of the urban forest resource and the powerful forces for change in the urban environment make sustainability a critical issue in urban forest management.

The diversity, connectedness and dynamics of the urban forest establish the context for management that will determine the sustainability of forest structure, health, functions, and benefits.

Khartoum Sunt Forest was reserved in 1932. The main reasons behind its establishment were to serve as a scenery place, home for birds, insects, wildlife, fresh air, shade, artistry, natural and environmental studies (FNC, 2001).

Recreation activities all over the world have a high importance due the awareness. Nature comes first as place of recreation and in nature or planted forests attract people as the most easy and enjoyable recreation.

In recent years, studies of urban forests have shown that cities' trees provide benefits worth, much more than the costs of their planting and up keep. (Hatim، 2002) demonstrated the value of Khartoum Sunt Forest, assuming that it is the only urban forest in Khartoum State. Urban forests all over the world have a high importance due the awareness towards sustainable management.

Urban forests affected by various problems such as encroachment, illegal cuttings, and low legal enforcement. Consequently, the main objective of this study was to assess the challenges and problems of the urban forests and to provide recommendations for different stakeholders who manage and participate in rehabilitating them.

1.2 Research problems:

Because of its unique position as a natural forest in the heart of the modern, crowded and growing capital of Sudan, Sunt forest provides a whole range of valuable services to the environment and the society of Khartoum. It is an important ground for both resident and migrating birds. It also acts as a barrier that protects the Residential areas in the vicinity from the annual flooding by holding the excess water of the White Nile. Moreover, the local community exploits the forest for fishing, grazing, farming as well as recreation activities (Eltayeb & Hamed, 2003).

The main challenges facing sustainable management of urban forests is the lack of plans that accommodated implication of being part of urban practices, rapid and unplanned expansion and commercial development, along with population pressure and environment at deteriorating with time, At the present in many part of the world urban forests are almost transformed to urban habitat accommodating an excessive population due to a high rate of rural–urban migration In addition, industrialization within the urban areas and conversion of different land use within the city and the surrounding urban areas. Due to its location The Khartoum Sunt Forest is affected by the bridges constriction and tunnels those threaten and reduce the original reserved area. Dumping of the garbage of demolished buildings on the eastern side of the forest. Sewage is disposed into the forest through daring canals and tankers. On other Small fires caused by visitors constitute another risk. Inadequate and negligence in guarding gave a chance for damage and illicit cutting of peripheral trees. Feeding on branches and regenerating shoots Browses.

In addition, necessity absorption needs of forest patterns users, and approaches because ancient plan not absorbs all variables. The previous plan was not reviewed from 1987 to 2003; Absence of regular programs for planting and, insufficient guards and neglect to open up the field of unfair cutting. Urban forests are affected by various problems such as encroachment, illegal cuttings, and low legal enforcement. Consequently, the main objective of this study was to assess the challenges and problems of the urban forests and to provide recommendations for different stakeholders who manage and participate in rehabilitating them.

1.4 Main Objectives:

To study challenges facing sustainable management of Khartoum Sunt Forest.

1.4.1 The Specific Objective Includes:

- To study the main factors challenging and interfering with the sustainable management the Sunt Khartoum Forest.
- To study the best means to dealing with challenges factors.

1.5 Research Question:

a) What are the main challenges facing sustainable management of the Sunt Forest?
b) What are the best means to deal with these challenges?

CHAPTER TWO

Study Area

2.1. Location:

Khartoum State where the Sunt forest located is lies almost in the center of the Sudan in the semi-desert zone at the junction of the Blue Nile or White Nile, for river Nile. The state is located approximately between latitudes 15^{o}-8^{o} N and 16^{o}-39^{o} North and longitude 31^{o}-35^{o} E and 34^{o}–24^{o}East, with elevation of 380 meters above sea level. (FNC, 2001) report.

2.٢. Population and Area:-

The total population of the study area is about 5.274,321 human inhabitants (SPHC). The area of Khartoum state is approximately 21,525 square kilometer (FNC, 2001).

2.3. Topography:-

Khartoum State is generally an extensive simple plain except for some scattered Mountains. The Sunt Forest is under lain at depth by the predominantly crystalline. Cambrian basement complex. In which its surface forms a platform where the Mesozoic Nubian sand stone lie. The soils are from of alluvial deposits (flood plain) brought down by the White Nile formation due to annual deposition was considered the most important factors of the soils (Younis and Osman, 1986). Covers most eastern parts of the state. Covers the state between the Blue and White Nile. Covers the area at banks of White and Blue Niles and deferent wades. (FNC, 2001).

2.4. Climates:-

The climate is tropical continental, characterized by hot summer with short rainy season. Which is usually from June to September, and relatively cold,

dry and windy winter (November- March). Low rainfall (124mm) and high evaporation potential. The climate of Khartoum State described as a semi-arid. In Khartoum state, the temperature at it's maximum in May and June is46^{o} C and at it's minimum in December and January is 13^{o} C. Annual rainfall in Khartoum state is about 161mm. the rainy season extend from May to September. In addition, the maximum rainfall was recorded in July and August. Khartoum generally has low Relative humidity, never exceeding 60% in every month. Which reflects characteristics of dry climate. This means its lowest is during April, i.e. 16%. The relative humidity along the Nile Valley reaches much higher value 80% particularly during the period between June and September. Relative humidity in Khartoum State is low throughout the year.

2.5. Vegetation cover:-

Khartoum State falls in semi-desert ecological zone. According to the vegetation map of the Sudan, which was put up by (Harrison and Jackson, 1958), there are three minor subdivisions of semi-desert ecological zone:-

Acacia tortillas – Merowe crass folia desert which occupied 90%from Northwest of the state there is Avery small portion named semi- desert grassland on sand. Another small portion to the southeast named semi-desert grassland on clay (Butana plain).*Acacia tortillas*.

Salvadora persica grow along seasonal courses. In the semi-desert grassland, the woody species (*Acacia mellifera*), grows along the drainages of seasonal (Wades).

Along the riverbanks and the island of Blue, White and the Nile Rivers, on uncultivated area found *Acaica nubica, Acacia seyal, Zizghus spina- Christi*, *Faidherbi albida* and occasionally *Balanitesa eagyptiaca*. (Van *etal,* 1984).Dicotyledonous and grasses herb and grasses only appear after the floodwater subsides from the forest *Acacia seyal* (Talih) on the adjacent slightly elevated bank away from the river.

Acacia nilotica (Sunt) predominates Khartoum Sunt forest on deep alluvial deposits very few individuals of *Faidherbia albida* (Haraz).

Balanites eagyptiaca (Higlige) and a variety of herbaceous *seyal* thrive on drier area thinner silt with area of deep racking clay soil. (FNC, 2001).

2.6. Land form:-

Khartoum Sunt forest has no available contour map. Generally, the area is composed of a gently sloping flat locally undulating plain that was formed as a result of river seasonal flood towards the eastern side of the forest. The area is slightly raised. (Hanadi, 1998).

2.7. Flood regime:-

Around August to September, a period between September and the end of October the food level subside rather rapidly.

In normal years, the White Nile leaves all the forest, by December the topsoil in the whole forest is dried except some few. The White Nile begins rising in mid-June and reach its climax low grounds. (Hanadi, 1998).

2. 8 History of the Forest:-

The Sunt Forest was owned by Sudan Forest Department, in 1921. The main purpose of forest was the production of fuel-wood for local bakeries and planks for railway lines. In 1949, a small sector of the Forest was set aside as an arboretum and training center for forest personnel. In 1939, it was declared as a national bird sanctuary. (Salah, 2003).

2.9 Problems facing of the Forest:

Urban Forest planning in the form of the roads, bridges and tunnels have threaten and reduced the original reserved area. The refuse dumping representing one of the major environmental problem in the forest.

Disposal of solid waste on land cause soil pollution. Polythene bags are one of the main environmental hazards in the forest. The nasty smells that result from waste dumping are another source of untreated effluents on the soil cause nuisance due to unpleasant smell and pollutes the ground water. Furthermore, such toxic substances present in the waste may kill fish and flora in addition to their production of odor. Di-back beetle often because a considerable damage to the natural regeneration of Sunt (Madia, 2012).

2.10 Legislation aspects:

- Recently the legislation has been violated by several illegal Activities such as:
- Illicit cutting of trees for both domestic and commercial uses.
- Feeding of branches and tramping in young Sunt regenerating to cattle and goats sometimes to ground level causing delaying in growth and reduction in the density of stocking.
- Fires for cooking inside the forest are sometimes ignited, affecting small congregations of plants such as seedling and bushes.
- Broken bricks and stones of demolished buildings are dumped inside the forest.

2.11 Legislations:

According to the central forest ordinance, Khartoum Sunt Forest has been reserved in 1932. In July 1932, the official order of reservation had been published in the Sudan government gazette No. 563 (Fathalaliem, 1977).

There have been rights of passing through the forest by animals for drinking water from the White Nile people were permitted to visit the forest for picnic and recreation.

Certain privileges are granted to the local inhabitants under control of the forest department. Collecting dry twigs as fuel-wood and Sunt pots (grad) .No rights or privileges are granted other than mentioned legislation has been violated by illegal acts.

3. 12 diversity of Khartoum Sunt Forest:

These include acacia trees and includes a large number of insects, spider, birds and mammals.

Due to existence of different type of local birds, it is a breeding ground for scientists, university students and those interested in environmental issues. It is an important link in the environmental balance in the region, and helps to soften the atmosphere and absorb the gases and toxins produced by cars and factories.

Each year, large numbers of migratory birds visits the forest from Africa. These birds are abundant in autumn and are home to a large group of

migratory birds on their way to and from Asia, Europe and some African countries. The most famous of the migratory birds is the Flamengo, which is found in the forest in the month of 12 (as I know it is on the journey back to Europe and enters Sudan in the month of 6 and is currently in Port Sudan on its way to Kenya) and the African open bill Stork many species are beautiful as well as there are amounts of wild ducks. The following table shows main birds visual the forest. (Eltayeb *etal*, 2003)

Some of Scientific Names of main Bird Species found in Sunt Forest:

Common Name	Scientific Name
Great White Pelican	*Pelecanus onocrotalus*
Pink backed Pelican	*Pelecanus rufescens*
Little Grebe	*Tachybaptus ruficollis*
Long-tailed Cormorant	*Phalacrocorax africanus*
Cattle Egret	*Bubulcus ibis*
Common Saquacco Heron	*Ardeola ralloides*
Little Egret	*Egretta garzetta*
Great Egret	*Casmerodius albus*
Goliath Heron	*Ardea goliath*
Grey Heron	*Ardea cinerea*
White Stork	*Ciconia Ciconiidae*
Abdims Stork	*Ciconia abdimii*
Black Stork	*Ciconia nigra*
African Spoonbill	*Platalea alba*
Sacred Ibis	*Threkiornis aethiopicus*

Source Eltayeb etal, 2003

CHAPTER THREE

Literature Review

3.1 Urban Forest:

Urban Forestry is the care and management of tree population in urban settings for improving the urban environment. Urban Forestry advocates the roles of trees as a critical part of the urban infrastructure. Urban forests plant and maintain trees, support appropriate tree and forest preservation, conduct research and promote the many benefits trees provide. Urban Forestry is practiced by municipal and commercial arborists, municipal and utility foresters, environmental policymakers, city planners, consultants, educators, researchers and community activists.

The concepts of urban forests management puts responsibilities on the hands of various stakeholders to contribute in urban forests development. Municipal and commercial arborists, foresters, environmental policy makers, city planners, consultants, educators, researchers, and community members (Nowake, 2000) practice urban Forestry.

3.2 The Importance of the Urban Forest

Urban forest have played importance roles in social, cultural, economic and environmental development of urban forest in Africa thought benefits such as landscape enhancement, provision of recreational and cultural facilities, erosion control, watershed protection and supply of fruits and fuelwood. The growing population and rapid urbanization occasioned by demographic switch from rural to urban society is outstripping the planting planning and carrying capacity of municipal authorities in Africa. The type of tree species planted for landscape enhancement environmental protection and other benefits varied with ecological zone and cultural values. Rapid urban population growth and poor implementation of government policies are some factors affecting urban forests development in Africa. To ensure sustainable development, forest management technique that accommodates human, social, political, cultural and economic factors should be adopted. Political goodwill should be secured while appropriate social awareness should be promoted to guarantee that forest initiative were upheld.

3.3 History of the Management of Forests in the Sudan:

Following the Battle of Omdurman at Karare between the Mahdist and the Anglo-Egyptian Army, and the start of condominium rule in 1898, forestry activities started in the Sudan in 1901. The government commissioned an Indian forester, Mr. C.E Moriell to tour the country and produce a report about the state of forest in the country. As a result of his report the woods and forests ordinance was promulgated in 1901. Moreover, the Department of Woodlands and Forests was established the in same year. The ordinance was replaced in 1908 by the first forest Act. Adoption and implementation of administrative and legislative measures continued ever since. The most salient of these is the endorsement of Sudan's forest policy in 1932, the central and provincial forest ordinance (1932), the local Government Act of 1972, regional Government Act (1980), the amendment thereof in 1985, the revision of forest policy in 1986, and the creation of the forests National Corporation (FNC) and revision of Forest Act in 1989.

Civil war erupted in South Sudan in August 1955, barely four months before independence in January 1956. The Addis Ababa accord of 1973, which was reached to stop the civil strife in the South created three ministries for agriculture, one in each of the three provinces, for which the forest sector was added. Since then forestry, matters formally went out of the jurisdiction of the central government and direction of the forests in Khartoum.

The civil war was rekindled in 1983. Comprehensive Peace Agreement signed between the Government of Sudan and South Sudan liberation Movement (SPLM) and army and (SPLA) in 2005 which ended after 50 years civil war embodied a self- determination referendum. In the referendum, which took place on January 9th, 2011, a majority of voters in Southern Sudan voted for cessation from Sudan Republic. Six months later, on July 9th the whole world starting with the Government of Sudan recognized the Republic of South Sudan (RSS) as member no 193 of the United Nations and number no56 of the African Union.

The (RSS) goes away with some 619.745km^2 and 8.26 million people of the area and population of Sudan. It will also go with some 50% of the forest and woodland area of Sudan. The Republic of Sudan retains an area of the 1886 km2 and some 50% of the forest and woodlands of its pre July 9th estate. Hassan et al. (2012).

3.4 Underlying causes of deforestation of forest:-

3.4.1 Climate and environmental variables:

These include intrinsic aridity and erratic rainfall coupled with recently setting in vagaries of climate change and the attendant extremes of climatic phenomena such as drought and floods. Such tree establishment is difficult and expensive. There is a standing order for search for adapting and tolerant multi- purpose plant species and varieties and measures to mitigate the effects of climate change and associated phenomena. Population growth, demographic changes and change in social aspirations and consequent pressure on scarce resources like land, water and changes in demand for goods and services from forest and range sector:

3.4.2 The need for forest institutions to accommodate all these requirements on a sustained basis:

- Wood and NWFPs are largely directed. Collected by people from forests or were traded in informal markets.
- The science of environmental and natural resource accounting is in its infancy.

As a reflection of the lack of appreciation coupled with a variety of economic difficulties in Sudan forestry is marginalized and placed low in national agenda and public expenditure on it is generally low.

3.5 Political variables:

- The rapid growth in human and animal population and the corresponding rise in demand for forest and range goods and services in the absence of rational land-use mapping have led and are likely to lead to conflict and political struggle. The case of Darfur is fresh in mind. Conflict between Sudan and the newly borne republic of south Sudan over Abeyi district is already brewing up.
- Major causes of deforestation and forest degradation in Sudan:
  Agricultural expansion: the biggest direction cause of deforestation in Sudan in the conversion of natural forests to cropland and pasture. A massive percentage of land has been converted into mechanized and traditional rainfall and irrigated agriculture during the period 1940-2012.
  Energy consumption: the Energy sector closely linked to deforestation through wood extraction for fuel and charcoal. Sudan depends mainly on the forestry sector as a household, services and industrial energy source.

Refugees and internally displace people: contribute to the removal of forests to obtain their requirements of fuel wood and building houses in Darfur and Refugees in the eastern and western Sudan.

Factors affecting forest health: information is available about insects, diseases and other hazards affecting forests and the forest sector in Sudan. Other factors like fire, fungal and insect attacks, among others.

Natural disturbances: Mainly drought related to climate change (Hassan *etal,* 2012).

3. 6 policies and regulation related to forest:

Environmental Protection and Environmental Protection Act of (2008)

In the law of environmental protection and environmental promotion in Khartoum State of the year 2008, the first chapter in the paragraph of natural resources: (means Resources Renewable and Non-renewable resources).

In the law of environmental protection and environmental protection in Khartoum State for the year 2008, the first chapter in the paragraph of environmental protection: (intended to preserve the delicate balance of the environment and prevent pollution and degradation to achieve sustainable development).

The first chapter in the paragraph degradation (means the impact on the environment, which reduces the value or distort the nature or depletion of resources or change the living organisms or effects).

The first chapter in the environmental impact paragraph: (means environmental variables resulting from human activities).

The first chapter of the paragraph evaluates the environmental impact: (means the detection of negative or positive environmental effects or returns in order to avoid, protect and address harmful effects and development projects).

The first chapter of the environmental impact assessment paragraph:

(Means the study of The Environmental Feasibility Analysis of the Proposed Projects, Which May Affect the Establishment or Exercise of Its Activities on the Safety of the Environment in Order to protect it).

In Chapter VIII (Violations and Penalties) is a paragraph that provides for the removal and excessive cutting of the vegetation cover.

In Chapter VIII (Violations and Penalties) is a paragraph that provides for changing the course of the natural sewage waters of the Nile waters, the cliff and the settlements.

In Chapter VIII (Violations and Penalties) in a paragraph that provides for environmental or urban misconduct.

3.6.1 Law of Charges for Environmental Protection and Promotion Services in Khartoum State:

The Law of Charges of Environmental Protection and Promotion Services in the State of Khartoum Amendment 2008 in the section (Violations and Penalties) shall be considered as the perpetrator of violation of any of the following activities and shall not pay the fee and shall be punished with a fine exceeding three thousand pounds in addition to the payment of the prescribed fees:

- Removal and over-cutting of trees and encroachment on the plant cover 200 pounds for the tree and offset by agriculture.
- Car wash on water sources 100 pounds.
- Discharge or discharge of safe water (wastewater) in the environmental 300 pounds.

3.7 Services provide by urban forest:

3.7.1 Forest goods and services fall into categories:

Where the resources are consumed (the use value of forest resource).

Where the resources may not be consumed but are never the less value by people (the Non-use values).

Forest goods and services were derived from plantations, natural forests and woodlands. The benefits and costs associated with each type of forest cover may however differ.

Examples of use values of forests for which there is normally an active market are:

Wood products for industrial processing and wood for fuel. Non-timer Forest products (NTFPs), such as resin, fruit and other food, medicinal plants, bark and fibers, and wildlife.

Opportunities for recreation and tourism development.

Non-use value were derived from the following services (there is usually No

market value afforded to them).

Spiritual, religious and cultural values.

Protection of water resources.

Conservation of biological diversity.

Fixing of carbon dioxide form the air to compensate for industrial emissions. (Madina, 2012).

3.7.2 Forest values to community:

Forest have always provided a wide range of goods and services to the people living in and around them. These include:

Timber and wood fiber, food and shelter:

A wide range of plants, parts plants, and animal parts are used for medicinal purposes some have been incorporated into conventional medical practice. Other remain as (indigenous knowledge) or have yet be identified as of medicinal value.

UNESOCO has a worldwide research program studying the different uses people make of plants. An important part of this program looks at medicinal uses of plants.

In addition to providing food, forests protect against wind, soil erosion and regulate climate by slowly releasing rainfall to the air and soil.

They produce oxygen and reduce carbon dioxide, a source of global warming. Forests are storehouse of biodiversity. Two – thirds of all land-bases species on earth live in forest; this biodiversity is a source for many contemporary and future medicines. Most important are the many forest medicines used directly by the poor developing country (Madina, 2012).

3.7.3 Outdoor recreation:

Is simply recreation that is typically carried on outdoor it require space and resource. Sometimes-large quantities for its enjoyment. Some kids are best carried on where natural landscape has had sieve investment.

Natural resources for outdoor recreation include area of land, bodies of water, forest, swamps and other natural features. (Marion, *etal*, 1966).

3.7.4 Forest Recreation:

Forest recreation is usually associated with some kind of activities such as

hunting, fishing, hiking horseback riding ,bird watching, camping, mountain climbing, auto moping, snow moiling , skiing, swimming, riding and many others. Enjoyment does not really answer the question of why People spend time in the forest (Gregory, 1972).

Urban forestry is the careful care and management of tree populations in urban settings for improving the urban environment.

Urban forestry advocates the role of trees as a critical part of the urban infrastructure. Urban foresters plant and maintain trees, support appropriate tree and forest preservation, conduct research and promote the many benefits trees provide.

Urban forestry is practiced by municipal, commercial, arborists, municipal utility foresters, environmental policymakers, city planners, consultants, educators, researchers and community activists.

3.8 Sustaining Urban Forests

The significance of the urban forest resource and the powerful forces for change in the urban environment make sustainability a critical issue in urban forest management. The diversity, connectedness, and dynamics of the urban forest establish the context for management that will determine the sustainability of forest structure, health, functions, and benefits. A dynamic planning and management model is presented that encourages decisions that will support sustainability through the implementation of collaborative and adaptive management.

Tons of large trees include aesthetics, cleansing the air, retaining rainfall, providing shade, and providing symbolic community heritage values. In fact, it is the enduring nature of large trees in a rapidly changing urban environment that contributes to their high symbolic values and a sense of permanence in our fast-changing society.

While researchers and natural resource professionals seem to agree that the goal of management is to maintain forest benefits through space and time, there continues to be debate over the functional definition of urban forest sustainability (Wiersum, 1995). Several attempts to characterize and model the components of sustainable urban forest systems have been made. Some researchers have even outlined specific criteria against which the

sustainability of an ecosystem and its management may be measured (LeMaster and Sedjo 1993; Gangloff 1995; Clark *etal.*1997). Because the social and ecological spheres of urban ecosystems are in constant flux, sustainability as a goal is subject to considerable variation. Ultimately, the attributes of a sustainable urban forest—what it looks like, how it functions, and how it is managed—depend on which ecological functions and social benefits are desired, who chooses them, and at what scale these elements are being sustained (Maser *etal.* 1994; Wiersum, 1995; Grierson *etal.* 1998). An approach to urban forest planning and management is presented that will lead to sustaining urban forest structure and health over time and space. This approach must be firmly grounded in the key characteristics of the urban forest.

3.9 Management Approaches:

Forest management is not carried out in a vacuum. The method adopted must be appropriate to the physical conditions as well as to the socio-economic and institutional context in which it will be implemented. Technical approaches that are, suitable for the slow-growing temperate and boreal forests, with their limited number of species, may not be applicable to the much richer but often more ecologically fragile rain forests. The tropical dry forests, with their own special characteristics and vulnerability, will require yet another approach.

There is no universal management prescription. What is essential in all cases is clarity about objectives and about who is responsible for pursuing them and under what conditions. Only when these are properly defined and established and priorities are assigned is it possible to develop a strategy that will enable the objectives to be realized. Forest Management in Progress Temperate and boreal forests once the management objectives have been clarified, the task is to decide on the management and silvicultural techniques to be used.

3.10 Constraints and the Need for Improvement to the Urban Forest:

A lack of funding is a major obstacle to urban forest management and the promotion of more effective urban forestry programs. Moreover, the situation is unlikely to improve, as municipal and national budgets continue to suffer economic restrictions, escalating, inflation and resource shortages.

Urban forests efforts will therefore increasingly need to demonstrate that their benefits exceed their costs. Those places emphasis on the need for quantitative research on the positive results of the urban forest efforts (Kuchelmeister, 1991).

Decision makers at both levels national and state have tendency to consider urban forest as a low priority activity and one more easily deferred than other programs. This may be due to inadequate education, information, awareness and understanding regarding the economic, social and biological benefits of trees in the urban environment (Nowak, *etal.,* 1991).

The limited availability of land is a key constraint to urban forest efforts. Urban sites are complex environments in terms of the availability of appropriate land for planting as well as in terms of ownership and tenure.

The urban environment is generally a harsh habitat for trees. Stress from environment reduces the vigour of many tree species and increases their susceptibility to disease and best infestation.

Responsibility for the management of urban trees and forest is often shared by various administrative structures that have competing and even conflicting responsibilities (Kuchelmeister, 1991).

CHAPTER FOUR

Materials and Methods

4.1 General:

This study was conducted to investigate the challenges facing sustainable management of urban forests namely Khartoum Sunt Forest where related data and information were collected from relevant sources including communities using the forest, FNC staff , key information's and related stakeholders .

4.2 The methodology:

The methodology based on identifying the different parameters interfere with urban forest management:

- Environmental aspects including biodiversity, ecosystem and habitats.
- Previous of ongoing management plan process.
- Ongoing management activities.
- Forest of services provided need and exists.
- Policies and strategies

A number of variables determined, grouped and accommodated into tools mainly questionnaire and checklists for collection of information from different source as wells for direct observation (annexed).

4.3 Sampling and data collection:

Sample size determined based on assessing of the average numbers of people visiting the forest during a day .representing about 800 persons and for this a sample size of 10% (80 persons)taken randomly.

This covered variables related to forest management and the challenges facing urban forests using set of tools and from different sources. Tools used included questionnaires for visitors, checklists for group discussion and interviews.

4.3.1 Primary data:

Primary data was collected covering socio-economic aspects related to the use of urban forests using questionnaire. Covering mainly, gender, education level and main occupation. Challenges facing sustainable management and views towards improving forest management (annex, 2)

. Information included the checklists (annex ,3) this method covering and highlight all aspect quality of administrative For worker in (FNC) section administrative technical The primary data was collected through social survey using face-to-face interviewing and using the questionnaire as a tool for data collection. Group discussion was also deployed in this research for sake of enriching the collected information from the target group.in addition Field visits and observations.

4.3.2 Secondary data:

The main sources of secondary data used in the study area included previous studies, literature review, documents, official reports, published, reports researches findings, scientific journals , web site and statistics, which proved base-line information for the study.

The institutions covered included Forest National Corporation (FNC) Sudanese environmental society (SECs) universities and other related bodies including wildlife authorities' research. Information was also obtained keys informants. Secondary data facilitated the understanding of the forest context and previous management history.

4.4 Data analysis:

The SPSS software was used for data analysis. The frequency and percentage of each variable is calculated.

CHAPTER FIVE

Results and Discussions

5.1 General:-

Results showed that the majority of the visitors ware students because there are number of Universities in the area including Sudan University of Science and Technology, Elnelien University and Elbayan University. They come to the forest. Because is it consider as a good site for recreational purposes. The future of forest management plans may target involvement of the university students in selected programs like exhibition or setting specialized awareness rising activities or mobilize their interest to conduct their graduations projects in forest related issues.

5.2. Socio economic aspects

Table (1) shows that both sexes visit the forest (58%) males and females (42%) , so management plans should consider this in services and awareness raising. Having both sexes (male, female) as visitors is another opportunity for awareness for different groups. It also useful to consider gender in any services to be provided along social and cultural aspects.

Table (1) visitors according to sex:

Gender	Frequencies	Percentage%
Male	46	58
Female	34	42
Total	80	١٠٠

Table (2) shows that most visitors of the forest are from Omdurman they living more close to the forest followed by those form Khartoum and Khartoum north (Bahari) (FNC) Forest National Corporation may think of establishing other urban forests for Bahari and Omdurman due to difficulties in transport for those who interested and this will minimize the load on this forest.

Table (2) forest visitors according places of residence:-

Place of residence	Frequencies	Percentage%
Omdurman	10	46
Khartoum	37	40
Bahri	32	13
Other	1	1
Total	80	١٠٠

Table (3) shows that most of those visit the forest are mainly youth where they are more interested in cultural activities, exhibition and inspirational motivation and they are group that can effectively influence the community and in awareness of the importance and constitution promising future..

Table (3) Age groups:-

Categories	Frequencies	Percentage%
15 -25	20	30
26 – 35	30	40
36 – 45	10	14
46 – 55	5	8
56 – 65	5	8
Total	80	١٠٠

According to the forest as visiting the forest is easier and less expensive other places as it's less expensive than visiting other places as entrance is free of charge. Been majority and students is a good as a an opportunity for awareness raising for the coming generations (table 4)

Table (4) Occupation of Respondents:

Occupation	Frequencies	Percentage%
Free Business	14	١٨
Employee	34	٤٢
Student	18	23
House Wives	6	٧
Policeman	1	١
Other	7	9
Total	80	١٠٠

Table (5) shows that most of the visitors came to the forest were students' mainly secondary school and students. This is because the forest is close to the universities such as Sudan University, Elnlin University and Elbayan University. Because the forest is a place for recreation and relaxation for them.

Table (5) Visitors According to Education Level:-

Education Levels	Frequencies	Percentage%
Khalwa	3	٤
Basic School	2	٢
Secondary School	18	٢٣
University	48	٦٠
Post Graduate	9	١١
Total	80	١٠٠

5.2.1 The purpose of the visits:

Table (6) explain that people come to the forest for many reasons including recreation, education, trade and others reasons. The forest also is attractive to visitors as a unique location between two Niles, White Nile and Blue Nile.

This result confirmed that recreation is still the main objective for the majority of the visitors (72%) and for this forest management plans should focus on this plans.

Table (6) Purpose of Visiting the Forest:-

Purpose Of Visit	Frequencies	Percentage%
Trade	3	٤
Education	8	١٠
For Recreation	58	٧٢
Other	11	١٤
Total	80	١٠٠

5.2.2 Forest benefits:

In addition to the social benefit the forest, provide an environmental services as an attraction for birds and some small animals including monkeys, as well as weather amelioration. In term of education, it's a suitable place for students of forestry science, natural resources and related fields to do their researches. Negative environmental practices area accumulation of dirt's, estuary of waste and the ruins of building. Renting of motorbikes inside the forest and Expansion in agriculture. According the result (37%) of the visitor recognized the value of the forest and its environmental role. There is a need to raise the percentage towards appreciating the environmental role of the forest through awareness using innovative idea like exhibition or celebrating occasions of environmental events

Table (7) Main Forest's benefits

Benefits	Frequencies	Percentage%
Education	8	10
Recreation	39	٤٩
Environment	30	٣٧
Other	3	٤
Total	80	١٠٠

Table (8) shows the frequency of the visits to the forests where (58%) visit the forest many times, which reflects to what extent visitors like the forests. This will tell also about arranging or organizing some of the visitors to be friends for the forest. They may also mobilize others to do the same which will finally create groups to be involved in some of the activities of the plans or to work as volunteers if needed.

Table (8) Frequency of the visits to the forests

Number of visit	Frequencies	Percentage%
Once	17	٢١
Twice	17	٢١
many times	46	٥٨
Total	80	١٠٠

Table (9) shows the forest contributes it preventing of natural disasters, recreation, education, cultures and others those who manage the forest must preserve the forest itself to perform it's role assigned to it help fullest and to contain the change that are necessary . Develop new plan or review previous plan for conservation and sustainable management and the need for more environmental awareness the importance forest. Total of 31%of the respondents considered recreation as the main service provided by the forest, 1% were selling and buying inside the forest, while 34% believe that the forest have high protection value for the environment of the area. It is interesting that 6% visit the forest as part of their culture which is another dimension that should be considered.

Table (9) Reasons for Visiting the Forest

Community's needs	Frequencies	Percentage%
Natural protection	27	٣٤
education	12	١٥
Fighting poverty	1	1
Culture	5	٦
For recreation	25	٣١
Other	10	١٣
Total	80	١٠٠

5.2.3 Challenges facing the forest management:-

According to table (10) one of the main challenges facing the forest is the urban structures like building bridges, tunnels, electricity connections, urban planning, and population growth of random housing. In addition to negative practices like illegal housing inside the forest, that affects security and may cause other problems like fires, these structure may interfere with water current affect the forest.

Appropriate solutions to be concluded forest management may include portable fencing for regeneration areas, laying benches and planting green yards inside. Develop binding laws or activation of laws. Prevent the washing of vehicles and renting the Motorcycles inside the forest. (FGDs) informed that, the last planting was in 2014 by seeds, where it didn't succeed and based on field observation there were number of goats rooming inside the forest which might also cause a problem for newly growing Sunt trees. New management plan will need to clearly explain means of planting and protecting newly growing Sunt trees the regeneration.

Table (10) Challenges Facing Urban Forest Management

Challenges	Frequencies	Percentage%
Shrinkage of the forest	19	24
Diseases	3	4
Urban planning	16	20
Population growth	12	15
Urbanization	17	21
Other	13	16
Total	80	100

5.2.4 Forest improvement

According to the results included in table (11) that 46% support the idea of using the forest with more developing it as an improved recreational area and only as an area for tree shad through adoption non- classical plant, but introducing new services, sports, exhibition etc. this will also impose more control about negative practices like washing cars or dropping litters or hiring of motorcycles for young people inside the forest. According the FGDs results that living inside the forest is another challenges where number of HHs are living inside the forest which may cause trees or pollution as a result of sanitary practices. Including defection in open or disturbing birds and other animals.

Table (11) Views about Improving the Forest in the Future:

Improving The Forest	Frequencies	Percentage%
Forest	31	٣٩
Residence	0	0
Resorts	37	٤٦
Change of tree	8	١٠
Other	4	٥
Total	80	100

5.2.5 Forest Environment

Table (12) and according to the views of the respondent, Environmental Value of the Forest is to reduce the temperature and pollution of different types and provide shade. It's can reduce the waste or allocate place and through the ruins building. It's considered to be an important shelter for migratory bird.

Table (12) Environmental Value of the Forest:

Environmental Value	Frequencies	Percentage%
Reduce temperature	23	29
Provider of shadow	13	١6
Reduce pollution	17	21
Other	10	٣4
Total	80	١٠٠

5.3 Forest management plan:

According to the study results that Sunt Forest management plan started in 1930s then reviewed in 1945 and another plan made in (1977-1987). There was a gap of lacking management plan during the period (1987-2003), then the last one for period (2003-2013) and since that time there is no management plan till now. This situation indicated that the management planning was not a continuous process which might cause negative impacts on the forest.

According to the interview held with the forest staff that, the gap in the plans has negatively affected the forest and led to

- Increase of Illegal trees felling
- A lot of litters in the forest due to lack of planned cleaning activities.
- In addition to another failed Forest guards are few in number
- Sometimes, that live in the forest.
- Use of plastic material of remains.

Some people come with boats and fell trees from river site, during the rainy season. All these to gather lead to deterioration of the trees cover especially at the east direction.

The survey with forest staff showed that:

The previse Management plans didn't address clearly the following:

- Those who are living inside the forest.
- The plans focus on the cost of the main managed plans and not how to accommodate creation.
- The plans didn't focus on empowering the capacity of the staff.
- Did no focus on partnership with private sector for provision of services for the visitors and other institutions and partner which could be an opportunity for FNC to improve the forest environment and to get an income

According to Aisha (2008), it is recommended to develop and implement technology transfer programs in urban forest health and management that are tailored to identify training and informal needs, and preferred educational outreach methods.

It is recommended also to define and agree on a plan to carry the coordination of activities and distribution of responsibilities between different institutions and organizations involved and interested in urban forestry development.

There is a need to arguing for a systematic plan for addressing issues like spread of trees disease including die back that especially at the east direction of the forest especially areas, not flooded during poor flooding season.

5.4 Forest Management challenges:

According to the study results and field observations there are many challenges facing the development of an appropriate forest management plan including:

- Increasing trees diseases as of increasing dry areas as affected by result from some of urban structure like bridges or building that affect river bank.

- Establishment of green parks close to the forest at the west direction expected to disturb birds that stay in the forest at the sun setting time.
- Number of families living inside the forest which may also cause disturbers for wildlife as well as contaminate the forest with waste of disposals and sometime may cause fires like the one happened in 2004 and 2005.
- Building and construction scraps and ruins brought inside the forest.
- Sanitation disposals inside the forest.

5.5 Considerations for new forest management plan:

New management is urgently needed to ensure that the forest is looked after within a professional frame.

New plans to accommodate challenges mentioned. There should be a mean for structured for involving concerned stakeholder in the new management plans with identifying roles including research encompassing, universities and private sector.

CHAPTER SIX

Conclusions and Recommendation

6.1 Conclusions

As a result of observations, interviews and visits to Khartoum Sunt forest the number of the visitors increased in Fridays Saturdays during occasions.

The study found that Sunt Forest is managed federally, (there is no role of state Khartoum in the Sunt Forest).

Majority of respondents were willing to visit Khartoum Sunt Forest from different places for recreation, swimming and watching birds. In addition, the forest has environmental values as it reduces temperature and Provide of shelter for wildlife, refresh the air and reduced pollution. In addition to small business including selling tea and coffee.

According to the survey carried out during the study the respondents showed that cutting part of the forest affects migration bird and other living organisms. The forest provide habitat for migration bird and wildlife and well supported in the literature.

Officials generally supported the idea of fencing the forest to be protected from illegal (grazing, cutting) and management easily.

Majority of respondents were of the idea that administrative system must be sufficient for protection and follow up the activities in the forest, there are no an overlap of tasks with those fields are related to the forest and forests plan their activities.

The study showed that the forest activities to be carried out in the field to concentrate on environmental awareness, among the visitor

The study confirmed the need of provision of services drinks and food for forest visitors but should arrange in an appropriate manner.

Study showed that there would be can income into the forest, from the fees obtained from those visitors can be used to improve forest and coordinate (FNC) with relevant agencies to solve the challenges facing management.

Forest conducts research, as a part of knowledge of challenges facing urban forest, a highlighted for the communities needs for urban forest challenges facing forest management are urban planning is necessary.

Challenges facing forest management can be mitigated and the proposals for the success of administration are to improve the new plan

6.2 Recommendation:-

- There is no functioning working forest management plans now and for there is need to adopt new one soon.
- New forest management plan will need to accommodate the prevailing surrounding realities including services needed for visitors with consideration of gender aspects when providing services.
- Good Administration must be adopted to prevent illegal tree cutting.
- Number of guards is not enough. Ruins of buildings and waste affect management and recreation aspect, which will need to be solved.
- Sewage and workshops railways affect the forest and visitors.
- The waste disposal should be stopped inside the forest and at boundaries of the forest.
- Enhances and establishing infrastructure to make the forest more comfortable and convenient location of recreation from Khartoum population.
- Broadleaved evergreen shade trees should be planted. The study found that this was advised by number of visitors.
- The study recommended stressing on forest extension concerning the awareness of people about the colleges urban that facing the forest management.
- Management plans may accommodate communities as NGOs or societies to be part of the management plan.

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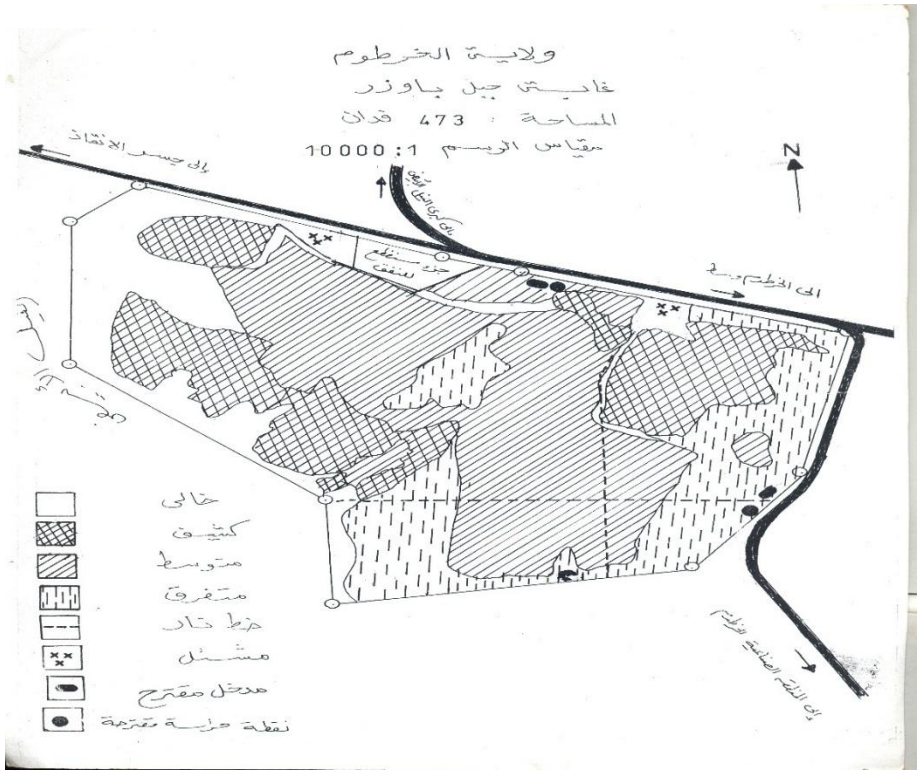
Annex (1)



1 Figure map Plant cover in the forest

Source: Work plan of Sunt forest No. 4

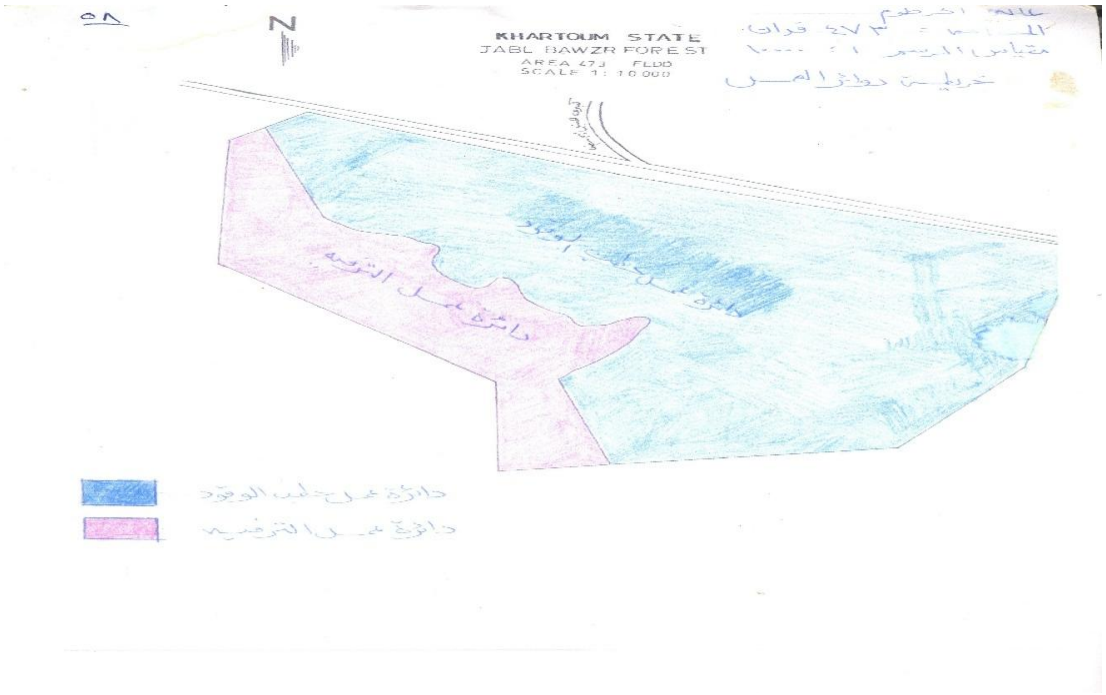


Figure 2 map Forest work circles
Source: Work plan of Sunt forest No. 4

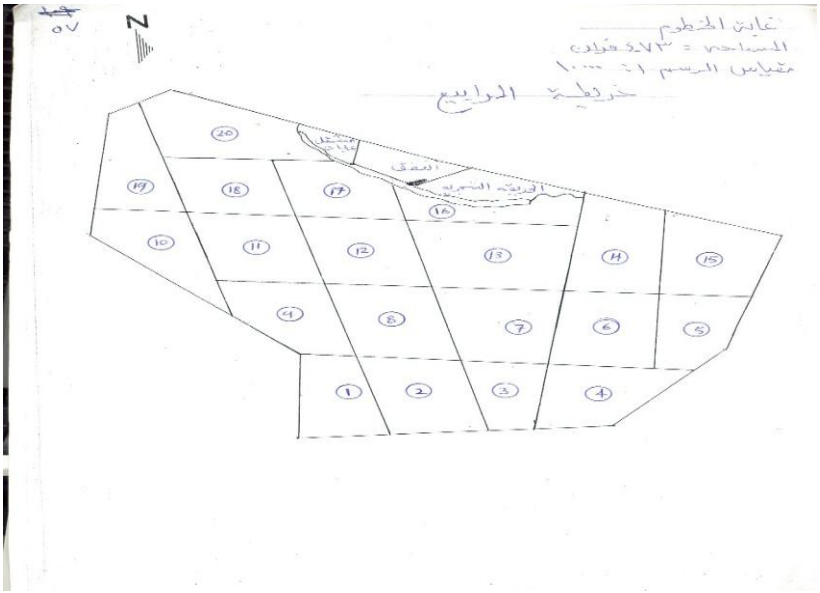


Figure 3 Forest plots

Source: Work plan of Sunt forest No. 4

Figure (1) plate of General of view of the Sunt Forest

Figure (2) plate of View the Sunt Forest during the flood season

Figure(3) plate of View the Sunt Forest during the flowers season

Figure (4) plate of Forest as recreation place

Figure (5) plate of the waste within the forest

Figure (6) plate of Disposal of waste in the forest

Figure (7) plate of Random housing in the forest

Figure (8) Illegal cutting of tree within the forest

Figure (9) plat of land scape

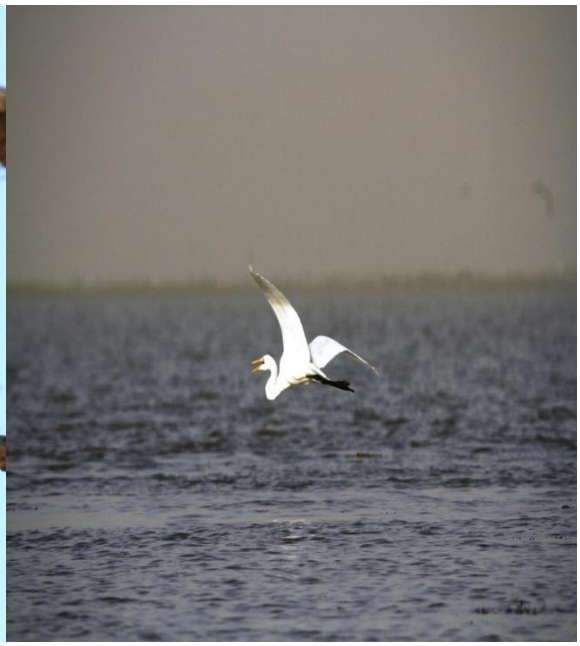
Figure (10) plate of the cultivated area at the edge of the Sunt forest

Figure (11) Plate of Rent the Mowers inside the forest

Figure (12)Forest as a suitable habitat for wildlife

Figure(13)plate of the grazing of cattle's in the forest

Figure(14)photo of Black Kite



Figure(15)photo of Little Egret

Figure (16) plate of Cattle Egret

Annex (2)

Sudan University of Science and Technology

College of graduate status

Questionnaire about challenges facing sustainable management of the urban forest

Khartoum Sunt forest

1-Name () 2- Age ( )

3- Date ( ) 4- Gender ( )

5 - Place of living ( ) 6- Occupation ( )

7- Education levels:

Illiterate ( ) Khalwa ( )

Basic school ( ) secondary school ( )

University ( ) post graduate ( )

8-What is the purpose of the visits?

Trade ( ) Education ( ) Recreation ( ) Other ( )

9-What are the benefits of the forest?

Educational ( ) Environmental ( ) Entertainment ( )

Trade ( ) Other ( )

10- Are the negatives of the forest?

1- 3-

2- 4-

11-What is the basic function of the Sunt forest?

……

12- Among the community's needs highlighted by forest

Natural disasters ( ) Education ( ) Culture ( )

The fight against poverty ( ) Manual skills ( ) Other ( )

13- How many numbers of visits to the forest?

Once ( ) Twice ( ) More ( )

14-What are Challenges Facing Urban Forest Management?

Deduction part of forest ( ) diseases ( ) Urban planning ( )

Population growth ( ) Urbanization ( ) Other ( )

15-What are the appropriate solutions to solve the challenges facing urban forest?

1- 2-

3- 4-

16- Environmental Value of the Forest?

Reduce temperature ( ) Provider of shadow ( )

Reduce pollution ( ) Other ( )

17-What is your point of view in improving the forest site in the future?

Residential ( ) Resorts ( ) Forest ( )

Annex (3)

Sudan University of Science and Technology

College of graduate status

Checklist about challenges facing sustainable management of the urban forest

Khartoum Sunt forest

1-Name () 2- Age ( )

3- Date ( ) 4- Gender ( )

5 - Place of living ( ) 6- Occupation ( )

7- Education levels:

Illiterate ( ) Khalwa ( )

Basic school ( ) Secondary school ( )

University ( ) Post graduate ( )

8-Is the forest management federally or state or both?

Federally ( ) State ( ) Both ( )

9-What is the state role in a forest?

Guidance ( ) agriculture ( ) Protection ( ) There is no role ( )

10-Is there currently a plan of action?

Yes ( ) No ( )

If the answer is no, there is no why there is no plan of action

……

11-Are there regular records of forest management history?

Yes ( ) No ( )

If there, answer is no reason, why there are no records

……

12-Is the administrative system sufficient of protection and follow- up?

Yes ( ) No ( )

13-Is the number of guards sufficient to guard the forest

Yes ( ) No ( )

14- How many guards?

……

15-Are there special laws?

Yes ( ) No ( )

16-Is there conventions there protects the forest?

Yes ( ) No ( )

If yes, what are the agreements?

……

17-What is the state of the forest?

Degraded ( ) fixed ( ) Improved ( )

18-Do you forest management planning for their activities?

Yes ( ) No ( )

If yes, mention the type of chart?

……

Long-term ( ) Short-term ( ) Medium-range ( )

19- Is there (FNC) branch forest management for the treatment of diseases and forest fires?

Yes ( ) No ( )

If yes, is there a cure for Die- back disease and other diseases?

……

20- What are the causes of collective death of acacia trees in the forest?

Drought ( ) Diseases ( ) Overgrazing ( ) Other ( )

21- Is there overlap in the tasks with the entities whose fields are related to the forest?

Yes ( ) No ( )

The answer was yes, how can this problem be solve?

……

22- What are the challenges facing management?

1- 2-

3- 4-

23-Are challenges facing forest management can be mitigated?

Yes ( ) No ( )

24-What are the challenges facing management?

Diseases ( ) Urban planning ( ) Population growth ( )

Urbanization ( ) Other ( )

25-Do (FNC) coordinates with relevant agencies to solve the challenges facing management?

Yes ( ) No ( )

26-How forests contribute to overcome the challenges facing the community?

……

27-Does the Forestry Department conduct research in the context of the knowledge of the challenges, solutions and extent of urban forests?

Yes ( ) No ( )

If the answer is yes to what extent?

.....

28- Do you forest management research in the framework of knowledge of the challenges that urban forests and solutions and how so?

Yes ( ) No ( )

29- Are forests established training courses in the field of challenges and highlighted need of community for urban forest?

Yes ( ) No ( )

30 - Are forests active in environmental awareness?

Yes ( ) No ( )

31- Does forest management need training courses to address challenges?

Yes ( ) No ( )

32-Among the community's needs highlighted by forest

Natural disasters ( ) Education ( ) culture ( )

The fight against poverty ( ) Recreation ( ) other ( )

33- In your view what proposals do you consider appropriate for the development of sustainable management to increase the efficiency of urban forests?

1- 2-

3- 4-

34- What are the challenges facing management?

Diseases ( ) Urban planning ( ) Population growth ( )

Urbanization ( ) Other ( )

What else do I mention? .....

34-Is the deduction of part of the forest affecting its management?

Yes ( ) No ( )

35- Are there information and guidance campaigns to sensitize people about the importance of urban forests and their environmental role?

Yes ( ) No ( )

36- Does forests contribute to the supply of forest products to community of fruits, branches and nurseries?

Yes ( ) No ( )

37- What mechanisms can forests use to highlight their role in urban forest development?

……

38- What are the methods used by urban forest management to bring economic, aesthetic and recreational value to the forest?

……

39- What are the main objectives of the National Forestry Commission plan to improve forest management?

……

40- How to deal with the challenges facing the forest?

……

41- Is the forest flooded in the fall season affect the management?

Yes ( ) No ( )

42- Does the impact of the buildings and waste on the forest affect the administration and entertainment?

Yes ( ) No ( )

43- Who is responsible for the debris that is now a danger to the forest?

FNC ( ) Supreme council of the environment ( ) Other ( )

44- Does water affect the drainage of water, water and railway tracks on the forest and on its visitors?

Yes ( ) No ( )

45- Is cutting part of us into a forest that affects migratory birds and kills living organisms?

Yes ( ) No ( )

46-Are there reports on the number of visitors?

Yes ( ) No ( )

46- When will the number of visitors increase and when are their number and any age groups more?

……

47- Are visitors treated with forest facilities inconsistent with programmed management activities?

Yes ( ) No ( )

48- Is there income from the Sunt forest?

Yes ( ) No ( )

If yes, how much is the annual income?

……

49-Are there specific fees for visiting forest visitors?

Yes ( ) No ( )

50-Are the fees collected forms the forest use to improve forest?

Yes ( ) No ( )

51- What is the role of communities around the forest in management?

……

52-Does the National Forestry Commission share with the community (neighborhoods - grassroots committees) in forest management?

Yes ( ) No ( )

If you do not answer, can the community be involved in the administration and know its importance and preservation?

……

53- Is slum dwellers entering a forest that affects management and entertainment?

Yes ( ) No ( )

If yes, what is the solution?

……

54- Is the presence of the vendor wandering in the forest (tea stakes and others) linked to the National Forestry Commission?

Yes ( ) No ( )

If the answer is yes, what is the commission's response?

……

55-Can the seller is confined to the forest?

Yes ( ) No ( )

56- Are having sellers inside forest is negative or positive

Yes ( ) No ( )

57- Is the presence of the seller inside the forest negative or positive?

Negative ( ) ineffective ( ) positive ( )

58 -What Suggestions for the success of the administration?

Improve the plan ( ) Create ways ( ) Add new types ( )