

Acknowledgement

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Dedication

This project is dedicated to the people of Kibera informal settlements and to all other Kenyans who live in those poor areas within the country. It is also a dedication to the authorities to make them realize the dangers which the natural environment undergoes if the necessary services are not provided to the public especially the urban poor. Lastly I have to dedicate this project to my lovely family and friends.

Declaration

I hereby declare that this is my original piece of work submitted for the partial fulfillment of a degree of Bachelor of Arts in Urban and Regional Planning and has not been submitted somewhere else for examination purposes

Signed.....

Date

Declaration

I hereby confirm that this is an original piece of work submitted for partial fulfillment of a Degree of Bachelor of Arts in Urban and Regional Planning and has not been submitted somewhere else for examination purpose

Supervisor.....

Date.....

Abstract

This paper is meant to investigate on the implications of informal land uses on upper Ngong' river riparian reserve. Slum dwellers are always excluded from most service deliveries by the responsible authorities. These include provision of land, solid and liquid waste management equipments, housing and other social services such as roads, health and education facilities. Previous researches on the Ngong river riparian reserve identify lack of infrastructural facilities, poverty and lack of housing as main causes of encroachment on the Upper Ngong' river riparian reserve. However, this research argues that, lack of infrastructural facilities, poverty and lack of housing are not the root causes of environmental degradation. This research concludes that the government of Kenya should not neglect its poor people. The government should sufficiently plan for all the people. For the Ngong river riparian reserve residents, the government should plan for resettlement in well-built and affordable houses developed in the neighboring open space.

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List of acronyms and abbreviations

<i>CBO</i>	<i>Community Based Organization</i>
<i>CBS</i>	<i>Central Bureau of Statistics.</i>
<i>CCN</i>	<i>City Council of Nairobi.</i>
<i>CIDP</i>	<i>County Integrated Development Plan.</i>
<i>EIA</i>	<i>Environmental Impact Assessment.</i>
<i>EMCA</i>	<i>Environmental Management and coordination Act.</i>
<i>GDP</i>	<i>Gross Domestic Product.</i>
<i>IRDP</i>	<i>Integrated Regional Development Plan.</i>
<i>KENSUP</i>	<i>Kenya Slum Upgrading Program.</i>
<i>KNBS</i>	<i>Kenya National Bureau of Statistics.</i>
<i>MCA</i>	<i>Member of County Assembly.</i>
<i>MDGs</i>	<i>Millennium Development Goals.</i>
<i>NCEO</i>	<i>Nairobi City Environmental Outlook.</i>
<i>NEMA</i>	<i>National Environment Management Authority.</i>
<i>NGO</i>	<i>Non- Governmental Organization.</i>
<i>NHC</i>	<i>National Housing Cooperation.</i>
<i>UN</i>	<i>United Nations Organization.</i>
<i>UNEP</i>	<i>United Nations Environmental Program.</i>
<i>UN-HABITAT</i>	<i>United Nations Organization for Human Settlement</i>
<i>WHO</i>	<i>World Health Organization.</i>

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CHAPTER ONE

1 INTRODUCTION

Nairobi is one of the fastest growing Cities in Kenya. This needs various interventions to help realize the sustainable development of the city in various sectors of the economy. Most African cities are still in the growing state and thus having room for development activities. Some of the major challenges facing most African cities include congestion due to rural – urban migration. This leads to difficulty in accessing infrastructural facilities as well as housing services. Those who fail to afford housing facilities provided at the middle and high income areas results to living in informal areas where there is very low service provision. Another problem facing Nairobi as a city is high rate of insecurity. This is brought about by the fact that there are few security officers to deal with the ever growing population of Nairobi. In addition to that, the city faces massive pollution due to lack of well-established solid, human and liquid waste management agencies and policies. Various facilities, among them physical and social infrastructure therefore, become very difficult to access. These include services such as water and sewerage, health and educational facilities.

Sustainable development is considered as a process of enhancing current growth without compromising the well-being of the future generations. It is that growth which takes into account Environmental conservation and cost effective. It always enhances the well-being of both the authorities and the individual citizens who own the various development projects. This research project is one aiming at doing proper planning and good management for various development activities brought about.

Environmental conservation means being mindful of the environment during any undertaking. The word environment means the area where we live as well as the space above it which includes the air we breathe. Anything found in the spaces we live, form part of the environment. It includes both living and non-living things, but they always interact with each other. Environment therefore form an important part of human beings

life and should therefore be protected and conserved for the well-being of future generations since they need it for survival just as we need it.

Before the coming of Europeans Nairobi was home for the Maasai community and the word Nairobi is said to have come from the Maasai word *enkare nyorobi* meaning “a place of cool waters” (Wikipedia). This implied that the Maasai loved this place because it was a source of clean and cool water they needed to sustain their way of life as well other domestic uses. In 1899 the railway line reached the city of Nairobi. During this time the city became attractive to most people including the Nubians who provided labor to the railway builders. Due to lack of enough housing during that time the Nubians resolved to stay in Kibra.

Kibera is one of the largest slums in Africa with a population of about 1,000,000 inhabitants (UN- Habitat report, 2010). This makes it highly congested and prone to serious disasters such as fire and in some parts landslides. This is because people here are so desperate for housing until there are no spaces between one house to the next and others resolve to living in areas which are prone to landslides. Most of them, are also living along the railway reserve making them vulnerable in case of an accident as well as victims of noise pollution.

Ngong’ River flows through this area and the stretch in this study passes through Soweto, Kianda, and Raila. It is about 300m from the railway line. This stretch experiences a high population just like any part of Kibra estate. Due to this, this stretch has been the receiver of massive pollution due to lack of proper sewerage facility in this area. Informal land use activities have also evolved along the riparian reserve due to demand for housing land at this stretch of the river. Due to disposal of both liquid and solid waste into the river the residents have suffered water shortages because the water from this river is unfit for use. These make river riparian reserve a crucial place of conservation to bring about sustainable development of the river to enhance water supply and security.

This research aims at the viability of the river riparian reserve conservation for sustainable development, the importance of the riparian reserve rehabilitation and the issues brought about by infringement of the reserve by various informal land use

activities. The research also aims at development of a rehabilitation plan to help save the riparian reserve to ensure supply of water to the residents of Kibra informal settlement. This rehabilitation plan will address issues of land use conflicts along the riparian reserve. It will also help other residents of Nairobi to get access to clean drinking water as well as good sanitation facilities among the households.

1.1.Problem statement

Water is one of the basic resources in the country and therefore needs to be given the attention it needs for it to sustain life. It forms part and parcel of human living hence if not conserved there is going to be dehydration due to inadequacy. Pollution also makes those living around the water sources be prone to water borne diseases which forms 26 percent of deaths in Kenya (daily nation 23rd December 2013). Living in such areas make most residents in the riparian informal settlements to be prone to diseases such as typhoid, malaria and in most cases diarrhea.

Most research done by the United Nation Environmental Program(UNEP) prove that Ngong' and Mathare rivers are some of the most polluted rivers in Nairobi, due to the fact that they pass through the informal settlements of Kibera and Mathare respectively. This puts the lives of the residents under a great danger. This stretch lies just a few meters below the railway line hence is prone to disposal of waste from the railway line through drainage whenever it rains. This stretch experiences pressure from land uses such as dumping of solid and liquid waste, encroachment by informal settlements, carwash among other activities. The habit of conservation has become a difficult task to undertake due to the informal settlements that halo around the river riparian reserve (daily Nation 5th December 2013). For Nairobi to fully realize the potential of its natural resources for development, the role of the environment in development and the social, economic and ecological impacts of the riparian reserve need to be fully understood (NCEO report). Land tenure issues also make rehabilitation of this area a hard task. Other issues which have made rehabilitation of this stretch to be hard are; the lack of good and coordinated institutional framework.

This study therefore aims at reviewing the institutional framework. It will come also up with a working framework on rehabilitation of this stretch. The riparian reserve acts as an area of transition between aquatic and terrestrial land uses and should therefore be managed and planned to help in sustainable use of the river. This will conserve the river as well as bringing back its aesthetic value to the people living around this place. However this is going to be a hard undertaking following that numerous studies done to help in the cleanup and conservation of rivers in Nairobi have not been fully implemented. Sensitization of the community to accept the projects is also going to be difficult because of land issues and failure of projects such as slum upgrading. Sustainable development of resources helps in provision of clean water and air. If resources are well managed the vision 2030 and millennium development goals will be achieved. Achievement of these will help in the eradication of poverty and diseases which were the country's goals at independence. This will also help in the provision of employment to the people since most of the projects proposed after this research if implemented will employ the unemployed youths around the Soweto estate where this stretch lies. These are going to be achieved by developing a rehabilitation plan which integrates the informal land uses and aims at their improvement for the sustainable use of the river. The proposed projects will also help in boosting the economy of the country. This research will therefore not only be viable to the country but also to the residents of Soweto estate in Kibera informal settlement. Since river Ngong is one of the tributaries of river Nairobi it will also help in cleaning up both the Nairobi River and Arthi River in the outskirts of Nairobi.

1.2 Research Questions

- i. What are the most common informal land uses found along the Kibera Ngong stretch?
- ii. Which are the conflicting issues brought about by the informal land uses along the river riparian reserve?
- iii. What are the impacts of the informal land uses on this stretch of Ngong River?
- iv. How can these informal land uses be rehabilitated for the sustainable development of the river riparian reserve?

1.3 Research objectives

1. To identify the most common informal land uses found along this stretch.
2. To Identify the conflicting issues brought about by the informal uses along the river riparian reserve.
3. To determine the impacts of the informal land uses on this stretch of Ngong River.
4. To identify interventions for the sustainable development of the river riparian reserve.

1.4 Assumptions

- a) Most of the informal land uses result from the fact that there is high demand for housing by the low income earning individuals who resolve to living in the riparian reserve because it is an open space thus suitable for setting up of temporary shelters.
- b) The schools set up in the riparian reserve are there due to demand for education facilities because if not the residents have to walk for long distances to find public schools and if they exist then they are therefore private schools.
- c) There are mixed use land use activities along the riparian reserve due to demand for services by the informal land users.

1.5 Justification

Environment form a crucial part of human life and is important for day to day life. Natural resources which form part of the abiotic component of the Environment are also important in day to day life. There is also need to protect the flora and fauna which form part of the biotic environment. Riparian zone always act as a zone of connection between the aquatic living things and the terrestrial living things. This zone is therefore important as both ecosystems depend on each other for survival. Destruction of aquatic due to disposal harmful substances also poses some danger to the terrestrial ones since they depend on each other for survival.

Socio-economic lives of most community also require conservation of areas of great importance to the community. Most native African communities had respect for the environment and would be happy if the environment is conserved. The current societies also require good services for them to lead good lives which will only be realized if natural resources are developed sustainably for better living of their grandsons and great grandsons. The current generation also needs order in the use of their spaces and this can only be realized if the societies realize the importance of proper land use and protection of areas of ecological importance.

Development is a process which needs proper planning of space and proper land management. This implies that there should be an order followed by the activities which involve the use of land. Open spaces and riparian reserves are areas of environmental, social and economic importance. If that is so then these areas should be protected for better living and should be at all cost be prevented from encroachment. These places also act as areas for carbon sequestration.

For achievement of the country's big dreams such as vision 2030, various policies realization, MDGs and for all people to feel they live in society in which they are assured of all the needs they strive for, then there is need to embrace reclamation of areas of environmental and economic importance. This research therefore tries to prove the importance of such areas as the riparian reserve. The residents will therefore be assured of involvement in various project to ensure that they aid the success of the rehabilitation of the existing land uses to ensure sustainable development of the riparian reserve. They will also be made aware that every decision made by them towards the reclamation of the riparian reserve is for a good course. This research will therefore be of a good use to the residents and the country at large.

!.6. Limitations of the study

This study was carried out in an area where land is a critical issue so obtaining data was difficult due to suspicion from the residents. This place is also characterized by massive insecurity so data on security made the research a hard task to undertake. The process of

data collection and analysis is also time consuming and tiresome. Most respondents have given biased information due to fear of victimization.

CHAPTER TWO

2. LITERATURE REVIEW

2.0 Introduction

This chapter focuses on the revision of the existing written materials which support the study and provide justification to the actions of the research carried out. It aims to review critical points of current knowledge including substantive findings it is also the process of reading, analyzing and evaluating and summarizing scholarly materials about a specific topic. It guides the choice of research designs and means used to collect data. This chapter addresses issues relating emergence of slums and their historical background, issues relating to urbanization and its effects, planning issues relating to urban areas, issues of urban sprawl, case studies and review of legal and institutional framework.

2.1 Urbanization process

This can be defined in two ways the first definition is the process of moving from rural areas to urban centers. The second is the process of towns growing to become urbanized. Various theories were developed to explain the process of urbanization. These theories include the central place theory, location theory, trade theory, the core-periphery theory, export or staple theory. All these try to explain the growth of urban centers. As for Nairobi it started as a railway town and grew following the model of central place theory where when the railway line reached the city of Nairobi there were just a few structures concentrated at the center which grew as population increased due to demand for better services. People come to seek them where they were available, others started moving into the city due to better employment opportunities which were availed due to railway construction and due to service industry which started growing around the city. Due to its population the city offered market opportunities for most goods and services. This area then developed as a central market attracting industries to be located around it due to ready and available market. The British made Nairobi the headquarters for East African

Protectorate. This made Nairobi the main market center in East Africa attracting more population. This made the process of urbanization rapid and by 1940s Nairobi had a higher population than any other town in East Africa. The housing segregation introduced by the British made the Europeans to live in high income areas, Asians and Indians occupied the middle income areas and the Africans were left to languish in low income areas with high densities. This can be said to be the historical root for the growth of slums. Africans who offering human labor for the Indians building the railway line stated setting up temporary structures along the railway line had no option but to set up structures along the railway line to make the be available whenever they were needed and this resulted emergence of slums along the railway line as the case of Kibra.

2.2 The nature of planning in urban areas

Planning is vital to the development of the current society. Most African towns like Nairobi are still organized according to development plans that were drafted by the white settlers. This as affected cities like Nairobi since the plan was prepared based on the small population that existed by then. Population increase has been a major drawback to such a plan. The influx of urban poor into our cities and inadequate planning and lack of employment opportunities are said to be one of the causes of urban poverty. Most of the slum areas lack development plans due to issues of tenure and conflict of interest in such areas. These conflicting interests are mostly influenced by the political interest. The culture of planning has been encouraged in the societies since it is one of the key elements of development. Planning guides the use of space and facilitates protection of places of great ecological importance. Planning ensure that citizens are involved in the whole decision making process. Physical planning exercises provide a forum in which the interests of multiple stakeholders as well as the physical, social, and economic constraints on land uses can be debated and balanced in the post-disaster context. Specifically, post-disaster planning provides opportunities for disaster preparedness. Nairobi city face acute problems of poverty, exclusion, insecurity and environmental degradation. The ever-widening gap between the rich and the poor is symbolized by the stark disparity in the quality of the living environment.

This is reflected in the contrasting urban forms – exclusive gated communities in areas like Karen, are developing side by side with rundown neighborhoods and slums. Proper urban planning is the key to bridging the urban divide and is an essential tool to make Nairobi city inclusive, environmentally friendly, economically vibrant, culturally meaningful and safe for all. To be successful in helping to achieve urban development, planning needs continuous monitoring and evaluation. Great strides have already been made, but more is needed. Urban planning does not achieve better cities automatically.

Neither urban planning nor spatial designs are ethically neutral activities. They translate - through resource allocation and budgeting exercises - political visions and values into the physical reality of cities. In Kenya, planning systems and decisions often protect the interests of the rich or are limited to beautification and decoration of urban spaces. In many developing cities and Nairobi in this case, planning systems and processes are still largely based on colonial laws, designed to support spatial segregation and population control. They fail to reflect the need and priorities of urban residents.

The urban model they have promoted has proved both unaffordable and inadequate for catering to the diversity of ways of life and needs of developing world cities and in the case of this study Nairobi. In the developed world, urban planning was originally conceived as a tool for the development of newly industrializing cities. Today cities in many developed countries have to contend with processes of de-industrialization and shrinking population. Moreover, city forms which were proposed as progressive and more efficient are under increased criticism for the patterns of consumption they command, in the face of growing awareness of global climate change.

The failures of planning to come to terms with informality and poverty and to go beyond the modernist dream, has partly to be blamed for the failure of cities as engines of economic growth and absorbers of surplus labor from rural areas. This results in exacerbation of the ecological crisis, hinders agricultural development and installs a vicious cycle of poverty, with more poverty-driven growth of the cities. For urban planning to play a positive role in urban development, it needs to vigorously assess and reinvent itself – through a serious analysis on the new context of urban planning and the responses it can offer, by learning lessons from stories of innovation and success, and on

this basis advocate vigorously for better and more appropriate planning for sustainable development. Indeed today, like rarely before, there is global consensus on the need to reflect on modernist development patterns. Urban planning can be at the forefront of this and provide important responses. (UN-HABITAT), 2010.

2.3 The concept of growth and urban sprawl

Growth is the expansion of an urban center or a city into the rural hinterland. Urban sprawl is the uncontrolled growth of urban centers or cities. It can also be defined as poorly planned development that spreads a city's population over a wider and wider geographical area. As outlying areas become more populated, the land between them and the city fills in as well. Nairobi as city has experienced this uncontrolled growth leading to evolution of slums along the river riparian and the railway reserve as is the case of Kibra informal settlements. This situation has led to reduction of the railway reserve and setting up of shelters along the river riparian reserve. This leads to dumping of solid wastes into the river and the railway line. The figure below shows an example of railway reserve encroached due to urban sprawl

Figure 1: Encroachment due to urban sprawl;



Source: SLUM DWELLERS INTERNATIONAL, 2010

Just like along the railway these informal land uses are spread along the river riparian reserve in the same way making the river water to be unsafe due to pollution brought by the encroaching land use.

2.4 The concept of sustainable development and its use in sustainability scenarios

Sustainable development encompasses three fundamental approaches: economic, environmental, and social developments, which are interrelated and complementary. Traditionally, the concept of sustainable development involves three equivalent components: environmental, economic, and social development; as well as three dimensions of wellbeing, i.e. economic, ecological, and social, and their complex interrelations.

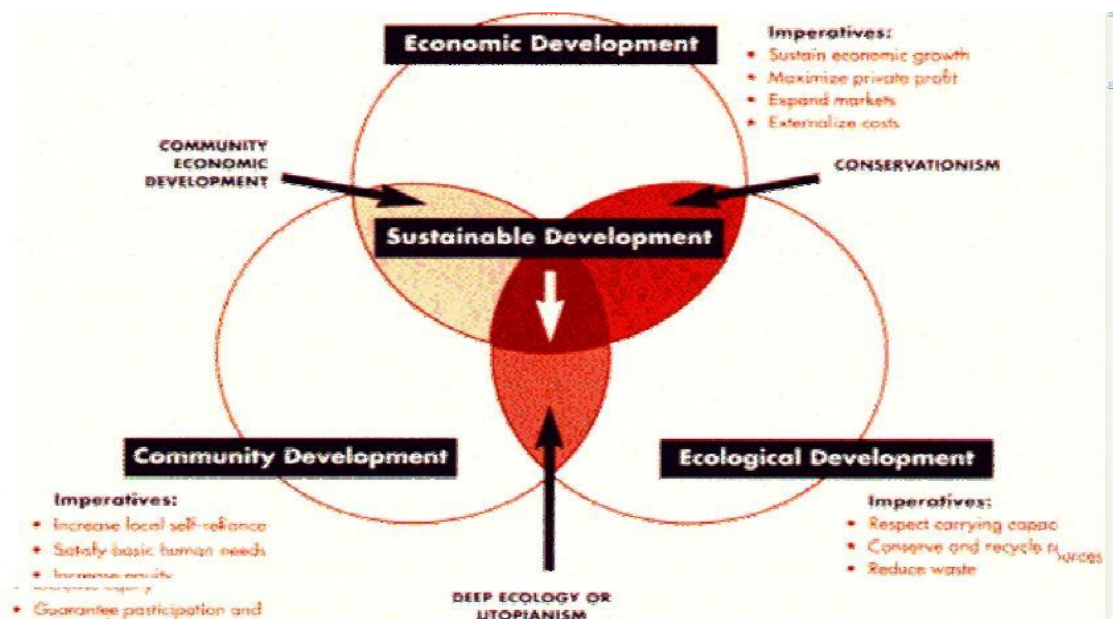


Figure 2: concept of sustainable development

Source: *Physical Planning Handbook*

However this should not be the case, sustainable development should be based on, the assumption indicating that sustainable development is based not on economic, social, ecological, or institutional dimensions, but rather on their system as an integrated whole.

The aim of this part of the report is therefore to systematize descriptions of sustainable development and its dimensions.

In 1992, the World Bank described sustainable development with an ambiguous phrase, “sustainable development is development that continues” (World Development Report, 1992). In the same year the Rio de Janeiro declaration on Environment and development described sustainable development as a long-term, continuous development of the society. It aims at satisfaction of humanity’s need at present and in the future through rational usage and replenishment of natural resources and in the process preserving the Earth for future generations (Rio Declaration on Environment and Development, 1992). Also on the same Harwood emphasizing on economics, described sustainable economy as that system which can endlessly develop towards greater benefit for people. For greater efficiency of resource use, and balance with the environment that is friendly to people and other species (Environmental Challenges in Farm Management, 1990).this term therefore has an important idea to note and that is, growth which guarantees better living conditions for the present and the future generations.

The only sure way of guaranteeing this, is by preservation of the environment to be in good use for future generations. The best dimension therefore to take when defining sustainable development define it as a form of development which satisfies the needs of the current generation without denying the future generations ability to satisfy their needs

2.5 Case studies

2.5.1 Water Resources and Riparian Reclamation of Nome Creek, White Mountains National Recreation Area, Alaska.



Figure 3: Nome creek reclamation.

Source; U. S. Department of the Interior, Bureau of Land Management, July 2007

2.5.1.1 Overview

In June 1989, the BLM began water resources monitoring and inventory on Nome Creek in preparation for a riparian reclamation and stream channel reconstruction project. The intent was to collect data useful in reconstruction of the stream within a single channel, to eliminate the unstable debris piles and settling ponds that contributed to excessive sediment runoff, as well as stabilizing and revegetating the floodplain. The reclamation techniques developed here could then be useful for other placer mining reclamation.

2.5.1.2 Reclamation of Nome creek

The basin characteristics used for the flood-recurrence calculations were estimated from topographic maps. Reclamation work commenced in July 1991 and continued almost every summer to the present. A D8 or larger tracked bulldozer was used exclusively most years, although an excavator was tried one summer. The channel construction was more difficult than anticipated, as the center of the valley held silt-rich, saturated soils, thought to be buried by settling ponds. In general, construction began with filling in of the settling ponds using material from surrounding tailing piles and then grading the area as flat as possible. A pilot channel was then dug, avoiding the filled-in ponds and the meandering points. Recommendations included:

1. Continue the reclamation work until the entire creek is consolidated into a single channel and all the unstable debris piles are reorganized into a well-graded and completely a flood plain with vegetation.
2. Continue to collect, analyze, and publish stream-gaging, water quality, and botanical data, not only for the reclamation work on the upper creek, but also for the in stream flow project on the lower portion of the stream.

2.5.1.3 Lessons learnt

All projects have challenges but if the right resources and right effort is put forth, whatever form of rehabilitation will be possible. What matters in a project is not how long it takes to be completed but how much effort is put forth towards its completion.

The Nome creek project was faced by several difficulties especially during excavation until at time machinery were changed but continuous monitoring and hard wok led to its completion no matter how long it took.

If the right resources are directed towards the right project and is directed towards environmental conservation then there is high possibility of other developments being successful. One development project always acts as a pilot to other development activities. Like in the case of Nome creek the river reclamation was supposed to support placer mining reclamation. Most developed countries value environmental conservation. Reclamation of the river riparian reserve always makes rivers economically viable. This

can be seen in the Nome creek reclamation where the problems of the river caused disasters were reduced and the money which could have been used for disaster management was diverted to help in the development of other sectors of the economy. In the Kenyan case once the riparian reserve is rehabilitated the money directed to pay for environmental degradation known as polluter pay principle can be used to develop other areas in the economy which needs to be developed. The money used for supply of water will also be directed elsewhere. Rehabilitation also reinstates the beauty of the river riparian reserve.

2.5.2 Rehabilitation of the lower Jordan River, Middle East.

2.5.2.1 Overview

This study represents the first ever regional environmental flows study of the Lower Jordan River prepared by experts from Palestine, Israel and Jordan and overseen by a Regional Advisory Committee involving key government representatives from each of the riparian countries. The findings are alarming and require urgent concrete action from all parties with support from the international community in order to breathe life into the dying Jordan River and preserve this important site of shared natural and cultural heritage. The Lower Jordan River and its tributaries are shared among the nations of Israel, Jordan, Syria and Palestine. It is the longest permanent river in the region, stretching along an aerial distance of 105 kilometers (km), with an actual stream channel length of 217 km from the Sea of Galilee to the Dead Sea. The river is gently sloped from an altitude of 212 meters (m) below sea level to an altitude of 422 m below sea level. The Lower Jordan River flowed freely for thousands of years from the Sea of Galilee to the Dead Sea creating a lush wetland ecosystem rich in biodiversity. (**Source: Friends of Middle East, May 2010**)

2.5.2.2 Rehabilitation of Lower Jordan River

The Environmental Flows Study was undertaken in the 2009 hydrological year and examined the characteristics of the Lower Jordan River in its current state and its original state before large-scale human intervention. The current river state was evaluated by undertaking hydrological, botanical and biological surveys at a number of selected sites

over the winter and summer seasons of 2009, while the original state was investigated by reviewing historical records of the river data. During the last century the Lower Jordan River has undergone severe alteration due to the impacts of industrialization, diversion of the fresh water and the continual expansion of agricultural and urban regions. These impacts have resulted into radical changes to the river's morphology and hydrology. The river's health has declined dramatically, with flow reduction of 98% and the water becoming increasingly saline with high pollutant levels. Consequently, the Lower Jordan River in-stream and riparian habitat characteristics have changed dramatically. **(Ortal, 1976; Anisfeld, 2009):**

The water quality and flow of the Lower Jordan River has been negatively affected by a series of hydraulic projects conducted by Israel, Jordan and Syria over the past several decades. Currently, the water in the Lower Jordan River is comprised of saline spring water, untreated sewage water, agricultural farm runoff, fish ponds outflows, ground water flow, and surface runoff during winter. The experts who took part in the rehabilitation came from Palestine, Israel, Jordan and international participants. These parties were involved in sampling various points of the river and in the end came up with a river rehabilitation which was presented to the organization Friends of Middle East for Approval and adoption by the three countries i.e Israel, Palestine and Jordan.

2.5.2.3 Lessons learnt

River degradation is an international problem. Just like is the case of Ngong River riparian suffering from issues such as discharge of sewerage products, agricultural wastes and surface run off and so was the lower Jordan River in the Middle East. This means that ideas of restoration can be viewed in the same way and there should be borrowing of ideas from one country to another.

Another lesson is that the issue of environmental conservation is not just the responsibility of the state but everyone's responsibility. The three affected countries in the rehabilitation of Lower Jordan River joined hands and mobilized resources towards restoration of the river which all benefit from. Restoration of Ngong river riparian reserve should therefore not be viewed as the responsibility of the Government or the residents

but all the institutions and residents should join hands to ensure that the river riparian reserve is sustainably developed for the benefit of all.

Environmental issues are currently global problems because we can see the international communities joining hands with the affected countries to help in the conservation of the environment. Just like the international community joined hands with the three Middle East countries we have also witnessed various research work carried out by international agencies such as United Nations to help in rehabilitation and restoration of the main rivers in Nairobi.

2.6 LEGAL, POLICY AND INSTITUTIONAL FRAMEWORK

2.6.1 Introduction

There is a growing concern in Kenya and at global level that many forms of development activities cause damage to the environment. This has been aggravated by lack of awareness and inadequate information amongst the public on the consequences of their interaction with the environment. In addition there is limited local communities' involvement in participatory planning and management of the environment and natural resources. Recognizing the importance of natural resources and the environment in general, the Kenyan Government has put in place wide range of policy, institutional and legislative framework to address the major causes of environmental degradation and negative impacts on ecosystems emanating from industrial and economic development programmes. It is now accepted that development projects must be economically viable, socially acceptable and environmentally sound.

This part tries to review the existing laws and policy guidelines in relation to river riparian rehabilitation. These documents provide laws and supportive documents of the topic. It will help to provide the laws that guide the conservation of the riparian reserve through review of various legislations, policy documents and review of various institutions that are involved in the ownership and protection of the riparian reserve.

2.6.2 Legislations.

These include the constitution and other laws drafted and adopted by the parliament. This part will involve review of the documents which provide legal support to the river riparian reserve conservation. These documents will support the action taken after this research through giving legal support to such an action.

2.6.2.1 The Constitution of Kenya 2010

This constitution adopted in 2010 has various parts supporting the conservation of the areas of Environmental importance during land use planning. It also outlines the rules to be followed during the development of any land use plan. It also gives the procedure to be followed for an approval of any physical land use development plan either for a site or

for the whole region. There are various parts of the constitution which support the issue of environmental conservation and guide the nature of planning.

The preamble recognizes the voice of the people of Kenya. During planning therefore planners should not only rely on their own instinct but also, they should know that all decision on any action should be made by the people themselves. Proposals made in this research will therefore be based on full participation of the people of Kibra to ensure that every decision made does not undermine the power given to the people by the constitution. The preamble also talks about the people being respectful to the environment and being able to sustain it for future generations. This will imply that all areas of environmental importance are protected and developed sustainably for the benefit of the future generations, this will require an EIA before any decision is made. It also talks about commitment to nurturing and protecting the well being of the individual, the family, communities and the nation. This means that people living conditions should be a priority during any decision making process. The recommendations made after this research will therefore be based on improvement of peoples living environment to ensure that their constitutional right is granted after the research on Ngong river riparian reserve.

Chapter 4 on bill of rights also has some relevant articles to this research. Article 33 talks about freedom of expression. It means during this whole process of research stakeholders, various institutions and citizens will be given unlimited chances to present their ideas without fear or favor. This article also grants academic freedom and freedom of scientific research. Article 42 on Environmental rights recognizes the right of people to a clean and healthy environment. This requires maximum protection of the environment for the benefit of the current and the future generations. This research is also in respect to this constitutional right granted to the people by the constitution. People are also given the right to clean water in adequate quantities.

Article 69 talks about the role of the state to ensure sustainable exploitation, utilization, management and conservation of the environment and natural resources. This chapter also talks about elimination of activities which endanger the environment and encourages utilization of the environment and natural resources for the benefit of the people of Kenya.

2.6.2.2 Vision 2030

This is a development strategy was developed for Kenya for the period 2008 to 2030. This vision has three main pillars which include the economic pillar, social pillar and political pillar. The economic pillar aims to improve the prosperity of all Kenyans through an economic development programme, covering all the regions of Kenya. It aims to achieve an average Gross Domestic Product (GDP) growth rate of 10% per annum beginning in 2012. This will only be possible if all sectors are integrated towards a common economic goal. This includes better exploitation of natural resources and environmental protection. The social pillar on the other hand aims to build a just and cohesive society with social equity in a clean and secure environment. It is based on such facts that this research is carried on Ngong river riparian reserve to ensure that this is achieved and people can live in ca clean and secure environment. The main sectors addressed in this pillar relevant for this research are water and sanitation, environment as well as housing and urbanization. A research based on development of either of these sectors must therefore be in line with this Kenyan development strategy.

2.6.2.3 County Governments Act (2012)

This act was enacted to provide for good service delivery within the counties of Kenya. Part 8 of this act stresses on the need for citizen participation as a key feature in decision making. All the decisions involving development of any nature should therefore be done in consultation with the citizens who are the sole occupants of the project area. This research will therefore be done in consultation with the people of Kibra where this stretch of Ngong River lies. Part 11 of the act addresses the issue of county planning. It outlines the principles of this process and various types of plans developed at county level. The principles identified here are integration of national values in all processes and concepts, protection of the right to self-fulfillment within the county communities and with responsibility to the future generations. Another principle of county planning outlined here is that of protection of interests of marginalized groups and minority communities. Moreover county planning should be aimed at protection and development of natural resources in a manner that aligns the national and the county government and engendering effective resource mobilization for sustainable development. This research

being a planning research project must also adhere to the provisions of the county governments act.

2.6.2.4 Urban Areas and Cities Act (2011)

This is an act of parliament passed in 2011 as the 13th act of that year. The main purpose of this act was to help in classification, governance and management of urban areas and cities. It was also to provide for principles of governance and participation of citizens and for connected purposes. The act identifies one role of the urban boards as promotion of clean and safe environment which also is the main focus of this research on Ngong river riparian reserve. It gives the residents of a city or a municipality power to plan strategies for engaging the various levels and units of government on matters of concern to the citizens. It is also based on this that the research is carried out to try and find out and address burning issues in relation to space conflicts along the Ngong river riparian reserve in Kibra Soweto estate. Part V of the act stresses on integrated urban areas and cities development planning. This part identifies the plans to be the basis for preparation of environmental management plans, provision of social infrastructure and transportation, overall service delivery and above all nurturing and promotion of informal commercial activities in an orderly and sustainable manner. Another basis of plans identified in this act is provision of a framework for regulation of urban agriculture and be the basis for development control. The act also obligates the county government to initiate an urban planning process for every settlement with a population of at least 2000 residents.

Section 38 of the act still puts emphasis on the provisions of an integrated urban area or city development plan. Some of the provisions outlined here include assessment of the current social, economic, cultural and environmental situation in its area of jurisdiction and for the case of this research Ngong river riparian reserve. Another provision outlined here is determination of community needs and aligning them to the requirements of the constitution. This act is therefore an important document in this study as it aims towards achievement of some of the objectives of the rehabilitation of Ngong river riparian reserve.

2.6.2.5 The Physical Planning Act (1996)

This act guides the actions taken by physical planning in the country, town, rural areas and regions. The act states clearly the role of physical planners in the process of development. It provides for preparation and implementation of physical development plans. The act tries to disallow development which is carried out without development permission and requires that if such is carried out on a part of land then that part of land should be restored to its original condition. Part V of the act gives one of the powers of a local authority as reservation and maintenance of land planned for open spaces, parks, urban forests and green belts. This also includes reservation of areas such as river riparian reserves. The act therefore supports the purpose of this research at all costs. In addition to that, the act demands for local authorities to ensure proper execution of physical development control and preservation orders. It also gives the director of physical planning powers to determine applications relating to applications relating to industrial location, dumping sites or sewerage treatment which may have injurious impact on the environment as well as applications in respect to land adjoining or within the vicinity of safeguarding areas, which directly applies to areas such as river riparian reserves.

2.6.2.6 The Government Lands Act (1984)

This is an act of parliament that makes further and better provision for regulating the leasing and other disposal of Government lands, and for other purposes. This act goes further to explain the administration of any government land and the powers of the president to safeguard the administration of government land, both alienated and non-alienated.

It also spells out the roles of the commissioner of lands on the administration of government land. In addition to that the act gives guidelines on conditions for leasing out government land to individuals or to companies by the government for different purposes. In the act the study area is identified as Kibera settlement area and requires the government with the help of the minister concerned to make rules in relation to management, administration and control of Kibera settlement area. This makes this document an important piece in this research since any issue on regulation of the spread

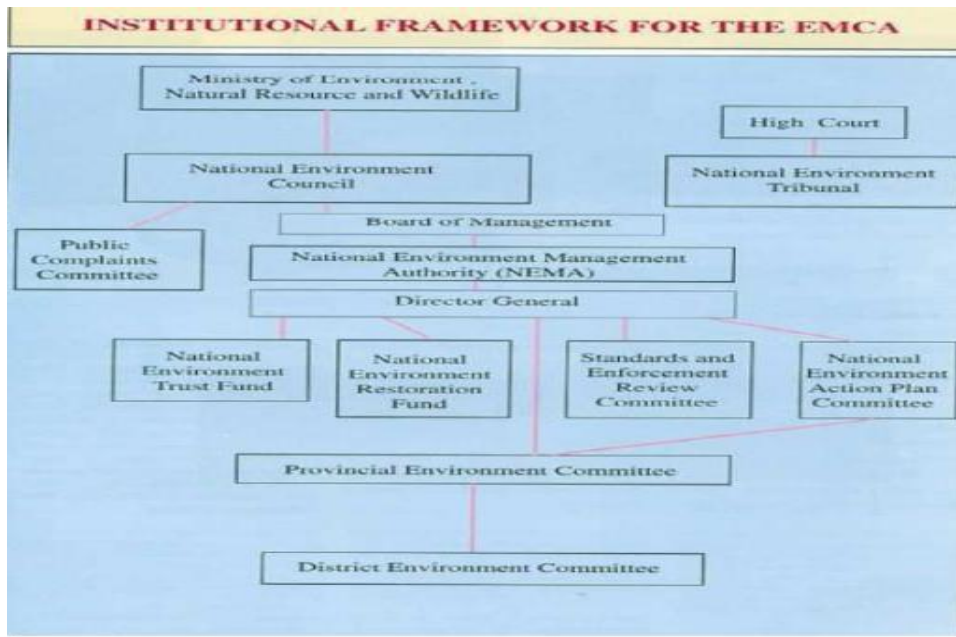
of informal land use activities along the river riparian reserve, can be addressed lawfully after this research.

2.6.2.7 Environmental Management and Coordination Act (1999)

This is an act of parliament that provides for the establishment of an appropriate legal and institutional framework for the management of the environment and for the matters connected therewith and incidental thereto. This act gives every Kenyan as right to a healthy and clean environment just like the constitution. It also gives the individual citizens the right to go to court incase this right is violated. Furthermore the commission establishes the national environment action plan committee which shall overlook all the planning issues related to action areas such as the river riparian reserves. The act also demands conduction of environmental impact analysis before any development project is undertaken. Any project which may have adverse negative impact on the environment will be therefore disallowed. Moreover the act establishes the environmental audit and monitoring committee which shall be responsible for carrying out an environmental audit for all activities that will have adverse effect on the environment.

The act also establishes the environmental quality standards which shall look into issues related to domestic water utilization among other uses. The act goes further to identify different types of wastes and for the case of this research we focus on solid and liquid wastes. The act provides for environmental restoration orders for areas which have been degraded environmentally. The act establishes the national environmental planning committee which is responsible for preparing action area plans in different parts of the environment. Furthermore the act through a gazette notice of the minister requires protection of the lake shore, river bank, wetlands and coastal zones to be protected from environmental degradation. In doing so the minister should take into consideration the geographical size of the lake shore or the river bank and the interest of the communities living around the river bank, wetland, lake shore or the coastal zone.

Figure 4: Institutions of NEMA



2.6.2.7 Forests Act (2005)

This law was enacted by Parliament in 2005 to provide for the establishment, development and sustainable management including conservation and rational utilization of forest resources for the socio-economic development of the country. Parts of the project area may consist of indigenous forests. Section 8 of the Act requires all indigenous forests and woodlands to be managed on a sustainable basis for the purposes *inter alia* of conservation of water, soil and biodiversity, river line and shoreline protection, sustainable production of wood and non-wood products. Community participation as provided for under Section 46 of the Act should be encouraged.

2.6.2.8 The Water Act (2002)

An Act of Parliament to provide for the management, conservation, use and control of water resources and for the acquisition and regulation of rights to use water; to provide for the regulation and management of water supply and sewerage services. The act vests all powers related to water resources to the state. Part 3 of the act establishes the National water management authority responsible for management and protection of water resources and catchment areas. The authority among other functions should be responsible for determining the requirements of reserves for each water resource. The

authority is also mandated with the approval of the minister to declare an area around a water resource a protected area and provide a gazette notice for the same.

Section 2 of this part gives different of issues to be included as a state scheme in relation to public purpose. These include responsibilities such as using of water for the benefit of the greater good of the public in terms of electricity generation and supply of water. In addition to that the public is given the responsibility of participation in drainage and reclamation of land. Moreover, the public should ensure protection of any water resource, its catchment and source. The public should also be involved in identification and development of retarding basin for the control and management of flood water or any other measures for its control as well as conservation and improvement of water quality. All these obligations apply to the Ngong river riparian reserve. It is based on these provisions of the act that the research is carried out on Ngong river riparian reserve to investigate the sustainability of the land uses along the stretch passing through Kibera informal settlement and come up with proposals which aim at sustainable development of the riparian reserve as well as environmental conservation.

2.6.2.9 Land Act (2012)

An Act of Parliament to give effect to Article 68 of the Constitution, to revise, consolidate and rationalize land laws; to provide for the sustainable administration and management of land and land based resources, and for connected purposes. Section 11 of the act require the Land commission to take appropriate action to maintain public land that has endangered flora and fauna, critical habitats and protected areas. The same article also mandates the commission with the duty to identify ecologically sensitive areas which are within public land and demarcate or take any other justified action on those areas and act to prevent environmental degradation and climate change. The commission is required to conduct the latter in consultation with the existing institutions dealing with conservation.

Section 12 on allocation of public land burs the commission from allocation of public land that is subject to erosion, floods, earth slips or water logging. It also prevents the commission from allocating public land that falls within forests, wildlife reserves, mangroves, wetlands or within buffer zones and environmental sensitive areas. In

addition to that allocation of public land that is along watersheds, river and stream catchments, public water reservoirs, lakes, beaches, fish landing areas riparian and the territorial sea are also disallowed. Occupation of any public land described above is therefore considered as encroachment and should be avoided at all costs.

This applies to the settlements and land use activities found along the stretch of Ngong river riparian reserve within Kibera informal settlements. Section 19 of the act stresses on conservation of land based resources provides rules for sustainable development of these land based resources.

2.6.2.10 Land Control Act (2010)

An Act of Parliament to provide for controlling transactions in agricultural land. Some parts of the study area are characterized by urban agriculture hence the application of this act. It only recognizes land within Nairobi as an agricultural land only with the approval of the minister and that approval has to be supported by a gazette notice. The study area falls within the jurisdiction of the city and hence any agricultural activity carried around the reserve must be approved and gazetted by the responsible minister.

2.6.3 Policies

These are documents developed mainly the government ministries and try to set out levels of performance by the different institutions in regards to delivery of services to individuals who are beneficiaries in those various sectors.

2.6.3.1 The Draft National Water Policy (2012)

This tries to explain issues pertaining to water and sewerage services. It sets standards for management of water resources and sewerage services. This policy identifies challenges to water provision as climate change, disaster management and environmental degradation. Another challenge identified in this policy is that availability of water and provision of water services does not grow with the pace of rapid urbanization, industrial production, tourism, recreation and agriculture. These pose great constraints in the delivery of water and sanitation services as well as endangering rivers due to encroachment. This policy aims to eliminate conflicts over water use and to enhance availability. The policy has various objectives and statements aimed at improving the

delivery of water services. Some of the objectives related to this research include the following:

- i. Ensure progressive protection and restoration of ecological systems and biodiversity of strategic water catchments
- ii. Enhance storm water management and rain water harvesting
- iii. Enhance pollution control
- iv. Establish sound research and development in the water sector.
- v. Ensure sustainable ground water resources for the present and the future.
- vi. Provide sufficient funds for sustainable development and management of water resources.
- vii. Develop a water management system which contributes to the protection of the environment.

All these objectives aim at good management of water resources and protection of the environment and so the study was carried out to come up with ideas which can aid the achievements of the objectives of this policy by making proposals to the relevant authorities.

2.6.3.2 The draft National Land Policy (2012)

This policy aims to provide for sustainable growth and investment and the reduction of poverty in line with the Government's overall development objectives. The objectives of this policy include following:

- i. All citizens, particularly the poor, should be provided with the opportunity to access and beneficially occupy and use land.
- ii. An economically, socially equitable and environmentally sustainable allocation and use of land.
- iii. Ensure the efficient, effective and economical operation of the land market.

Chapter one of the policy addresses the question of land and goes further to identify four geographical and ecological zones of land namely; the coastal plain, the arid low plateau, the highlands and the lake Victoria basin. The same chapter addresses other issues such as population and settlement patterns as well as land use and population distribution.

Chapter 3 addresses the constitutional issues on land and gives the government authority to empower all planning authorities in the country to regulate the use of land to take into account public interest. The same chapter also addresses issues such as land tenure, land reforms, land use management issues, land reform issues and land issues requiring special attention.

2.6.3.3 The National Housing Policy

The National Housing Policy is intended to arrest the deteriorating housing conditions countrywide and to bridge the shortfall in housing stock arising from demand that far surpasses supply, particularly in urban areas. This situation has been exacerbated by population explosion, rapid urbanization, widespread poverty, and escalating costs of providing housing.

The aims of the policy include:

- i. . Enabling the poor to access housing and basic services and infrastructure necessary for a healthy living environment especially in urban areas.
- ii. Encouraging integrated, participatory approaches to slum upgrading, including income generating activities that effectively combat poverty.
- iii. Promoting and funding of research on the development of low cost building materials and construction techniques.
- iv. Harmonizing existing laws governing urban development and electric power to facilitate more cost effective housing development.
- v. Facilitating increased investment by the formal and informal private sector, in the production of housing for low and middle-income urban dwellers

2.6.4 Institutions

These consist of international agencies, government bodies, community based organizations and other NGOs. In this section only focuses on the study of those that address issues of environmental concerns. That means that only agencies involved in issues related to river riparian reserve development, management and conservation.

2.6.4.1 The United Nations Environmental Program (UNEP)

This is an international organization which is concerned with environmental management and conservation. Its headquarters is based in Gigiri Nairobi. This organization has put forth a lot of efforts in regards to environmental management and conservation through organization of various environmental fora in many countries across the globe. The main talk in these fora has been on climate change and environmental conservation. Here in Kenya the organization has been involved in various environmental initiatives. It has helped in addressing various development activities in Nairobi focusing mainly on the rivers of Nairobi. One of these moves was to come up with a research which focused on Nairobi river basin. This was known as The Nairobi river basin development program which was carried out in different phases and focused on Nairobi River, Ngong River and Mathare River. UNEP also addresses issues related to slum settlement such as demolition of slums which had been proposed in the country by the government.

2.6.4.2 UN-HABITAT

This is an international organization focused on development of settlements to ensure improvement of the living conditions of people. It advocates for clean and healthy living environment. This organization has a mandate to ensure that planning is an important feature in urban housing development. It has also organized for several fora to address issues of uncontrolled growth leading to environmental degradation and depriving people of the right to a clean and healthy environment. This organization has therefore made numerous steps towards environmental conservation as key towards sustainable development.

2.6.4.3 The World Health Organization (WHO)

This is an organization that is focused on the conditions of public health and sanitation. This organization advocates for a clean and healthy environment as the only way of improving public health and sanitation. This is because the spread of diseases related to unhealthy living environment such as cholera; typhoid and diarrhea need to be reduced drastically. They also assess the level of water supply and consumption to come out with standard requirements for each individual to remain healthy.

2.6.4.4 The National Government of Kenya

The government of Kenya through the parliament has passed various laws and statutes which aim at regulation of the use of public land. The government has power over both alienated and unalienated public land. The government also has power to allocate public land but in the process mandated to protect environmentally sensitive areas such as river riparian reserves, open spaces and parks by ensuring that these places are not allocated for any development activity. The government is also mandated to ensure that during the allocation of any public land the interests and priorities of the resident citizens are respected and honored. The government through the concept of *eminent domain* and *police power* has the power to reposses any environmentally degraded piece of land and rehabilitate that land for sustainable development with benefit to the resident community.

2.6.4.5 The Nairobi City County Government

This government came into being after the new constitution came into place. The role of this county government is to govern the Nairobi City region. This county government is required to prepare an IRDP which focuses on proper land use structure, community participation and environmental conservation. The Nairobi City County which replaced the City Council of Nairobi has the mandate is to ensure a clean and healthy environment by providing for waste management services and ensuring that there are designated dumpsites within the city and its surrounding, such that solid or liquid wastes are not dumped into environmentally sensitive areas such as river reserves and even into the rivers themselves. Nairobi City County has the mandate to deliver services to its residents. These services include both physical and social infrastructure. County government's role is to approve and ensure that there are action area plans for specific areas which need special attention. The County government has an obligation also to ensure that areas such as forests, wetlands, rivers among others are protected from encroachment by human activities. This study was done in consultation with the Nairobi City County government to ensure that appropriate attention is given to Ngong river riparian reserve.

2.6.4.6 The National Environment Management Authority (NEMA)

This organization was set into place by EMCA to help in management and protection of the environment. It is the leading organization dealing with environmental issues. The organization to advocates against activities that lead towards degradation of the environment. This makes the organization to approve all projects through conducting an environmental impact assessment before any project is carried out. NEMA also sets environmental standards required in any living environment and ensures that the environment is maintained clean and healthy. In addition to that NEMA provides for the size of the riparian reserve required in any river as 30m measured from the highest water mark. This study involved NEMA to ensure that environmental management and protection issues are well captured.

2.6.4.7 Ministry of Lands, Housing and Urban Development

This ministry is concerned with control of land use and provision of housing to mainly urban residents. The ministry has to come up with the best guiding policies for land use and urban development. The ministry has the mandate to regulate land use and to ensure that there is public participation during land use planning and allocation to enhance equitable sharing of land resources. They should also ensure that land is used sustainably during provision of housing and other developments. This ministry is therefore one of the stakeholders of this research since it largely influenced the decisions made after the research and provided necessary information support towards the success of this research.

2.6.4.8 Ministry of Environment, Water and Natural Resources

This ministry is concerned with management of the environment, water and natural resources. Any activity touching on any of the three components therefore requires the attention of the minister concerned. This ministry aims to ensure that water, the environment and natural resources are used for the greater good of the larger resident community. This ministry is also obliged with the duty to ensure that natural resources are not over or underexploited. They are to ensure equitable and optimum use of the natural resources. The ministry therefore protects areas of environmental importance and ensures that all citizens have access to clean and safe drinking water. It is therefore the

role of this ministry to protect areas of concern such as water catchment areas, forests, lakes, rivers, wetlands and even the ocean. This is also the leading ministry in dealing with the issues of environmental degradation and rehabilitation on which this research is based on. The ministry was very vital and resourceful during the study.

2.6.4.9 The National Land Commission

This commission was set up in 2013 as a requirement of the constitution of Kenya 2010. The commission is an independent government commission whose mandate is to manage all public land on behalf of the county and national governments. It is required by the constitution in chapter 5 that all land use plans must be along the requirements of the Commission. The commission also has the mandate to give guidelines on land issues and is the main body responsible for solution of land based conflicts. This commission apart from the management has the duty to advise the government on the issues of land such as registration of titles. It is also mandated to conduct research related to land and natural resources then make recommendations to appropriate authorities.

2.6.4.9. The Courts

These are judicial institutions which are meant to ensure administration of justice. In the case of land and environment there is an established land and environment court. This court is meant to solve all land and environmental conflicts. The normal court also solves such cases since the constitution grants the rights to individuals who feel that their right to clean and safe environment is violated to move to court and demand compensation. The courts as vessels of justice are therefore important institutions in this study since they will assist in solving various land and environmental conflicts that may arise from the recommendations of this study by the use of the law

2.6.4.10 The University of Nairobi

This is a higher learning institution equipping learners with skills and knowledge needed in the professional world. In relation to this study the institution equips learners with necessary skills needed for research and innovation making it a very important institution in this study.

CHAPTER THREE

3. METHODOLOGY

1.1 Introduction

This chapter covers methods used for data collection, analysis and compilation. The main methods which were used in the collection of data here were; review of existing literature which involved reviewing of relevant existing data in libraries, documentation centers and those available within the internet. These data gives supportive information on the study and justifies why the research was fruitful in the sustainable development of the river. This was followed by primary data collection which involved administration of business and household questionnaires, institutional and key informant interviews, observation, photography and collection of GPS data at various points of the area of study. Some of the institutions which were targeted for key informants included: the Nairobi City County officials mainly the MCAs , ministry of environment, water and natural resources officials, ministry of lands, housing and urban development officials, NEMA and interview of community based organizations. The survey methods used were within the water resources and at the same time met the requirements and standards covering; data collection, interpretation, organization, analysis, compilation and presentation in the required format and ensure that the data collected is handled carefully.

The report was compiled using desktop methods such as MS-office, Arcmap,SPSS and Arc GIS of data compilation in consultation with the relevant authorities such as the Nairobi City County government and NEMA. Reconnaissance visit of the study area was carried out to ensure familiarity with the study area. After the reconnaissance there was a comprehensive data collection, data analysis and recommendations on the best way to rehabilitate the Ngong river riparian reserve for sustainable development. This is to enhance improvement of living standards of the residence communities and stakeholders of the Ngong River riparian reserve conservation.

1.2 Sampling methods

Sampling refers to selection of a representative population out of the whole population of the study area. This research was carried out by Interviewing a sample of 40 households and 15 business questionnaires. These samples were taken because they represented 50% of households and business activities of the population in the Ngong river riparian reserve. These samples were used because they represented a greater percentage of those living within the riparian reserve. The samples were randomly selected in the Kibera estate. The community located next to the riparian reserve was selected. This sampling was important because the data obtained here represented the characteristics of the whole population of Kibera people living within the riparian reserve. This also saved the time needed for data collection since only a small population out of the entire population was taken into account.

1.3 Data collection

This involved collection of both qualitative and quantitative data needed to assess the situation on the ground as far as the riparian reserve is concerned. Data collection involved obtaining primary data from field survey and secondary data from existing written sources of data. The data collection techniques used included:

- (a) **Research on secondary sources;** this involved review of existing written sources of data such as books, journals, documentaries, reports from various international and local forums among others in search of information and ideas on the riparian reserves within urban areas.
- (b) **Observation;** this involved a participatory method of touring the study area and viewing the existing situation and collection of important data through taking of photographs and sketching of important features within the study area. So here instruments such as cameras and measuring equipments were used.
- (c) **Interviews;** interviews involved making face to face inquiries with the household heads and various stakeholders involved in the management and conservation of the Ngong river riparian reserve as well as getting their ideas towards its sustainable development. Interview schedules were used as instruments to record this data.

- (d) **Participatory method;** here all the stakeholders and the public at large were involved in problem identification, collection of data as well as analysis of the collected data. Methods such as participatory urban appraisal were used to obtain the required relevant data from the stakeholders and the public. Focused group discussions were also used here to ensure that the community needs are taken into account during the identification of the problem and in finding the solutions in regards to the riparian reserve.
- (e) **Questionnaires;** these involved administering of semi-structured questions to households and to other land users within the river riparian reserve. Questionnaires were also administered to the institutions involved in the management and conservation of the riparian reserve.
- (f) **Surveys and opinion polls;** this involved spatial analysis to create a picture of the study area in form of sketches. This was done to analyze the existing infrastructural situation, socio-economic structure and the environmental situation. It was also meant to analyze people's ideas, attitudes and interests as far as the riparian reserve is concerned.

1.4 Data preparation

This involved activities to input, store, retrieve and analyze the collected data. This therefore entailed data coding, editing, validation and input. Here computer softwares such as Microsoft office, SPSS and GIS were widely used to come up with accurate and up to date data on the Ngong river riparian reserve. To be able to ensure this was achieved, there was preparation of data needs matrix to show the sources of data, methods of analysis, ways of presentation and data types based on the objectives of the study.

1.5 Data needs matrix

Research objectives	Data needs	Form of Data	Source of data	Analysis
1. To find out the most common informal land uses found along this stretch.	Identification of the land uses that are found within this Ngong river stretch and assessment of their positive and negative impacts on the sustainability on the river	Qualitative data/ quantitative	Observations, Interviews, Focus group discussions, Photographing, GPS and secondary sources	A detailed analyzed situation showing the existing land uses and their sustainability on the riparian reserve
2. To find out the conflicting issues brought about by the informal uses along the river riparian reserve.	Identification of land uses which have encroached the river riparian reserve and to examine land use conflicts brought about due to this encroachment	Qualitative/ quantitative data	Field survey and consultation of the various institutions such as NEMA and the relevant ministries, GPS and use of secondary data sources	Analysis of land use conflicts at various points of the river riparian reserve use of analysis tools such as GIS and SPSS.
3. To find out the impacts	To assess the environmental,	Qualitative/ quantitative	Opinion polls (participatory	A comprehensive assessment of land

<p>of the informal land uses on this stretch of Ngong River.</p>	<p>social and economic issues brought about by the encroachment in comparison to the assumed situation if the encroachment was not there.</p>	<p>data</p>	<p>urban appraisal) observations, questionnaires, photographing and use of secondary sources.</p>	<p>uses along this stretch of Ngong river and their implication on the sustainability of the river; this will involve GIS mapping and use SPSS to analyze various questionnaire responses.</p>
<p>4. To find out how the informal land uses can be rehabilitated for the development of the river riparian reserve.</p>	<p>Determination of the best utilization of the riparian reserve and the land around the river for sustainable development of the river.</p>	<p>Qualitative/quantitative data</p>	<p>Questionnaires, interviews, photographing, GPS and secondary sources</p>	<p>Land use mapping and zoning of activities which involve use of sketches and aerial maps. Here there was use of GIS as an analysis tool.</p>

Table 1: data needs matrix

CHAPTER FOUR

STUDY AREA

4.1 Critical information about Nairobi

Nairobi's name comes from the Maasai phrase "enkare nyorobi" which means "a place of cool waters". It originated as the headquarters of the Kenya Uganda Railway, established when the railhead reached Nairobi in June 1899. The city grew into British East Africa's commercial and business hub and by 1907 became the capital of Kenya (Mitullah, 2003; Rakodi, 1997). Nairobi occupies an area of about 700 kmsq at the south-eastern end of Kenya's agricultural heartland. At 1,600 to 1,850 m above sea level, it enjoys tolerable temperatures year round (CBS 2001, Mitullah, 2003). The western part of the city is the highest, with a rugged topography, while the eastern side is lower and generally flat. The Nairobi, Ngong, and Mathare rivers traverse numerous neighborhoods of Nairobi and the indigenous Karura forest and still spread over parts of northern Nairobi. The Ngong hills are close by in the west, Mount Kenya rises further away in the north, and Mount Kilimanjaro emerges from the plains in Tanzania to the south-east. Minor earthquakes and tremors occasionally shake the city since it sits next to the Rift Valley, which is

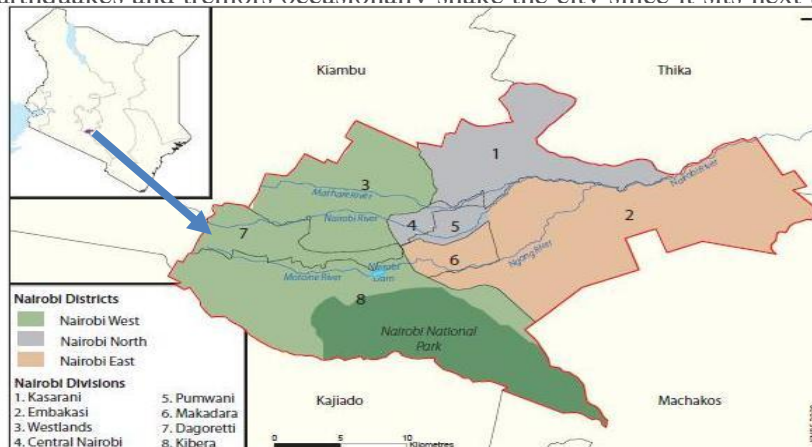


Figure 5: Nairobi in Kenyan context

Rapidly increasing population has been ongoing since independence, surpassing one million in the 1980s, two million in the 1990s and now over three million residents. While the annual rate of growth has at times exceeded ten per cent, it has more recently decreased to below four per cent per year. This is still very high by global standards. Nairobi is projected to top 4 million by 2015. The footprint of the city's growth can be defined in at least two ways, the official boundaries and the actual changes in settlement, which can be seen in series of satellite images. The light purple of the intense urban settlement can be seen steadily growing between 1976 and 2005.

Much of Nairobi's urban area is unplanned settlement driven by rapid population growth and urban poverty, among other things. Sprawling informal settlements handicap the city's delivery of social services and negatively impact the quality of life. Informal settlements date to the city's earliest days when European settlers appropriated large tracts of land displacing the local African population with no provision for their resettlement. In the early 1990s, it was determined that over half of the city's population was living in unplanned settlements.

4.2 Population and demographic characteristics

In 1901, there were only 8 000 people living in Nairobi. By 1948, the number had grown to 118, 000 and by 1962, the city had a population of 343, 500 people. By the 2009 census, the city's population was about 3.1 million and in 2015 it is projected to be 3.8 million (Rakodi, 1997, CBS, 2001). Rural migrants fueled Nairobi's early growth. An explosion of growth took place between 1979 and 1989 when 772, 624 newcomers came to the city (NEMA, 2003). The forces motivating rural-urban migration to Nairobi include better economic prospects, opportunities for higher education and higher wage employment, and the attraction of Nairobi as a market for goods and services. Nairobi is currently home to nearly three million people and represents about a quarter of Kenya's urban population. A growing economy and swelling population from both in-migration and natural growth are continually increasing the city's size. A significant number of commuters from satellite towns such as, Thika, Naivasha, Ngong, and Machakos come into Nairobi daily to work or bring goods and supplies. Daily commuters from such satellite towns contribute an estimated additional half-million people to the city's population. Nairobi's large and growing population is one of the main forces driving the city's overwhelming environmental challenges. Ongoing rural to urban migration, high natural birth rates, and poor or inappropriate city planning conspire to continue degrading the city's water and air quality. In turn, environmental degradation has impacts on human health and the economy. For the country to achieve the MDGs, progress must be made in Nairobi, as Kenya's capital city and its largest urban centre. An important target is stabilizing the fertility rate at 2.1, as recommended by the Population Policy for Sustainable Development (CBS, 2004). Although it covers only 0.1 per cent of Kenya's total surface area, Nairobi has about eight per cent of the country's total population. The

city's overall population density is 3 079 people per square kilometer, but this varies significantly from extremely high in the Central and Kibera divisions to very low in the up market residential area of Muthaiga in Westlands division. The poorest 60 per cent of Nairobi residents live on only 8.7 per cent of the city's land base, mostly in informal settlements (ITC 2004).

Figure 6: population of Nairobi graph

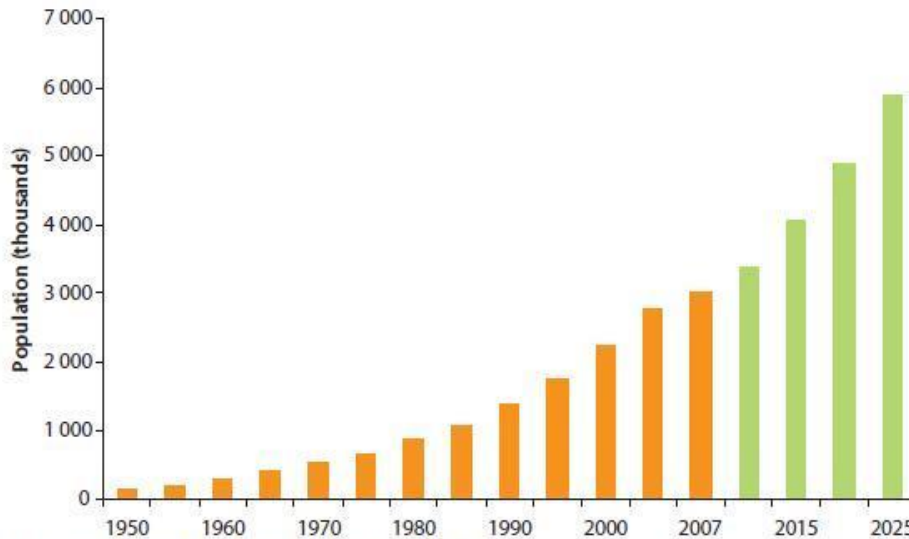


Figure 2: Nairobi's historical and projected population, 1950-2025
(Source: KNBS 2008)

4.3 Major environmental issues

As Nairobi's settlements sprawl outwards, they take over forested and agricultural land, fragmenting and degrading remaining natural areas. In addition, rapid population growth has outstripped the city's ability to deliver adequate services such as education, health care, safe water, sanitation, and waste removal. It has also led to an explosion in the number of cars and other vehicles, leading to constant traffic jams and high levels of air pollution. As it continues to grow, Nairobi faces the challenge of planning for sustainable urban development that provides adequate housing and services at the same time as it protects air and water quality and the natural environment within and around the city. The major environmental issues faced by the city and its residents of which some are looked at in this section include; rapid urbanization, informal settlements, air and water pollution, water supply and sanitation, and solid-waste management.

4.3.1 Rapid urbanization

Nairobi once had a reputation as a healthy place to live and was called the “Green City in the Sun”. Its landscape was characterized by natural forests, labyrinthine riverside ecosystems, and wetlands. The area boasted abundant wildlife in forest groves, marshy wetlands, the Kitengela Corridor, and the Athi-Kapiti plains. Nairobi’s physical expansion has come at the expense of the natural environment. Urban sprawl and the construction of roads and other city infrastructure has led to the loss of forests and other natural areas, such as mixed rangeland and bush lands. As a result, the forest cover receded and was replaced by coffee plantations. Later, the demand for food for the growing population led to the transformation of the city’s outskirts to other agricultural uses, which in turn are threatened by further urban growth.

4.3.2 Informal settlements

Nairobi’s rapid growth increased the demand for land and led to land speculation, forcing the poor to settle in fragile and unsavory areas where they face hardships due to a lack of proper housing and public services and where they are vulnerable to environmental change. Urban poverty, lack of employment opportunities, and inadequate urban planning also conspired in the gradual growth of informal settlements in Nairobi since the city’s founding.

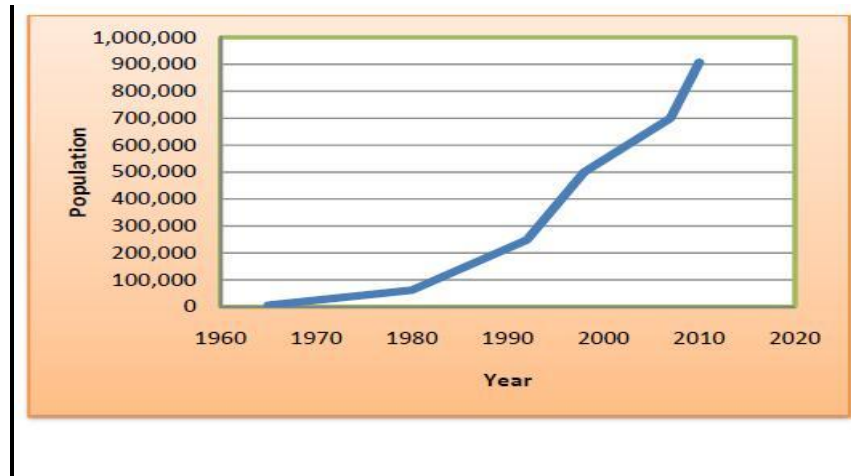
By 1995, there were a total of 134 informal settlements with 77, 589 structures. These settlements had a combined population of 1, 886, 166 (CCN, 2007). People living in Nairobi’s informal settlements, particularly the slums, usually find themselves in the city’s most fragile areas, such as flood plains, steep slopes, river valleys, or adjacent to sewers or dump sites.

Kenya is facing an increasing growth of informal settlements in her urban centers. As rapid urbanization takes its toll, so has the development and growth of slums. More than 34% of Kenya’s total population lives in urban areas and of this, more than 71% is confined in informal settlements (UN-Habitat, 2009). This number will continue to increase unless a serious and concerted action by all relevant stakeholders is undertaken. Informal settlements have a long history in Nairobi dating from colonial period, where most Africans were barred from the city’s designated residential areas since they were

reserved for Europeans and Asians. Kenyans who came to the city in search of work had to create informal residential settlements outside the central business district and the planned residential areas which were largely ignored by the colonial government [Amnesty International, 2009]. Mitullah (2003) argues out that the city's first development plans did not include early settlements; hence essential services to the settlements and road construction to link them to other areas of the city were not provided by the local authorities. As a result, Nairobi developed along segregated lines. The city's 1948 Master Plan and other major urban development plans continued to neglect informal settlements (Anyamba, T.J.C., no date). Informal settlements in Nairobi are the consequence of both explicit government policy and decades of official indifference. In particular, informal settlements were excluded from city authority planning and budgeting processes. The governments in power have ignored their existence until recently when national authorities and international bodies outlined the dangers of slums to humanity. Complexities surrounding slums in the city have made it difficult for the government to pass workable policies which if enacted and applied in the right way could help Kenya improve slums life.

In Nairobi therefore, the lack of recognition of slums and settlements as residential areas denies residents a range of essential services provided by the government to other residents of the city. These essential services include improved water supply, improved sanitation, electricity, garbage collection, improved health services, education, access roads and transport. Lack of good governance and proper leadership in these settlements has worsened the situation. The experience of slum-dwellers starkly illustrates that people living in poverty not only face deprivation but are also trapped in poverty because they are excluded from the rest of the society, denied a say, and threatened with violence and insecurity [Amnesty International, 2009]. There is indeed a clear lack of empowerment and social capital and corrupt authorities have taken advantage of this. Kibera informal settlements which began in 1912 have an estimated population of 950,000 people, (Umande Trust, 2007).

Figure 7: population of Kibera graph

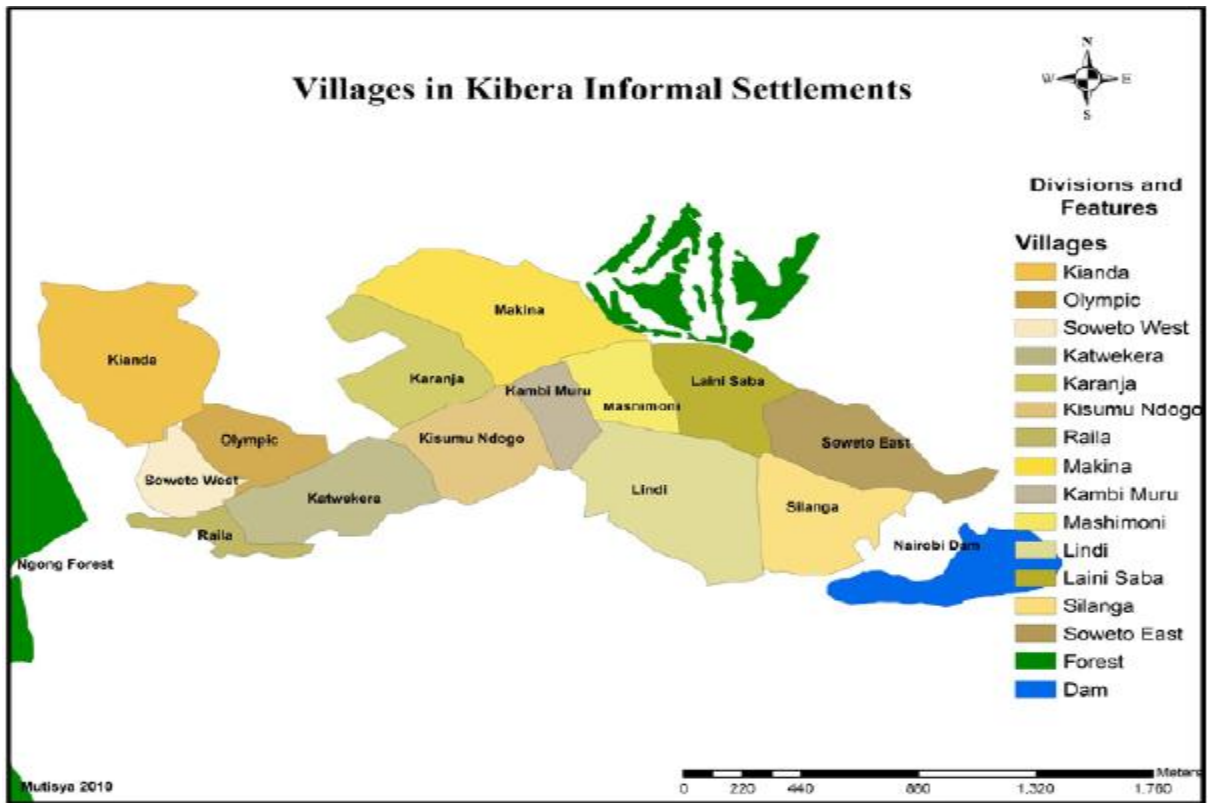


Kibera's population growth (Data source: An average of Kenya Bureau of Statistics Approximations, UN-Habitat, Local government, NGOs in Kibera).

4.4 Kibera

The Kenyan government owns all the land upon which Kibera stands, though it continues not to officially acknowledge the settlement; no basic services, schools, clinics, running water or lavatories are publicly provided, and the services that do exist are privately owned. Kibera settlement is located on two Nairobi divisional administrative areas; Dagoretti and Lang'ata divisions. The slum is divided into 14 villages with varying populations - Kianda, Olympic, Soweto West, Gatwekera, Raila, Karanja, Kisumu Ndogo, Makina, Kambi Muru, Mashimoni, Lindi, Laini Saba, Silanga and Soweto East.

Figure 8: Kibera; map

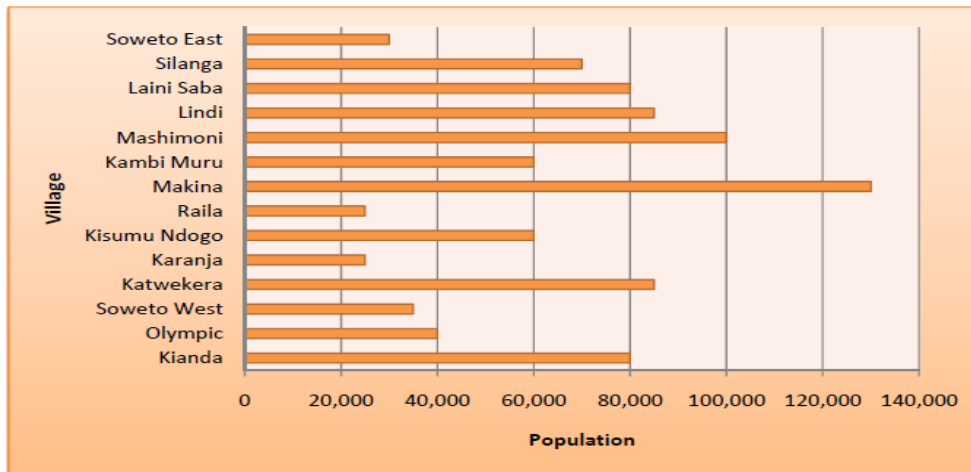


(Source: Emmanuel Mutisya)

4.4.1 Population by Villages

Makina, with a population of 130,000 people is the largest village by population. Mashimoni, Katwekera, Kianda and Laini Saba villages equally accommodate large populations of more than 80,000 people per village. The graph below shows a summary of the population of various villages

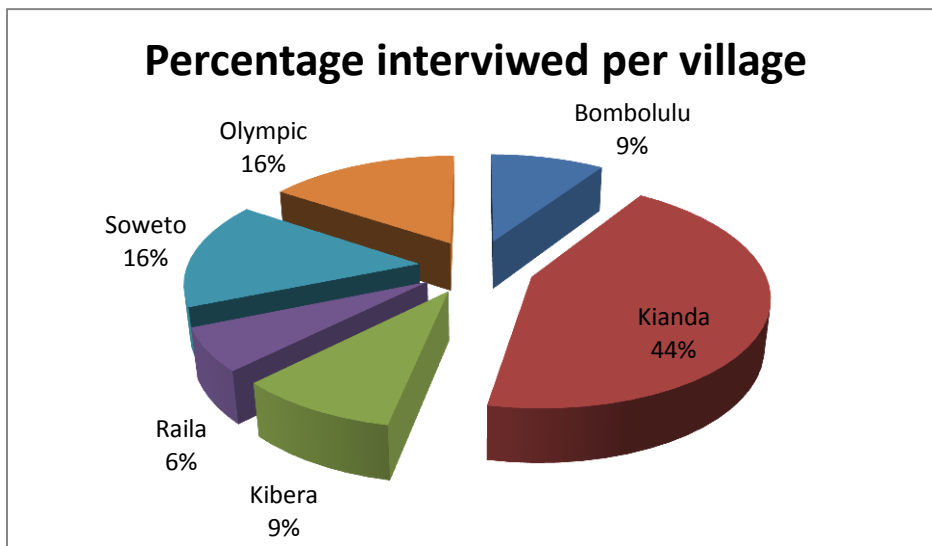
Figure 9: Kibera; population by villages' graph



(Source; KNBS, 2010)

The percentages of population interviewed in the respective villages during the field survey on the Ngong river riparian reserve are as per the chart shown below.

Figure 10: Chart of percentage interviewed

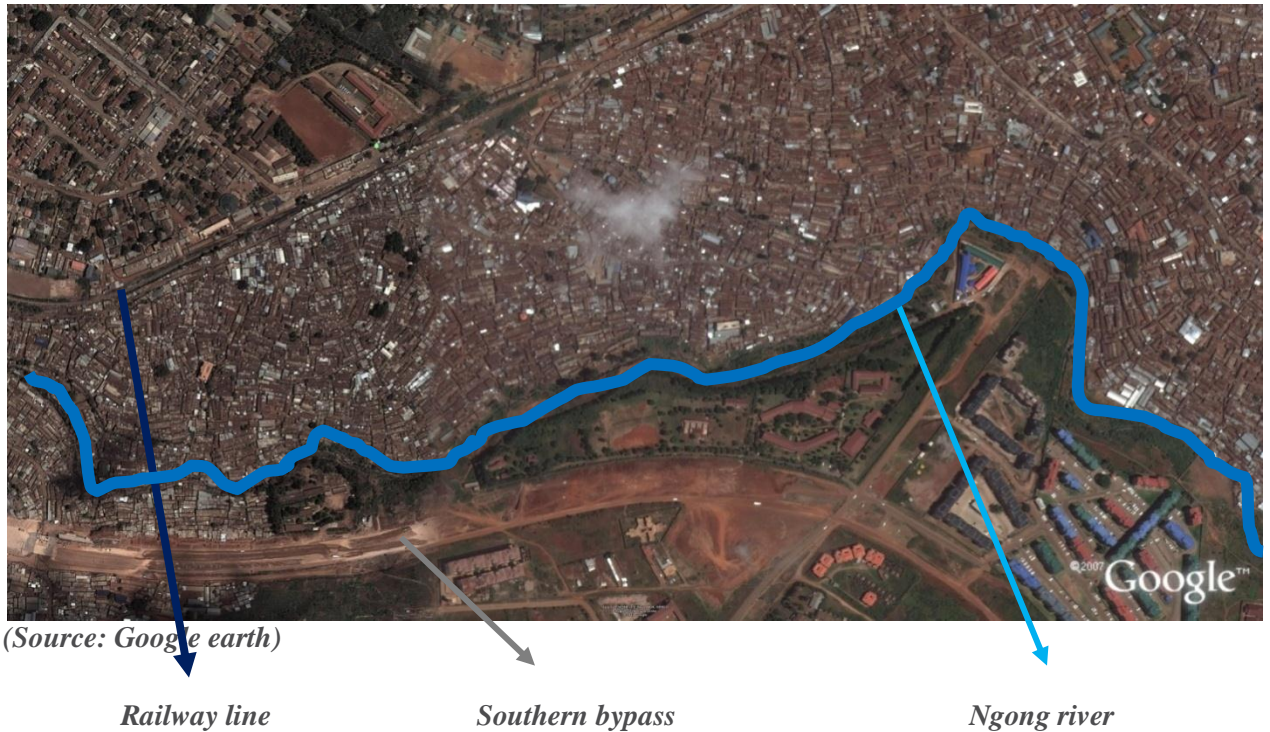


(Source: Field survey)n = 40

The village referred to as Bombolulu is a sub-village found within Kianda village while that referred to as Kibera came from respondents who were not sure of the name of their villages. Kianda with the largest area and population had the highest percentage of 47% being interviewed, while Raila with the lowest population and size obtained the least population of only 6% being interviewed.

4.5. Study Area

Figure 11: Google earth image of study area

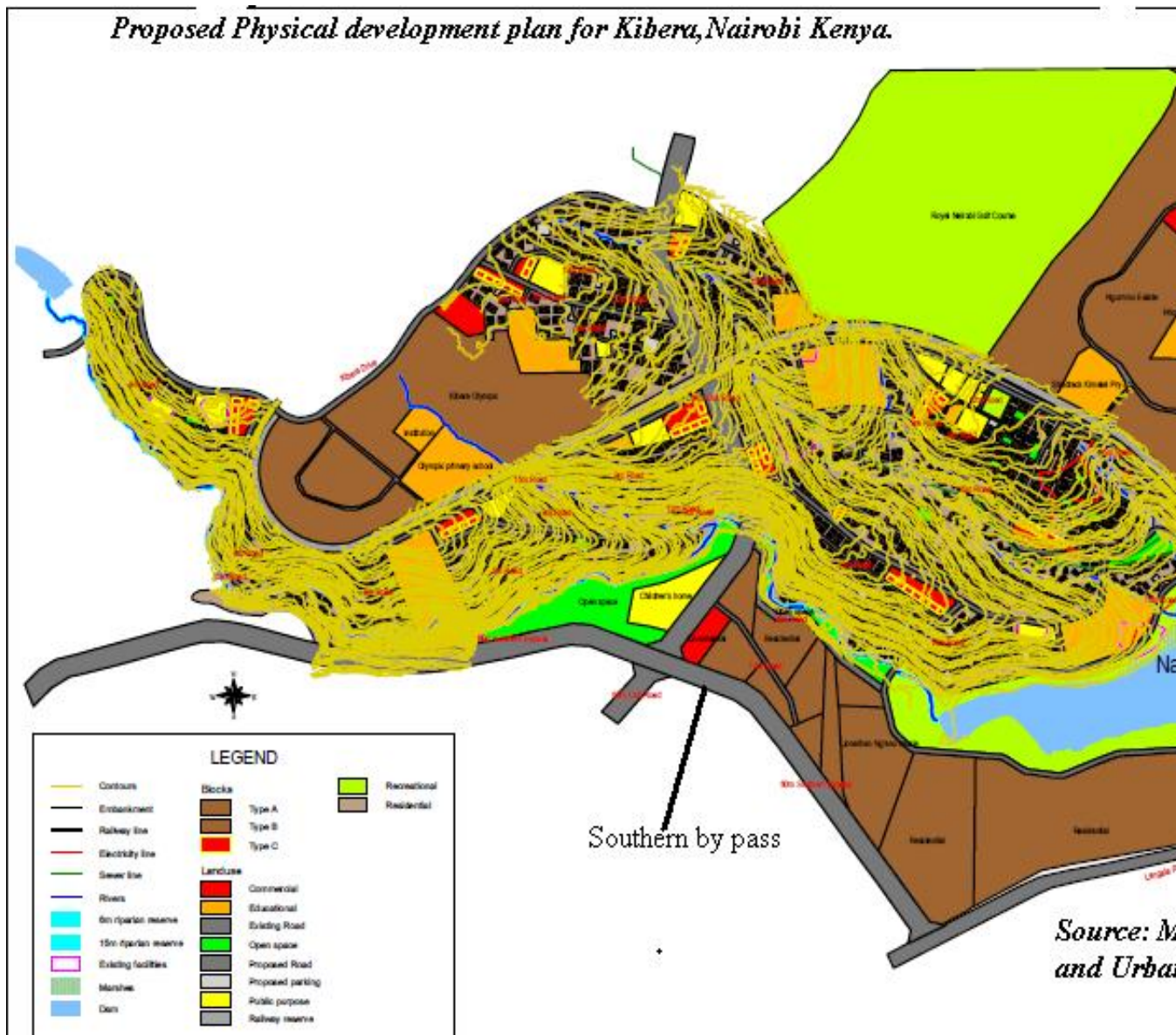


The stretch of the Ngong' river under study passes through Kianda, Soweto, and Raila villages as well as bombolulu, a small village coming up within Kianda estate and all these are found within Kibera informal settlements in Nairobi. The study area covers an area of 1kmsq. The study area is bordered by the southern by pass, the railway line and a mass of informal settlements.

4.5.1. Existing land use plan for Kibera informal settlements

So far most informal settlements don't have an operational land use plan. Kibera however has a proposed land use plan which has not been implemented in any of the villages within the area. This hinders service delivery in the informal settlements and poses a threat of encroachment to environmental sensitive areas such as the river reserves and the railway reserve, other than settlement in the residential areas designated by the plan.

Figure 12 :Proposed Kibera Development Plan



CHAPER FIVE

5. Research findings

5.1 Poor solid and liquid waste management

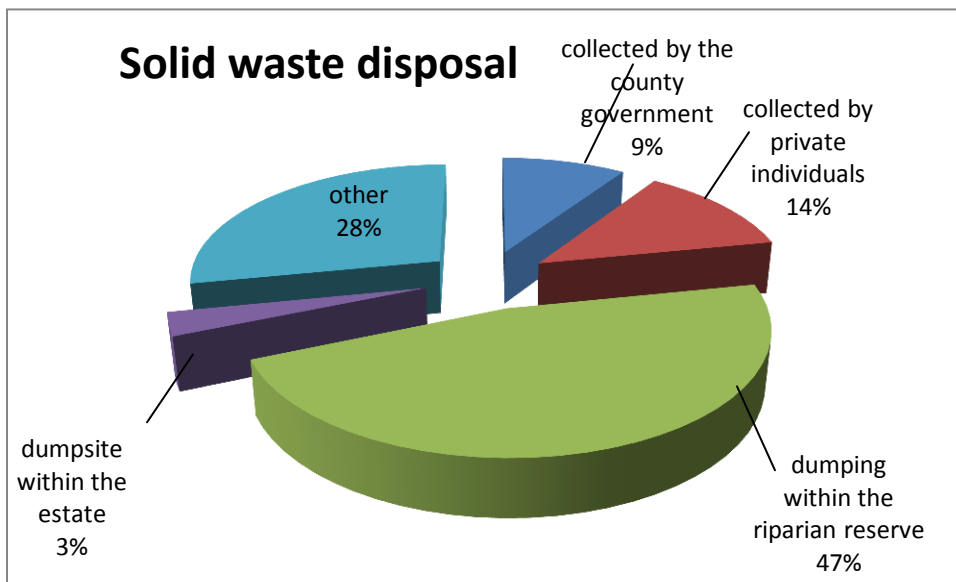
Most residents of Kibera don't have access to basic solid waste management services by the county government. 47% of residents dump their waste either on the riparian reserve or on the railway line, a few burn their waste in open spaces in front of their houses, while only 9% have access to the county garbage collection services and handling of garbage by private individuals takes 14% as indicated in figure 13 . They also dump on the drainage channels causing blockage of such facilities. The drainage systems therefore become inefficient for storm water drainage when it rains making the roads to be impassable. Liquid waste from households is in most cases channeled through some tunnels into the river. This makes the river water unsafe for use and makes residents to be prone to the spread of water borne diseases. Plate 1 below, shows dumping of solid waste within the railway reserve and within a wooden bridge in one the crossing points of the river.

Plate 1: Solid waste dumping within the railway line and the river, field survey





Figure 13: solid waste disposal chart, field survey



As suggested by the above statistics from the field survey it is evident that 47% dump their waste in the river riparian reserve, 28% referred to as other, comprised of those who dump their waste mostly in the railway line and those who burn wastes in open spaces in front of

their houses. Service delivery by the City county officials stands only at 9% showing very low concern to the slum residents by the county government. Only 13% percent can afford the services of private individuals and 3% percent have dumpsites within the estate where they stay.

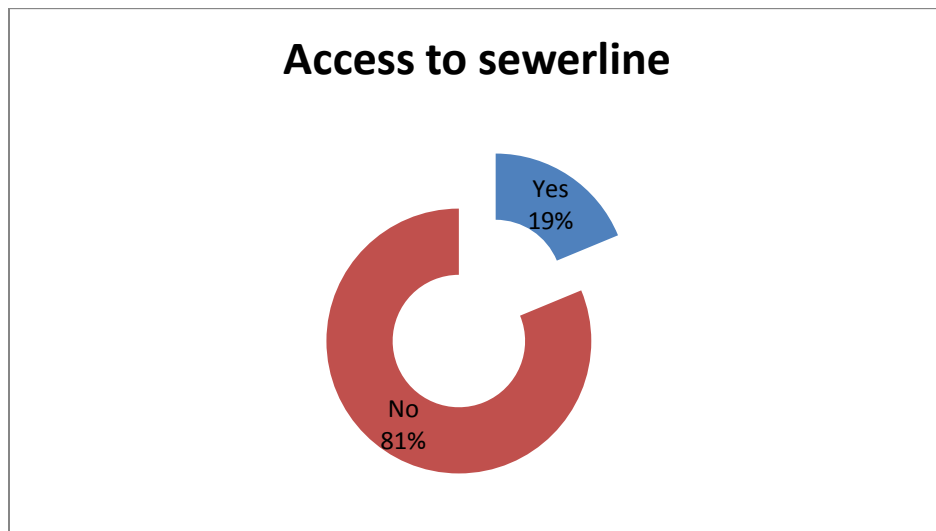


Figure14: Access to sewer line, field survey

On handling the issue of liquid waste management the study revealed that only 19% of the residents have connection to a sewer line with a larger percentage of 81% having no access to a sewerline. Those who don't have access to the sewer line have turnels dug leading to the river. They therefore use the river as a disposal point for both solid and liquid waste.



Plate 2: poor liquid and human waste management

Turnels of liquid waste leading to the river from some of the households



Source, Field survey

Public toilet facilites located just in the riparian reserve

1.2 Water pollution

The stretch of the river passing through this area is polluted to an extent that the residents of the area have nicknamed the river as 'sewage'. The water colour in this area is greenish showing high levels of pollution of the river. The river therefore is of no benefit and makes the people be at risk of spread of diseases as noticed during the field survey it was noticed that some residents even fetch and use the water from the river. 75% of residents in the study area have access to piped water supplied mainly through the water kiosks. Therefore most residents in the study area buy water from such Kiosks. Only 6% have piped water connected to households and very few use the water from the river due to pollution. This is brought by inadequate supply of sanitation facilities to the slum community. All the liquid waste from the households is therefore released directly into the river. Untreated sewage is also released into the river at various points by the residents living around the river due to the sloping nature of the land.



A man fetching water from the polluted river of which, its color shows high levels of pollution. This therefore shows how residents are at a great risk of contracting water borne diseases.

Plate 3: Pollution of the river, field survey

5.3. Encroachment of the riparian reserve by land use activities

Due to the high demand for housing by the increasing urban population most of the people in the study area have resolved to construct both temporary and semi permanent houses along the riparian reserve. The houses constructed along the riparian reserve are

not only for residential purposes but also houses for other land uses such as commercial facilities, educational facilities e.g. Soweto Secondary School, health facilities e.g. Revival Health Center. Others include an open space used by the school as a playing field for students. The high demand for housing has even made other residents to build housing structures on top of the river. This encroachment makes the people be at risk of flooding when it rains and make people vulnerable due to spread of water related diseases. It also interferes with the flora and fauna within the river ecosystem. This also affects the utilization of the river as a natural resource. People who have encroached on the riparian reserve said that they resolved to settle in such a space because they had no alternative housing sites and that they are unable to afford housing services in the middle income residential areas such as Lang'ata. In most cases public latrines are located within the riparian reserve for ease of disposal of solid waste into the river which is used as sewage by most of the slum settlements. Activities such as urban agriculture have also encroached the riparian reserve. The land uses in the reserve range from agricultural, educational, public purpose, commercial and residential.

Plate 4: Encroachment of the reserve, field survey



Urban agriculture in Soweto Estate

Kianda Preparatory school



Soweto Secondary School

Health facility in the reserve



Informal residential Housing in Raila area

Commercial activities on the reserve

During the research, the question of what should be done to ensure that the riparian reserve is conserved for the sustainable development of the river was administered to different land users and the summary is represented by the graph shown below

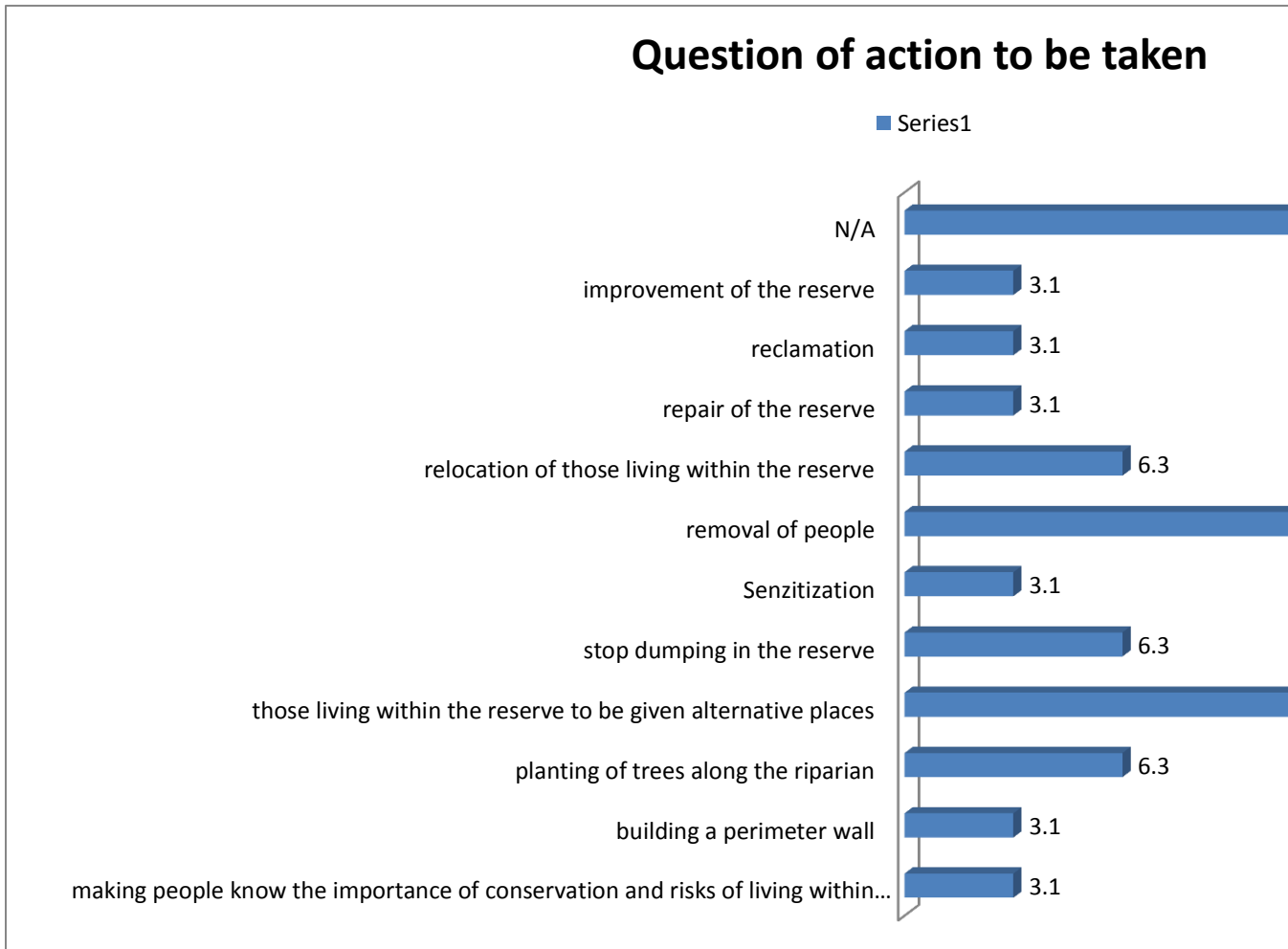


Figure 15: Action to be taken for encroachment, field survey.

Most of these structures apart from being in the river riparian reserve they are also marked to be on the road reserve meaning the place should be just for utilities and not residential, commercial and any other kind of land use. This is supported by the fact that apart from Soweto girls and others being on the riparian reserve they are also marked to be on the road reserve. The findings drawn from this is that the owners took advantage of the open spaces and utilized them for their own personal gain.



field survey

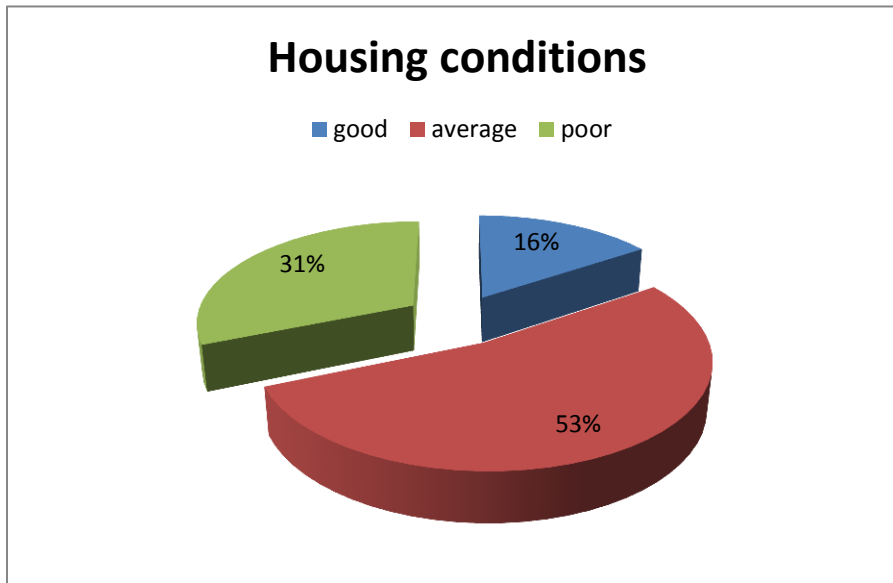
Red X-marks showing that Soweto Academy is not only within the river riparian reserve but also within the road reserve and so is the Barbershop.

Plate 5: Double encroachment

5.4. Poor housing and road situation

Being within the areas of low service delivery, this area is characterized with poor housing standards as compared to other areas within the city. Residents however are contented with the conditions with most respondents saying their housing living condition is average. 15% agreed to the fact that they live in good housing conditions and 31% of respondents accepted that their housing conditions are poor. The chart below summarizes this as:

Figure 16: Housing conditions chart



Source: Field survey.

According to the chart, 53% of the respondents were contented with their living conditions just because of having no other better option, 31% accepted the fact that the housing conditions are poor and wished for improvement and only 16% live in good housing conditions. This shows how pathetic the housing conditions are in the study area. People therefore resort to maximize the use of any space available to improve the standard of their living. This therefore endangers any open space in the informal settlements such as Kibera.

The physical infrastructure in the area is also poor, though there are developments such as upgrading of the southern by pass. The infrastructural situation is very poor. This consists of unmaintained roads with poor drainage facilities. The study area has good supply of electricity. Accessibility to individual households is however limited to very small spaces making the residents to have very low risk management strategies.

Plate 6: Infrastructural and housing situation, field survey.



The housing typologies also range from semi permanent to shanty with highest percentage resolving to semi permanent type of houses. These semi permanent houses are always made of stabilized earth materials consisting of clay and concrete. The results carried on housing typologies consisted of the following:

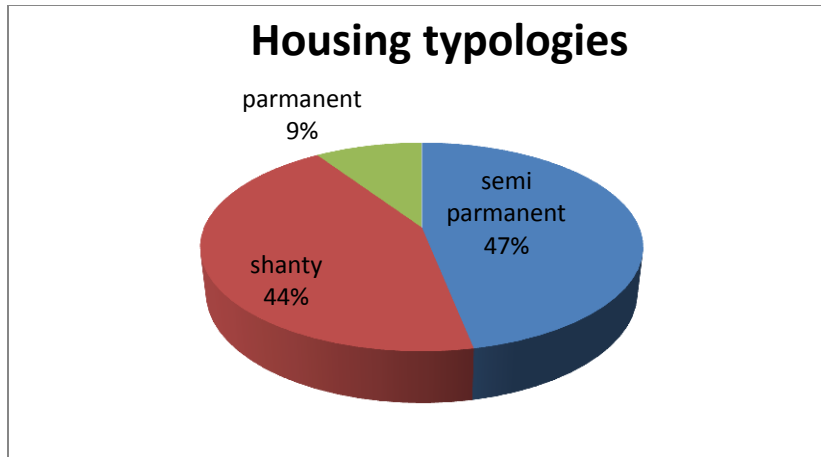


Figure 17: Housing typologies' chart

Source; field survey

According to this field survey report on housing typologies, 47% of the people who stay along the riparian reserve have semi permanent structures, 44% live on shanty structures made of either clay or iron sheets and only 9% have permanent structures within the riparian reserve



Semi- Permanent



Permanent



Shanty structures

Plate 7: Housing typologies

According to the study carried out on building materials most of the residents living within the riparian reserve live on semi permanent houses and thus concrete is the most used building material. This came across as most of the households were made up of stabilized earth materials consisting mainly of clay smashed with concrete.

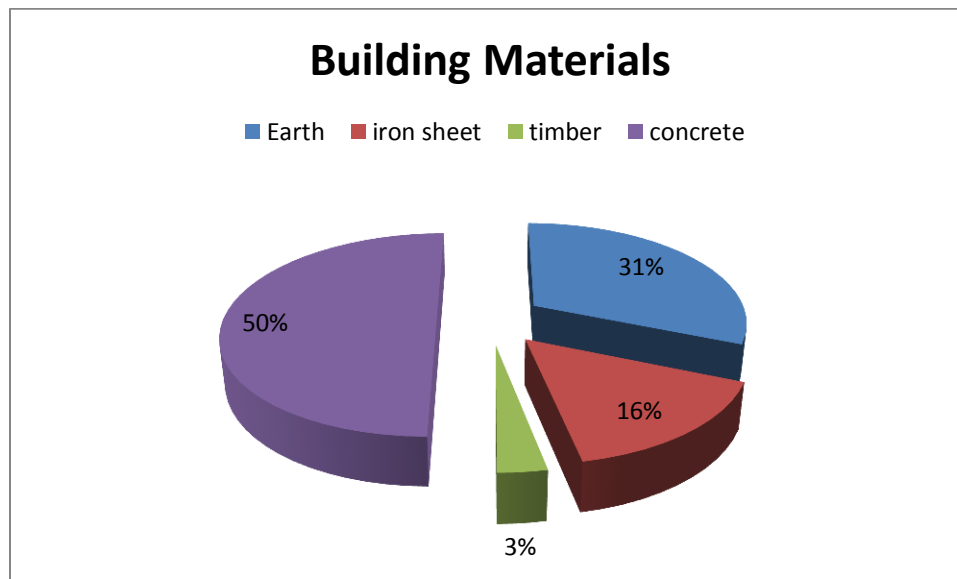


Figure18:

building materials chart, field survey

5.5 Potentiality for development

The study area shows great potential for development of both the physical infrastructure and housing. There are existing programs to help reduce the housing and infrastructural poor conditions; these include the existing upgraded slums and upgrading of southern by pass. This projects show the steps taken by various government Agencies and NGOs to

help curb the deteriorating housing and infrastructural conditions within Kibera slum settlements. Apart from these projects there is need for coordination of various stakeholders to invest in these projects because, in as much as there are these projects, there is need for more of such to help deal with urban sprawl that has made living conditions in these areas pathetic.

There is need to also develop other utilities such as water supply system and drainage facilities. Improvement of social and physical infrastructure should be development priorities in this area. There is also an open land that can be used to give alternative developed housing for those who live in the riparian reserve. This unencroached space can be used to provide multi storey mixed use housing to help accommodate the varieties of land uses within the riparian reserve. The soil within this area is also stable enough to sustain such housing developments. The area consists of rocky red soil types which show an example of very stable structure of soil.

Plate 8: development potential of the study area, field survey.



southern by pass, slum upgrading program and an open space with further housing development potential

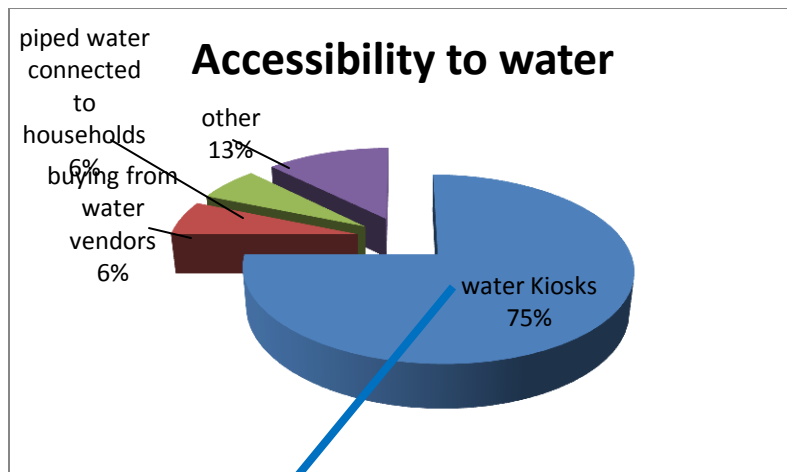
5.5.1 The negative side

Experience has shown that forced eviction, demolition of slums and resettlement of slum dwellers create more problems than they solve. Eradication and relocation destroys large stock of housing affordable to the urban poor, while new housing provided has frequently turned out to be unaffordable, resulting to the movement of relocated households back to slum accommodation. Resettlement also shifts slum dwellers from their employment sources, destroys their productivity and disrupts their livelihood networks. National approaches to slums and informal settlements have generally shifted from negative policies such as eviction, neglect and involuntary resettlement to more positive policies such as self help housing, on site upgrading and enabling the rights based policies. Where appropriate improvement policies have been put in place, slums have become increasingly financially cohesive, offering opportunities for security of tenure, local economic development, improvement of income and shelter among the urban poor. The accepted best practice for housing interactions in developing countries is now participatory slum upgrading, with holistic neighborhoods improvement and approaches taking into account health, education housing, livelihoods and gender (UNHABITAT, 2003). Although such success stories have been few in comparison to the magnitude of slum challenges, this study suggests that in site slum upgrading is more effective and should be the form in most slum improvement projects. The key to success of such projects lies in creating access to livelihood and opportunities as the central pillars.

5.6 The state of water supply facilities and other utilities

The water facilities are not well provided within the study area. The study revealed a lot of casualties related to water supply and other utilities. The study related to water supply services revealed so many water related problems. One of these was the fact that the supply of water is inadequate since 75% (same percentage found by UN- HABITAT report) of the slum population still access water through water kiosks in which majority of residents access water by paying between 4-5 shillings and a few paying between six to ten shillings for a 20 liters jericane. Another issue facing the water supply service is that most of the water supply facilities are located within the riparian reserve. These facilities are not well maintained, making the supply capability to be low and insufficient as compared to the WHO per capita water supply recommendation of 30 liters per person

per day. There are only a few residents who have water supply system connected to their households. The water supply in this area is a responsibility which has majorly been taken by The Nairobi water and Sewerage Company and all the supply system seems like a temporary one since most of the water supply pipes are made of plastic. This makes the supply facilities to be prone to damages and loss of water within the areas due to leakages. There is also no well maintained sewerage facility within the study area making the ultimate function of Ngong River within the area to be the main sewerage disposal point for all the liquid waste within the study area. Most residents including business people, CBOs, household owners and stakeholders complain of inadequacy in supply of water and other utilities such as sanitation and drainage facilities. This is one of the major causes of the deteriorating situation of the Ngong River and its riparian zone within the Kibera informal settlements.



A queue in one of informal

water kiosk in Kibera.



Plate 9: State of water supply facilities and utilities, field survey

5.7 Varying Perception of the riparian reserve

According to the information obtained from interviews with key informants of the field work different ministries, they were found to be have varying perceptives on widths in relation to the riparian reserve. These ministries and other branches of government have laws within their respective acts guiding the width of the riparian reserve. Apart from the various laws and regulations, each ministry has a development strategy which restricts development within a specific length of public land. This shows that government ministries have an aim to ensure that riparian reserves and environmentally sensitive areas are exempted from any development activities. The Nairobi City County Government holding in trust all public lands in the city requires that those who live within the riparian reserves are to be forcefully removed by use of police power and existence of eminent domain by the government in order to ensure conservation of such areas. The ministry of environment, water and natural resources on the other hand has measures in place which not only guide reduction of environmental degradation but also include protection strategies. These guide the use and management of water based resources among other natural resources. These strategies include those that ensure all resources are not overexploited or underexploited but used for the optimum benefit of all the citizens of the nation. This ministry also has an obligation to ensure that all the natural resources are used equitably by those who live in those particular resource base areas. During the key informant survey, the following was obtained in relation to riparian

reserve length. The study found this width to be varying from one ministry to another. In spite of this, there is an indication that all the ministries are in the forefront to protect the environment no matter the controversies over the required width of the riparian reserve. There are therefore efforts made by both the National and the County Governments to ensure that the riparian reserve is conserved and well managed. This coincidentally was the main aim of carrying out this kind of research to try and find out the responsibility of each government institution towards good management and conservation of the riparian reserve. However no ministry or any government officials have so far reacted to the encroachment of the river riparian reserve. These have been triggered by massive corruption, tribalism, varying political interests and an order given by the international agencies stopping the government from demolishing slums.

The information obtained from CBOs indicated that poverty, low housing supply and lack of tenure are the main causes of encroachment of the Ngong river riparian reserve. The Government on the other hand requires support from NGOs as an option for eradication of these community problems which have existed since independence.

During the institutional interview the question of the recommended width of the riparian reserve was raised and the information obtained was summarized in a table as shown below. This clearly showed how there are disparities as per the width of the riparian reserve, as far as different government institutions are concerned.

Table 2: Different widths of the riparian reserve

Act/Institution	Recommended riparian width (m)
NEMA	Minimum 6m and max. 30m from
Ministry of Environment, Water and Natural Resources	Minimum 6m and max. 30m from
The Nairobi City County Government	Requires a planner's discretion. In some instances it is taken as equal to width of the river.
Ministry of Lands, Housing and Urban Development	Minimum 30m for tidal rivers or smaller rivers. Measurement from
Physical Planning Act	Minimum 2m in height and max. 2m from edge of river

In addition to that, the residents, business people and the CBOs were asked a question on their understanding of a riparian reserve during the administration of the household, CBO interviews and business questionnaires and so the information obtained showed that most of the residents of Kibera are not aware of the riparian reserve and continue to stay within the riparian reserve out of ignorance and lack of sensitization on the risks of staying in such environmentally sensitive areas. Information obtained from the questionnaires and interview of residents was also analyzed and presented as percentages by the use of the chart shown below and this showed the perception of the residents as per the question of what a riparian reserve is.

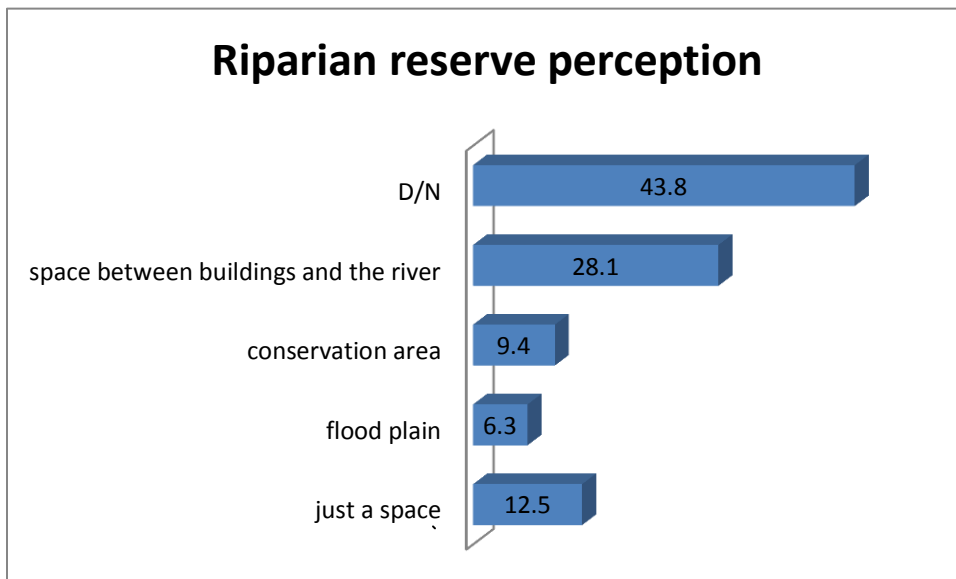


Figure 19: Riparian as perceived by residents, graph

Field survey

CHAPTER SIX

6.0 CONCLUSION AND RECOMMENDATIONS

6.1. CONCLUSION

This research clearly points out that the problem of unsustainable urban growth in Kenya is not just about poverty but the poverty of ideas. The government and organizations operating in informal settlements in Nairobi and other stakeholders have not been able to come up with new and applicable ideas to combat the rising growth of slums. Nairobi, just like any other African city is not only faced with sustainable development challenges but also sustainability of developmental efforts. Negligence by the Kenyan government to improve informal settlements and at least to provide the minimum support on basic requirements and services has led to unimaginable suffering to slums residents. This is coupled by the fact that the government fails to recognize the growth and proliferation of informal settlements and thus excludes them from the rest of the city's development plan.

The government and UN-Habitat development plan for Kibera settlements upgrading is a good gesture but falls short of a comprehensive plan to recognize the settlements and to invest in improving the living conditions. The increasing level of population without equivalent development of these settlements is worrying. With so many sustainability challenges, increase in population in Nairobi slums has aggravated the situation. Together with this, the lack of allocation of resources by the central government to these settlements has ensured that the residents continue to wallow in sustainability challenges. It was hoped that the passing of a new constitution which advocated for devolution of governance and resources would help change the course of events in informal settlements in Nairobi if pertinent laws were implemented to cater for this. However the devolution and implementation process have been characterized by politics making the situation worse.

Due to increasing housing demands, the situation in these areas has continued to deteriorate. As rapid urbanization takes toll these areas have been the targeted settlement

areas for the low income earners. This has made areas such as the Ngong River be the receiving end of such increased population and settlement. Issues such as urbanization and population increase have not only caused this encroachment but also it has been caused by availability of cheap houses in these areas. In addition to this the area's proximity to the city center and the industrial area makes it vulnerable for uncontrolled growth of informal settlements. The railway line passing through the area has also made it accessible through cheaper transportation making the journey to work affordable to the low income earners within the area.

6.2. Recommendations

6.2.1 Developing a solid and liquid waste management plan

During the study carried out within the riparian reserve it was found that most solid and liquid wastes are dumped in the riparian reserve and into the river respectively. This calls for an agent intervention to rehabilitate the riparian reserve and to reduce pollution of the river. During the field study it was found that residence resolve to these due to the negligence of the relevant authorities to effectively handle management the solid and liquid waste within the area. It is unfortunate that lack of delivery of these services has led to the deteriorating state of the river. The railway line on the other hand has not also been left behind by this vice. The situation will therefore get worst unless an appropriate and immediate action is taken. It is the responsibility of both the county and national government to ensure that the constitutional right of the citizens to a clean and healthy environment is guaranteed. This research will therefore come up with an integrated action area plan that ensures that there is an established solid waste collection points within all the villages covered. After the research it is therefore recommended that the concerned authorities together with development partners develop a permanent and well maintained sewer line that ensures that all the liquid waste from households is well managed and directed towards the right channels to a treatment plant downstream.

The plan is also meant to ensure that the river is freed from all the solid and liquid waste directed to it in order to ensure its sustainable development and reduce its pollution to enable the residents to be able to get an adequate supply of water. The plan will also ensure that there is a solid waste recycling plant developed within the area. This will

improve the livelihoods of the slum dwellers by ensuring that the unemployment rate within the area is reduced significantly. Apart from offering employment it will make the attitude of the residents be changed from viewing solid waste not only as waste but as a source of income.

Most and foremost this will save the river and bring back its aesthetic value to the surrounding community. This plan will therefore transform the slum area from the current dirty status to area on a clean and resourceful area full of employment opportunities. There will also be improved living standards and good health among the residents. This on the hand will not only be of importance to the slum dwellers, but also will lead to economic development as it will increase income and productivity of the whole country. Improvement of economy will therefore ensure that the country attain its development strategies such as the vision 2030.

6.2.2 Reduction of pollution and environmental risks

Due to the disposal of both solid and liquid wastes into the river, it suffers massive pollution and those who live within the riparian are at a risk of landslides and spread of waterborne diseases. There is therefore need for the river cleanup and relocation of those living within the riparian reserve to ensure that the environmental risks they put themselves in are reduced at all costs. The residents will also be made aware of the polluter pay principle which simply implies that any one who generates any pollution knowingly or unknowingly has a price to pay. This price comes as result of the cost of treatment for health problems brought because of such pollution. The price also comes because of the dangers which the pollution poses for the future generations.

To be able to achieve this, there is need for the integration of the institutions, stakeholders and government agencies to ensure that all come to an agreement on what should be the best ways to solve the issue. During that deliberation they should not only view pollution of rivers as only a responsibility of the individual communities but as the responsibility of the country at large. To improve the environmental health, pollution is a vice which should totally be eradicated and its eradication requires involvement of all as it is not an individual's task to eradicate pollution. After coming to an agreement, the stakeholders, resident community and other institutions should come up with strict rules

and penalties against pollution of the river. These rules should go hand in hand with the constitutional provisions and EMCA. If all this is done then there will be an assurance of the citizens to a clean and healthy environment. This will improve investment as the part of money used to pay for pollution caused will be invested in other areas.

This will therefore improve the national economy and ensure sustainable development of both the river and the environment for the benefit of both the current and future generations.

6.2.3 Restructuring and restoration of the riparian reserve.

This river is subjected to different urban processes making it vulnerable to activities that cause pollution and degradation of the water ecosystem. Restoring the health of the river has posed a huge challenge to the residents, NGOs, CBOs, Government and international agencies. Rehabilitation of this stretch of the river will bring both climatic and landscape impacts to the residents and will be of high value in terms of improving the economy and improvement of the quality of life of the residents. Restructuring will involve relocation of the land users to mixed use housing areas which will ensure that all the existing land users occupying the riparian reserve are accommodated. The process of restructuring will therefore be carried out in different stages. The first stage will involve a consultation procedure between the communities, government, development partners and the concerned institutions. This will be done to ensure that the resident communities are not left out in the restoration of the river riparian reserve. Their views will therefore be incorporated into the restoration plan for this stretch of Ngong river riparian reserve.

The second stage will be the identification of the alternative housing development site for relocation of the various land users found within the riparian reserve. This will involve experts concerned with skills such as civil engineers, building scientists, land surveyors and land use planners. This will be done in consultation with the relevant authorities in order to ensure that possible land use conflicts are reduced at all costs. At this stage the views of the communities will be taken into consideration as required by various agencies such as the UN. The county government will be highly consulted since all public land is held by them in trust. Consultation of the county government will ensure that residents

are assured of the tenure security which has been a major problem among the slum dwellers.

The third stage will be selling the idea out to the development agencies such as the NHC other private developers and individual investors. This will ensure that the issues relating to funding of the housing projects is not only left to the National and County governments but also is shared out by the private developers and other individual investors. During this stage there will be preparation and issuance of titles to developers and private investors to give them the security of tenure over the housing development site. After all this the most competent will be granted with the go ahead licence to start the housing development process. The process will start with preparation of housing development plans to ensure that all the necessary infrastructure, other extension services and solid and liquid waste procedures are all taken into consideration. Experts such as architects will also be involved at this stage to come up with the proposals of the best designs which should go in line with the physical housing development plan.

The fourth stage will be the actual construction of the alternative multi storey mixed use houses. Here experts such as quantity surveyors, construction managers, construction engineers and a contractor will be involved in development of the houses. These constructions should however go in line with the building standards for such houses. This will address issues of building heights, plot ratios and zoning regulations. The documents such as the building code will be used from time to time during the construction of these houses. This construction may take time but this will depend on factors such as availability of labor, capital and building materials. The housing development should therefore be opened up to allow for transport of building materials. Labor provision should ensure incorporation of mostly the residents to enable them benefit from the project through provision of employment during the development.

The fifth stage will now be holding campaigns and seminars in the various villages making the residents aware of the relocation plans and issuing them with notices on when and how the demolition will take place. They should then be allowed to occupy the new housing sites. The rent for these new dwelling units should be that which take into account the income range of most slum dwellers. On acceptance, the demolition process

will start from the highly populated areas to the lowly populated ones. Here there will also be development of strict rules and penalties which restrict further encroachment.

The demolition will be carried out in stages and will ensure minimum use of force since the communities will have been sensitized to have a positive view on the process. This will ensure that no conflict arises during the demolition and relocation of these communities. This should be done because this is an area that has been prone to conflicts which are politically instigated. The process will therefore be characterized with so many informalities but for its success the communities around need a lot of involvement and sensitization and involvement from the first stage to the last one.

The last stage upon acceptance of the communities on demolition will involve development related to the riparian reserve. This will involve issues such as landscaping, provision of a walk way within the riparian reserve and provision of a buffer zone between the riparian reserve and other land uses. This step will also be aided towards the benefit of the communities since the landscaped riparian open space can be used for functions such as recreation which is of benefit to the community. There will also be an action area plan for this kind of development. Since a large area of the study area also falls within the road reserve there will be an integration of both the two plans. The road and the river, since study found that most land uses are not only within the river riparian reserve but also within the road reserve. The integrated plan will ensure that the river riparian as well as the road reserve are conserved.

6.2.4. Clearance and forced migration

This will involve making the community aware of the benefits of river conservation and the risks of settling within the river riparian reserve. The community will also be made aware of the importance of the riparian reserve and how its conservation can contribute to their livelihood. After which involvement of the relevant authorities will be sought to ensure that those who live within the riparian reserve are removed through the Government application of *police power* and the *eminent domain*. However this will not be done out of ignorance since all those who stay within the country have a right to housing. Therefore forced migration must only be undertaken if the people have been given alternative places and have refused to move to those places. In such instances then

the power of the government is sought to ensure that these people respect the rule of law. This is the rule of majority and democracy whereby the acceptance of a larger population means that the best course of action should be taken.

6.2.5. Stakeholder involvement

The stakeholders involved with some specific interests in the riparian reserve will be impacted either positively or negatively with actions taken after this research. They are therefore important participants during the decision making to come up with a good development proposal for the Ngong river riparian reserve. The resident community of Kibera will be involved in the generation of development proposals meant to improve sustainability of the Ngong river riparian reserve. The decision making process will therefore take into account the needs and interests of the communities living around the riparian reserve. Therefore a skill such as participatory urban appraisal is a key one to ensure participation of urban residents. The stakeholders in this case will include National and County governments, CBOs, NGOs and the resident community among other private and individual developers. Consultation with the stakeholders will ensure acceptance of the projects and prioritization of the best projects in the area under study. During the study different questionnaires were administered to different stakeholders to ensure that they were involved in the decision making process as far as the Ngong river riparian reserve is concerned. Stakeholder involvement is one of the important key elements during the plan generation process. Aspects of decision making process requires techniques such as the game theory and in game theory the aspect of players is brought into action, this therefore means that stakeholders are one of the players who have to be involved in the decision making process in order not to end up with the *prisoners dilemma* in the decision making process. Stakeholder involvement is also important as it ensures funding of the various development projects.

The sole function of this research was to ensure that the problem is identified and possible advice on the best course of action is given which can not be possible unless the relevant problem sufferers are consulted. This therefore was the sole purpose of carrying out the research and without involving the relevant stakeholders then it means that the research is meaningless. Involving the relevant stakeholders will ensure security and

accuracy of the information given during the research. The stakeholders will also not feel neglected that assuring the researcher of security. The stakeholders are always involved during the implementation process of any plan and thus cannot approve to any development in which they were not consulted. Stakeholder involvement is therefore an important aspect of research which any researcher should not take for granted.

6.2.6 Mobilization of adequate resources

All the processes aimed at the rehabilitation of the river require mobilization of resources and adequate funding from various stakeholders who should collaborate with Kenyan government to ensure that there are enough funds for restoration of the river. There is need to harmonize existing laws and policies to come up with the best possible alternative for reclamation of the river riparian reserve in a way that it will adhere to the existing laws and policies. In addition to that it should take into account the requirements of various institutions involved in management of water resources and environmental conservation. Any development without adequate resources is always bound to fail. It is therefore important to analyze the resource base situation of a place before making proposals. In this study resources, refer to building materials, capital, labor, and land among others which are meant to help in the success of the process of development e.g. security. Availability of resources is always the cornerstone to the success of any project. Mobilization of resources always requires consultation with the relevant authorities to release whatever they have towards the process of development.

6.2.7. Community involvement and sensitization

To reduce possible conflicts and to ensure acceptance of various project proposals by the resident community then there is need for the process of decision making to involve the communities which reside in the area. The study area has always been characterized by various land based conflicts. These conflicts range from the 2007 post election violence and the recent negative reaction by the residents over the issuance of title deeds by the president. The community around due to lack security of tenure and due to the fact that most business people run business without licenses is prone to suspicion of victimization. This was clearly brought out during the research where some individuals even refused to answer to questionnaires due to fear of victimization. The researcher had to explain to

them why the study was being carried to make them confident of giving out information. Some of them thought that the researcher was a schemer to force them out of their residential areas following the road reserve demolition, which had been undertaken without a public notice. Their reaction made the researcher to think about an important planning tool of involving the community in any kind of action or proposal affecting them either positively or negatively. Communities should be made aware of the benefits and dangers of some matters such as settling in the river riparian reserve. This will make them take the demolition as a positive move and not a negative one. Their needs and interests will only be known if they are entirely consulted during the whole process of decision making. Sensitization will make them have a positive view of the action taken. But above all they should be assured of more positive benefits than negative ones. Communities should be made aware of environmental risks by citing specific examples such as the Mukuru Sinai incident and the Kibera landslides, to make them have a view of live incidents within the country most so within the informal settlements. These will inflict fear in them for settling in such areas and take the move to resettle them not as a move of hatred but as a move of saving their lives.

6.2.8 Harmonization of institutional framework

During the study it was found that the institutions have conflicting widths in relation to the width of the riparian reserve.. There is need to review the existing policies of institutions specifically in relation to the river riparian reserve. This is because these institutions are supposed to have a common width of the riparian reserve so that if an action is needed then they speak from a common voice. The government institutions are always politically influenced and also had different views on the best course of action to be taken. Differences between different relevant institutions make the decision making process a hard task since they have to be involved as the sole stakeholders during this process.

Failure for them to speak the same voice makes defaulters to take advantage of the situation. This has been one of the causes of encroachment into the Ngong river riparian reserve and has delayed coming up with the best solution making the situation to get worse. There is need for harmonization of the institutional framework to speak from a

common voice. This will enable the concerned authorities to come up with the best course of action and to speak from a common voice any time a problem arises. Otherwise if the concerned institutions continue to have different views then it means that the situation will continue to deteriorate and those who will always be at the stake of this will be the normal and innocent citizens on the ground. However these institutions are meant to be there to ensure that citizens' rights are granted and not infringed and thus there is need for the differences between them to be solved.

6.2.9 Environmental design for the riparian reserve

There is need to look into the issue of conflicting land uses within the riparian reserve by creating a design which incorporates the land uses into an environmental design which takes into account integration of land uses for sustainable development of the river riparian reserve. This design should take into account environmental sustainability and has to be responsive. Issues such as landscape, aesthetic value and appreciation should be considered by the design. This design will be meant to address environmental problems related to the river riparian reserve. Environmental planning is an important tool always meant for conservation of the natural and human environment.

The plan always ensures that the environmentally sensitive areas such as wetlands, rivers, forests and other ecosystems of great environmental importance are conserved. Since this stretch of Ngong river is always subjected to a lot of environmental degradation there is need to develop an environmental plan which should be done with the help of NEMA.

6.3 Areas of further research.

- Ways of improving housing conditions within slum settlements.
- Ways of handling waste management within slum settlements.
- Ways of controlling urban sprawl within informal settlements.

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8.0. APPENDIX

8.1 RESEARCH INSTRUMENTS

8.1.1 QUESTIONNAIRES



UNIVERSITY OF NAIROBI
COLLEGE OF ARCHITECTURE AND ENGINEERING
SCHOOL OF THE BUILT ENVIRONMENT
DEPARTMENT OF URBAN AND REGIONAL PLANNING

HOUSEHOLD QUESTIONNAIRE

Objective: To investigate the implications of informal land uses on Ngong River riparian reserve- A case of Kibera informal settlements.

Declaration: The information given here will be strictly used for academic purposes and will be treated confidential

Residence/ locality.....

Name of interviewer.....

Date

1. Name

2. Age.....

3. Gender 1. Female () 2. Male ()

4. Education background.

i. Primary ()

ii. Secondary ()

iii. Tertiary ()

iv. None

5. Relationship with the HHH

- i. Spouse
- ii. Son
- iii. Daughter
- iv. Other ;(specify).....

6. HH Size.....

7. For how long have you stayed here..... **1.** 1>10 years, **2.** over 10years

8. Housing characteristics

<i>i. Type of house</i>	
<i>ii. No. of Rooms</i>	
<i>iii. No of floors</i>	
<i>iv. Roofing material</i>	
<i>v. walls</i>	
<i>vi. General condition</i>	() very good () good () average () poor

9. Water and sanitation facilities

- i. Do you own a toilet 1. Yes () 2. No ()
- ii. If no how do you access this service 1. Shared () 2. Paid ()
3.other (specify).....
- iii. Do you own a bathroom 1. Yes () 2. No ()
- iv. If no how do you access this service 1. Shared () 2. Paid () 3.
Other (specify).....
- v. How do you dispose off your garbage

- 1. *Collected by the County Government*()
- 2. *Collected by private individuals* ()
- 3. *Dumping within the riparian reserve* ()
- 4. *Dumpsite within the estate* ()
- 5. *Other (specify).....*

vi. *Do you have a sewer line* 1. *Yes* () 2. *No* () 3. *D/N* ()

vii. *Where do you get your water from*

- 1. *From the river* ()
- 2. *From water kiosks* ()
- 3. *Buying from water vendors* ()
- 4. *Piped water connected to houses* ()
- 5. *Other (specify).....*

viii. *How much is 20l jerican of water.....*

10. Perception of the riparian reserve.

i. *In your understanding what is the river riparian reserve*

.....

ii. *In your opinion what should be done to ensure that the river riparian reserve is conserved*

.....

THANK YOU!!!!!!!!!!!!



**UNIVERSITY OF NAIROBI
COLLEGE OF ARCHITECTURE AND ENGINEERING**

SCHOOL OF THE BUILT ENVIRONMENT

DEPARTMENT OF URBAN AND REGIONAL PLANNING

Objective: To investigate the implications of informal land uses on Ngong river riparian reserve.-A case of Kibera informal settlements.

Declaration: The information given here will be strictly used for academic purposes and will be treated confidential.

BUSSINESS QUESTIONNAIRE

Name

Residence

1. Which year was this business started here?
.....

2. Why did you prefer this specific location?
.....
.....
.....
.....
.....

3. Do you own the premises 1. Yes () 2. No ()

3a. if no who owns it.....

4. Do you have a business license allowing you to run this business? 1. Yes ()
No()

5. If yes, which institution issued the license.....

- 6. How do you dispose off your garbage
 - i. In the riparian reserve ()
 - ii. collected by the county government ()
 - iii. collected by private garbage collectors
 - iv. Other (specify).....

7. How much do you get from the business in a peak day?

.....
.....
.....

8. How much do you get from the business in an off peak day?

.....
.....
.....

9. Which environmental issues do you experience in your business activities over the year?

- 1. *Water pollution* ()
- 2. *Storm water run off* ()
- 3. *Solid waste management* ()
- 4. *Liquid waste management* ()
- 5. *Air pollution* ()
- 6. *River riparian as a dumping site* ()
- 7. *Other (specify)*.....

10. What will you want to be improved so that you can be able to expand your business

.....
.....
.....
.....

11. As a business owner in this place, which projects will you propose to be initiated in this area to allow for sustainable development of the river and conservation of the riparian reserve.....

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THANK YOU!!!!!!!!!!!!!!!!!!!!

8.1.2 INTERVIEW SCHEDULES

NEMA interview schedule



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Declaration: The information given here will strictly be used for academic purposes and will treat it private and confidential.

1. Do you have strategies in place to handle the issue of riparian reserves in the city of Nairobi and its surroundings?

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.....

2. Which are some of these strategies?

(a).....
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(b).....
.....

(c).....
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(d).....
.....

(e).....
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3. *Is there an environmental action plan for Ngong river riparian reserve?*

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4. *If no, why?*

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5. *If yes which are the key objectives of the plan?*

(a).....
.....

(b).....
.....

(c).....
.....

(d).....
.....

(e).....
.....

6. *According to your standards what should be the width of the riparian reserve?.....*

.....
.....

7. *What courses of action does your institution to take over the encroachment of the riparian reserve by informal land use activities*

(a).....
.....

(b).....
.....

(c).....

(d).....
.....

(e).....
.....

8. *Which challenges do you face in management and conservation of the environment?*

(a).....
.....

(b).....
.....

(c).....
.....

(d).....
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(e).....
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9. How can the land uses within Ngong river riparian reserve be integrated for sustainable development of the river

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City County of Nairobi interview schedule



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1. What measures have you put in place to control encroachment of the city river riparian reserves?

(a).....
.....

(b).....
.....

(c).....
.....

(d).....
.....

(e).....
.....

2. Which institutions have been incorporated into the urban boards to ensure conservation of the riparian reserves?

(a).....
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(b).....
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(c).....
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(d).....
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(e).....
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3. *What punitive measures has your government put in place to protect environmentally sensitive areas such as riparian reserves?*

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4. *What waste management services do you offer within the slum settlements to ensure that residents don't take opportunity of open spaces and riparian reserve?*

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5. *What challenges do you face in the management and protection of public lands such as riparian reserves?*

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6. What are your proposals towards rehabilitation of the land uses for the sustainable development of the river?

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Ministry of Environment, Water and Natural resources interview schedule



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Declaration: The information given here will strictly be used for academic purposes and will be treated confidential

1. Does the ministry have a policy for management of river riparian reserves in the city?

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....

2. What environmental conservation measures has the ministry put in place for sustainable management of riparian reserves?

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3. What actions has the ministry put in place in recent times to address encroachment of the City Rivers riparian reserves by informal land use activities?

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4. According to your standards how long should the riparian reserve be?

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5. What challenges are faced with the ministry in addressing issues of environmental degradation?

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6. Which key steps should be carried out to restore the degraded Ngong river riparian reserve within Kibera Olympic estate?

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Ministry of Lands, Housing and Urban Development interview schedule



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Declaration: the information given here will strictly be used for academic purposes and will be treated confidential.

1. What measures has the ministry put in place to deal with issues such as urban sprawl and urbanization?

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2. What are some of the development control measures employed by the ministry to protect riparian reserves from urban development?

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3. According to your ministry which land uses are allowed within the river riparian reserve?

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4. What should be width of the riparian reserve according to the standards of the ministry?

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5. What challenges are faced within the ministry in dealing with encroachment of unalienated public land?

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6. How does the ministry plan to repossess the encroached riparian reserves within the city of Nairobi?

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Community Based Organization interview schedule



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Declaration: the information given here will strictly be used for academic purposes and will be treated confidential.

Name of the group:

.....

1. Which environmental issues does your organization address?

(a).....

.....

(b).....

.....

(c).....

.....

(d).....

.....

(e).....

.....

2. What developments has your group initiated to conserve the riparian reserve?

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3. How do you fund your activities?

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.....

4. Do you receive government funding? 1. Yes () 2. No ()

5. If no, where do you get the funds to run the affairs of your group?

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.....

6. What is your opinion on settlement on the river riparian reserve?

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7. Do you think the public (people residing or having business here) would be willing to sustainably manage this riparian reserve? 1. Yes () 2. No ()

8. If yes, how can they be organized?

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