SAFEGUARDING SANITATION IN HIGH POPULATION DENSITY URBAN SETTLEMENTS: A CASE STUDY OF KIBERA SLUMS NAIROBI COUNTY.

BY

KITONYI HUMPHREY CHARLES

N36/2809/2010

A Research Project Submitted in Partial Fulfilment of the Requirements for the Award of Bachelor of Environmental Planning and Management of Kenyatta University

APRIL 2014

DECLARATION

This Project is my original work and has never been submitted for any Academic Award in any institution of Higher Learning.

NAME: KITONYI HUMPHREY CHARLES

REG. NO: N36/2809/2010

Signature:…… Date……..

SUPERVISOR'S APPROVAL

This research project has been submitted for examination with my approval as the university supervisor

NAME: MR. ALLAN KIRUI

SIGN…….. Date…….

Department: ENVIRONMENTAL PLANNING AND MANAGEMENT

DEDICATION

I dedicate this work to my mother Ruth N. Kitonyi and Dianah Mghendi as well as the County of Nairobi.

ACKNOWLEDGEMENT

It is my utmost pleasure to acknowledge and pay my regards to distinct personalities who contributed immensely to the success of my project. First of all, I want to thank the Almighty God for His always sufficient strength which has enabled me to pull through this work successfully.

Secondly, I thank my mother for her continuous prayers and encouragement in addition to her financial support that she accorded me so as to see that this work was completed efficiently and on the required time.

Lastly, I would wish to express my unhidden joy to my Supervisor Mr. Allan Kirui for the smooth and cordial coordination during the period of working on this project. I acknowledge his time and his unrelenting efforts to guide me to the very end of this work.

ABSTRACT

Sanitation has been a thorny issue especially in many informal settlements all over the world with the third world countries being highly affected. Therefore people living in these affected areas are exposed to these deplorable conditions. Kenya is not spared either and therefore our informal settlements are suffering from myriad of sanitation related problems that are causing slum residents to be unprotected from all manner of exposures.

Since there are a lot of underlying factors which are causing the state of poor sanitation in Kibera then this study was natured with the aim of unearthing some of the contributors leading to poor sanitation which have prevented the realization of the dream of a slum with sound sanitation systems.

Since inadequacy of water and lack of sanitation facilities and services can be highly blamed for the nature of sanitation, the study further focussed on analysing the depths of these issues keenly and objectively. This was done so as to come up with sustainable solutions that will help alleviate poverty as well as promote environmental sanity which is key in promoting the standards of living of Kibera residents in addition to health of the slum dwellers. The stakeholders' roles will be analysed to evaluate their contribution to solving the sanitation menace.

Ultimately, recommendations and an action plan are provided with the view of seeking to change the issue of revolving around the status quo and start moving towards the desired quo of sound sanitation.

Contents

ACRONYMS

AWSB-Athi Water Service Board

E**COSAN**-Ecological Sanitation

M&E-Monitoring and Evaluation

MDG's-Millennium Development Goals

MSW-Municipal Solid Waste

NGO-Non-Governmental Organization

NWSC-Nairobi Water and Sewerage Company

SANDEF-Sanitation Development Funds

SPSS- Spatial Package for Social Sciences

WASREB-Water Services Regulatory Board

WATSAN-Water and Sanitation

WHO/UNICEF (JMP) - World Health Organization/ United Nations Intentional children's Education Fund Joint Monitoring Programme

WSB-Water Service Boards

DEFINITION OF TERMS

Sanitation- This is used to refer to access to, and use of, excreta and wastewater facilities and services which also include safe water, liquid and solid waste management, environmental cleanliness and personal hygiene.

Slum- This is used to refer to a densely populated urban area that is characterized by a generally low standard of living.

Sustainability-it is used to refer to using wisely the present environmental resources without jeopardising the potential for future generations to meet their needs using the same resources.

CHAPTER ONE

1.1 Background Information

According to Water Aid (2006), approximately 1.1 billion people in the world do not have access to safe water, and another 2.6 billion do not have access to adequate sanitation. In developing countries an estimated 2.2 million people, most of who are children, die annually due to diarrhoea linked to a lack of access to safe drinking water, inadequate sanitation and poor hygiene (Water Aid 2006). The World Health Organisation estimates (WHO, 2004) show that 88% of the burden attributable to unsafe water supply, sanitation and hygiene severely affects children in developing countries.

The poor are especially affected by inadequate and substandard sanitation services and these effects are not only limited to the health impact resulting from daily exposure to polluted habitats. Many of the poor, women and girls in particular, are forced to divert time and energy in search of a private place to relieve themselves. Often they can find such places only before dawn or after dusk which brings the risk of sexual assaults.

Women reduce their food and fluid intake during the day, which can result in kidney stones and urinal tract infections. Poor people are forced to pay in price for sanitation in terms of loss of time, dignity and health (Sijbesma, Diaz, Fonseca, & Pezon, 2008)

In many sector debates, no clear distinction is made between water and sanitation or between rural and urban areas. Often sanitation is assumed by default to be included with water as in the debates on privatisation(Allen, Adriana, & Hofmann, 2008). However, urban areas – irrespective of their size – are not simply very densely populated rural areas. Urban areas are distinctly different in a number of ways, such as: the large number of people living in rented accommodation, the relative proximity of government, the monetary character of the urban economy, the scarcity of land, the large fluctuating migrant populations, the cultural diversity, etc. All these contextual factors pose their specific challenges to delivery of urban sanitation

services to the poor. Moreover, urban sanitation is not simply the flip side of urban water supply(Eales & Kathy, 2008).

In Africa, as many as 150 million urban residents representing up to 50 per cent of the urban population do not have adequate water supplies, while 180 million, or roughly 60 per cent of people in urban areas lack adequate sanitation. In urban Asia, 700million people, constituting half the population, do not have adequate water, while 800 million people or 60 per cent of the urban population is without adequate sanitation.(UN-Habitat, 2008)

According to the Population Research Bureau (2008), of the estimated 140 million people in East Africa, the urban population comprises of at least 25%, 18%, 17%, 13%, and 11% in Tanzania, Kenya, Rwanda, Uganda, and Burundi respectively. An estimated 60 million people reside in East Africa's informal settlements.

In Kenya statistics indicate by all measure that a third of the urban population is living in poverty. And therefore referring to World Bank/Cities Alliance figures indicated levels closer to a half, and also suggest that by 2020, urban poverty will represent almost half of the total poverty in the country (Oxfam GB, 2009). It is approximated that over 60% of the urban population in Nairobi are poor and are living in deplorable informal settlements that are characterized with extreme deprivation of basic human needs especially service provision.

1.2 Problem Statement

Urbanization has brought into play large array of negative impacts especially in the informal settlements ranging from the social issues to environmental ones. Just to mention but a few, some of these environmental issues include; high pollution levels {land, water and air}, poor solid waste management, poor drainage, poor housing, poor sanitation among others. This study will focus will focus on sanitation as a thematic issue in Kibera slum.

The widespread sanitation and hygiene problems can be attributed to be as a result of poor political leadership, mismanagement of resources and poverty. The lack of basic services

include; visible and open sewers, lack of pathways, the uncontrolled dumping of waste and polluted environments result to unhealthy living and hazardous living conditions. In addition, building of human settlements in unsuitable location for example near waste disposal sites are all issues to do with sanitation. Poor sanitation has led to increased diseases among the urban poor in the slums which are resulting to more deaths of children. These diseases are caused by the continued pollution of drinking water; entry of the bacteria into the food chains and this is mainly via fruits, vegetables, fish etc.; bathing, recreation and other contacts with contaminated water and also the polluted waters provide breeding grounds/sites for flies and insects which are responsible for spreading diseases.

With the already bulging population in Kibera informal settlement together with increasing levels of poverty, sanitation levels are growing from bad to worse. As evident , the local community in this area are suffering and becoming more prone to infectious diseases leading to poor health standards which continues to be a growing nuisance especially to the most vulnerable who include the young ,women and the elderly and more so for people suffering from diseases that lower their resistance. It is because of the above reasons that the study seeks to propose mechanisms through use of appropriate technologies and better planning for the basic service delivery to improve the sanitation levels of the people of this slum area.

1.3 Research Questions

a) What are the causes of poor sanitation in Kibera slums?
b) What are the prevailing environmental conditions and their impacts to health of Kibera residents?
c) What initiatives have been implemented to improve levels of sanitation in Kibera slums?
d) What recommendations can be put forward to promote sanitation services to the residents of Kibera?

1.4 Objectives

a) To establish the contributing factors to the poor levels of sanitation in Kibera slums.
b) To assess the ambient environmental conditions and implications to the health of residents of Kibera slums.
c) To evaluate the past initiatives to redress the poor state of sanitation in Kibera slums.
d) To recommend an integrated action plan to promote better health and sanitation in Kibera.

1.5 Premises

a) The major contributor of the sanitation problems is inadequate planning.
b) Poor sanitation has a negative impact on the health of the residents of Kibera slums..
c) Past initiatives have significantly impacted positively on the lives of Kibera slum dwellers.

1.6 Justification

It is evident that the world population is increasing at a very alarming rate especially with the current world population being estimated to be around seven billion. Despite this fact, also urban areas are been faced with high migration of people from the rural areas which is leading to the over urbanisation hence this has resulted to sprawling of informal settlements. These settlements have caused a lot of strain in the environmental resources thus causing a collection of problems. Water and sanitation has not being spared in the event and since demand has always being higher than the supply, this has prompted this study to ensure that at least the basic infrastructural facilities are available and accessible to the slum dwellers as a way of remedying the situation and at the same time promoting the achievement of MDG 7 which call for achieving Environmental Sustainability. Also as the new constitution 2010 provides in section 42 which states that every person has a right to a clean and healthy

environment. Section 43 (1), (b) also states that every person has the right to accessible and adequate housing, and to reasonable standards of sanitation. Being a constitutional entitlement and looking at the present standards of sanitation in Kibera, they do not come anywhere near that and thus this makes it relevant for the study to establish what can be done to promote adequate sanitation in a view to improving the livelihoods of the urban poor through proposing better service delivery systems.

1.7 Significance of the Study

As the popular adage goes water is life. Therefore it is very important if the slum dwellers can have access to clean and quality water for their needs. The community will be the first beneficiaries of better sanitation implementation and this will be through the better access to sanitation facilities which are evenly distributed and clean as well. The NGO's will benefit through directing their funds in more sustainable programmes rather than the short-term projects which are only helpful in their early stages and with time, they fade in impact. The work of the CBO's will be made easier with better sanitation in place because they will needed to increase advocacy and sensitization. The government will benefit from the effort of improving service delivery to its citizen thus contribute in helping fight poverty by ensuring services to the residents are highly delivered. Through the government promoting health facilities within Kibera, this will help foster better health standards and ensure that communicable and water and poor sanitation diseases are not on high levels as they are currently.

1.8 Scope and Definition of the Study

The study area is supposed to cover Kibera slums in Nairobi County. The following villages will be carried out in the event of my study;

- Soweto, Kisumu Ndogo, Gatwekera and Raila
- Characteristics of Kibera slums
- Map of the area
- Water, Solid waste and the Sanitation services in the area.
- Action plan and recommendations for improving the service delivery systems.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

The global statistics on sanitation hide the dire situation in some developing regions. With an average coverage in developing regions of 50%, only one out of two people has access to some sort of improved sanitation facility. The regions presenting the lowest coverage are sub-Saharan Africa (37%), Southern Asia (38%) and Eastern Asia (45%). Western Asia (84%) has the highest coverage among developing regions. Out of every three persons unserved, two live in Southern Asia or Eastern Asia.(WHO & UNICEF, 2006)

One of the major development challenges that the majority of African and Asian countries face is that of providing safe sanitation services in both urban and rural areas. While effort has been made by some governments to provide a basic level of these services to the population, the coverage levels have remained insufficient and only 61 per cent of the global population uses improved sanitation facilities. At least 2.6 billion people in the world are estimated not to have access to basic1 sanitation, of which 72 percent live in Asia and 565 million are in Africa (WHO/UNICEF, 2010)

The sanitation coverage in Africa and Asia varies from country to country but the worst affected countries are in Southern Asia although there are also large numbers in Eastern Asia and Sub-Saharan Africa (WHO/UNICEF, 2010).

Access to adequate sanitation is generally a problem in most urban poor communities in Africa and Asia due to poor service provision by sanitation agencies, high population densities and limited availability of land to build new latrines once the old ones fill up (Wegelin-Schuringa, 1997)

According to the 2006 Human Development Report, two in three people in Kibera identify the ‘flying toilet’ as the primary mode of excreta disposal available to them. With neither

public nor private latrines available, many of Kibera's residents resort to defecating in plastic bags which they dump in ditches or throw on the wayside.

2.2 Factors leading to poor sanitation

2.2.1 Urbanization

Globally, more people now live in urban centres than in rural areas and this trend is expected to continue. Within the next 30 years, developing countries are predicted to triple their population size and account for 80% of the world's urban population. In Asia the rural population is expected to decrease in the next 25 years.

Projections for this urbanisation look bleak, with slums to see 60%of all urban population growth and increased poverty. Without a fundamental change, our urbanising world will, in reality, become vast sprawl of inhuman slums and informal settlements.

The world population is becoming predominantly urban.

While the population of industrialized countries is already largely urban, urbanization processes are still acute in developing countries. Today, 40 per cent of the population in developing countries already lives in cities. By the year 2020, that figure will have risen to 52 per cent. Latin America and the Caribbean already have 75 per cent city dwellers, while in contrast, only one-third of the population of Africa and Asia live in urban areas. The greatest challenge will present itself in Africa and Asia, where explosive demographics is expected in the next quarter century. By 2015,153 of the world's 358 cities with more than one million inhabitants will be in Asia.(UNCHS,Habitat, 2001)

Rapid urbanization, one of the greatest socio-economic changes during the last five decades or so, has caused the burgeoning of new kinds of slums, the growth of squatter and informal housing all around the rapidly expanding cities of the developing world. Urban populations have increased explosively in the past 50 years, and will continue to do so for at least the next 30 years as the number of people born in cities increase and as people continue to be

displaced from rural areas that are almost at capacity. The rate of creation of formal sector urban jobs is well below the expected growth rate of the urban labour force, so in all probability the majority of these new residents will eke out an informal living and will live in slums.

The developing world has been predominantly rural but is quickly becoming urban. In 1950 only 18 per cent of people in developing countries lived in cities. In 2000 the proportion was 40 per cent, and by 2030 the developing world is predicted to be 56 per cent urban. Future urban growth in developing countries will be absorbed by urban centres, which have a high average annual urban population growth rate of 2.3 per cent, in contrast to the developed world's rate of 0.4 per cent.(UNHSP,Habitat, 2003)

According to the Population Research Bureau (2008), of the estimated 140 million people in East Africa, the urban population comprises of at least 25%, 18%, 17%, 13%, and 11% in Tanzania, Kenya, Rwanda, Uganda, and Burundi respectively. An estimated 60 million people reside in East Africa's informal settlements. As Table 1 shows, a relatively small proportion of East Africa's population is classified as urban; this proportion is going to dramatically increase in the next 15 – 20 years.(Lubaale & Musyoki, 2011)

Table 1: Urbanization Trends in East Africa

Country	2000	2010	2020	2030
Kenya	19.7	22.2	26.6	33.0
Uganda	12.1	13.3	15.9	20.6
Tanzania	22.3	26.4	31.8	38.7
Rwanda	13.8	18.9	22.6	28.3
Burundi	8.3	11.0	14.8	19.8
East Africa	**20.7**	**23.7**	**20.20**	**33.7**

Source: United Nations Department of Economic and Social Affairs UNDESA(2008)

2.2.2 Poverty

According to UNDESA (2008) poverty in East Africa remains one of the greatest challenges facing the people and their governments. In Uganda, poverty trends show a mixed picture. In 1992, 56% of the population was poor. This declined to 44% and 34% in 1997 and 2000respectively. Recent estimates show that urban poverty constitutes 18% compared to45% for the rural. Urban poverty increased from 9.6% in 2000 to 12.2% in 2002/03(Government of Uganda, 2004). The population in Uganda is predominantly rural and agricultural based. There are significant regional disparities in poverty levels, with the highest incidence in the north of the country. In these regions, long affected by conflict, all the MDG indicators fare very poorly.

For Rwanda, poverty fell from 60% in 2001 to 57% in 2005/06. There were important regional dimensions to this: the poverty headcount fell substantially in Eastern Province, fell by smaller amounts in Northern Province and the City of Kigali, and actually rose slightly in Southern Province. The level of inequality was already high in2000/01, with a Gini coefficient of 0.47, and this rose to 0.51 in 2005/06. The high initial level of inequality, and the fact that inequality worsened over this period, were important factors making the consumption growth less effective in terms of poverty reduction – in more technical terms,

lowering the growth elasticity of poverty reduction. Inequalities rose in Southern and Western provinces in particular. Even though the consumption growth rate was positive in Southern Province, poverty also rose. The population of Rwanda is young, with a mean age of 21 years and children under 15 years comprising 43% of the population.

The Kenya statistics tell a slightly different story. At least a third of Kenya's urban population is living in poverty by any measure. Recent World Bank/Cities Alliance figures indicated levels closer to a half, and also suggest that by 2020, urban poverty will represent almost half of the total poverty in the country (Oxfam GB, 2009). It is approximated that over 60% of the urban population in Nairobi are poor and are living in deplorable informal settlements that are characterized with extreme deprivation of basic human needs especially service provision. The 2005/06 Kenya Integrated Household Budget Survey (KIHBS) showed worsening poverty both in rural and urban areas. But an analysis of recent poverty data shows an increase in urban poverty of close to 50% of the population(Lubaale, 2011).

2.2.3 Inadequate water Provision

Historically, the informal settlements of Nairobi have lacked environmental services. For almost 20 years after independence in 1963; the government policy was to demolish informal settlements. In pursuance of this policy, the Nairobi City Council Water and Sewerage Department was unwilling to provide basic services to informal settlements for fear of legitimising them.

Such discriminatory policy practices have led to a situation whereby a large population is deprived and not served by the major city water networks, resulting in insufficient distribution outlets and acute shortages. This in turn has encouraged the proliferation of unofficial ways of accessing water services. Technically as well as institutionally these systems are inadequate, even if they are far better than no systems at all. Providing adequate systems would go a long way in ensuring the provision of sufficient water to Kibera. The position taken by the project was that the new pipe network would solve the technical insufficiency.

At the start of the project, water supply was distributed through small diameter pipes of 1.5 to 2.0 inches serving multiple users. These are individually owned parallel pipes drawn (illegally) from small diameter mains serving neighbouring residential areas. At the same time, there exists a limited distribution network provided by the Council in some villages. However, the suppliers/operators are not technically co-ordinated within the distribution network managed by the Council, are generally not officially recognised, and do not pay the regular dues. (Munguti&McGranahan, 2002)

2.2.4 Inadequate Planning

Urban settlements and cities in Africa continue to become more chaotic as increasing population put more pressure on capacity of urban cities to provide services to their residents. The cost of urban infrastructure and services (Housing, Water, Transport, Healthcare, and sanitation among others) has become unaffordable to majority of urban dwellers due to widespread poverty, and low-income levels. This has resulted to the growth of slums and informal settlements, which are unplanned, lack basic infrastructure and services such as water, electricity, roads, lighting and sanitation among others. It therefore emerges that Housing planning and development policies and concepts applied have failed to meet the demand for housing, infrastructure and services.(Akatch & Kasuku, 2002)

The unplanned, crowded housing and lack of infrastructure have led to acute drainage and sanitation problems. In Kibera, water does not easily flow out of the compounds.

Blocked drainage channels, overflowing pit latrines (especially during rainy season), stagnant pools of dirty water and heaps of uncollected garbage are all too evident. The poor drainage and sanitation system has contributed to the emergence of breeding sites for mosquitoes and flies. Where the flow allows, the waste enters directly into the Mbagathi River, thus further polluting an important source of water for washing, bathing and, at times of extreme stress, for drinking. (Munguti & McGranahan, 2002)

2.2.5 Poor Governance

Local Government should have a key role in all aspects of urban developments but in most developing countries, they are still weak. Strengthening the democratic self-governance at this level is very crucial. The slow decentralization of responsibility and authority need to be hastened up through the support of developing fiscal reforms and coming up with other means of increasing financial resources. The devolution of power to local authorities however must be accompanied by governance reforms and strengthening of institutional capacity. One of the most critical issues for the poor is lack of affordable land and basic services for housing and therefore more effective land and housing markets need to be promoted through regulatory reforms but local authorities got to handle land issues in a proactive manner. Legislation of informal settlements, provision of tenure security and improved basic services are urgent measures.(Tannerfeldt & Ljung, 2006)

2.3 State of environmental Conditions and their health implication to Kibera Residents

2.3.1 Dumping of Solid waste

There is no regular solid waste collection within the settlement. Most residents dispose off their solid waste by dumping it in open drains, along the railway line and in pit latrines. The closest collection point is on the main road outside the settlement.(TRUST, 2009)

The growth in MSW generation has been rapid, while the capacity to collect and safely dispose of the material has been on a general decline. Nairobi, gives a typical situation in most local authorities in Kenya over the years. The suburban areas, which are mainly occupied by the urban poor rural migrants and the jobless, are characterized by high population densities and unplanned poor residential structures which are hardly accessible.(Henry, Yongsheng, & Jun, 2006)

2.3.2 Water Supply

According to (Birongo & Le, 2005), Kibera perhaps suffers the greatest water shortage in Kenya. In terms of water sources, Kibera relies on hawked water drawn from piped water, boreholes and the polluted Nairobi River to meet its water needs. Drinking water is pumped through plastic pipes alongside sewage trenches.

Most slums dwellers have three main concerns with water: access, cost and quality. They complain about the limited access to water points, which are often located far from their houses, some landlords ration water such that it is only available on specific days of the week and at specific times. For many years, Kibera slum has not had clean water points as most collected water comes from Nairobi dam. The Kenyan government in 2007 admitted that sustainable access to water dropped to as low as 20 per cent in the settlements of the urban poor where half of the urban population lives. This is a tragic situation given that Kenya falls far below the estimated defined minimum water per capita requirement.(Water Sanitation Programme, 2008).

2.3.3 Pollution

Given that these slum settlements are illegal in Kenya, slum dwellers are not provided any services, which would include; latrines, water, maintenance and repairs, infrastructure etc. which results in higher rates of defecation in public areas where there no clearly defined boundaries for waste disposal. Although the proportion of urban dwellers defecating publicly has declined by 33% per (from 3% in 1990 to 2%in 2008),this has not been the case in rural areas where proportion has increased from 17% in 1990 to 18% in 2008. In fact, more than 600,000 residents of Kibera have developed a common practice known as the “flying toilet”, which refers to the practice of defecating into a plastic bag that is then tossed away. This custom poses serious environmental problems and health risks for the people in the area and greatly contributes to water pollution.(K’akumu & Olima, 2007)

There are trenches that carry refuse and human wastes to the river at the base of the valley. The river then runs into Nairobi Dam. Both the river and the dam are used for recreation (e.g.

swimming) and resource (e.g. bathing; clothes washing). The plastic pipes are brittle and exposed, often breaking, to be repaired without care for sanitation. The pipes are jammed or taped back together often without being cleaned, creating suitable habitat for waterborne diseases like cholera and typhoid.(Birongo & Le, 2005)

2.3.4 Sanitation and Health

The United Nation Habitat (2006) have described sanitation and hygiene challenges in slums in terms of poor basic services results in lack of access to sanitation facilities or safe water sources. This is due to the lack of waste collection services, a poor rain water drainage system, poor infrastructure and absence the of an electricity supply.

Diseases related to contaminated drinking-water, unsanitary food preparation, unimproved excreta disposal and unclean household environments constitute a major burden on the health of peoples in the developing world and are among the leading causes of ill-health (UNICEF, 2005)

Results from a study undertaken by the WSSCC (2001) show that around 4 billion cases of diarrhoea are experienced annually, resulting in 2.2 million deaths of children under the age of five.

Research on health benefits has shown that the greatest impact on diarrhoeal disease comes from a wide adoption of three key practices: clean sanitary toilets used by all, hand washing by all with soap or soap alternatives, and safe storage and drawing of clean water (Sijbesma, 2008).

Although the sanitation coverage is much lower in the rural areas compared to the urban areas, those living in urban areas face a greater risk to health. This is due to the much higher population densities in the informal settlements where the worst environmental health conditions prevail, resulting in illness and death (Hardoy and Satterthwaite, 1989 and Mulenga et al., 2004).

The situation in Uganda is not significantly different from that in Kenya. The traditional approach has focused mainly on improving water supplies. Notwithstanding the emphasis on improving water supply, 80% of incidences of diseases in Uganda are linked to poor sanitation (Water Aid, 2006). These diseases are the top killer in the country with a lack of clean water accounting for nearly 50% of the diseases. In 1996 diarrhoea, worm infestations, eye infections and skin diseases (all either water borne or water related diseases) accounted for23.5% of illnesses in all health units across Uganda. In Uganda, cholera epidemic in 1998 recorded 46,000 cases and 1,900 deaths in 37 districts. Some of the impacts are such that3.5% of all work time is lost due to sanitation related diseases culminating in 40 million working days per year lost due to sanitation related diseases.

In Kenya approximately 80% of hospital attendance is due to preventable diseases out of which 50% are water, sanitation and hygiene related. For example, about 2,500 Kenyans died from diarrhoea and gastroenteritis diseases in 1999. At about the same time, diarrhoea and gastroenteritis diseases were the highest causes of infant hospitalization. Thousands of children suffer nutritional, educational and economic loss as a result of diarrhoea and worm infections. In all these cases, informal urban settlements are the worst hit due to extreme congestion and general hygienic negligence. A rapid applied research pilot study to determine the level of hygiene awareness conducted in Korogocho slums of Nairobi in Kenya by NETWAS Kenya and the Water Supply and Sanitation Collaborative Council in 2003 indicated that knowledge on the key hygiene behaviours and practices by the slum residents was very low and only 29% of the respondents had ever attended any form of hygiene training (Ghosh, Karanja, & WSSCC, 2003).

Environmental improvements are very important in making the health status of individuals better. Prevalence of water-borne diseases, suggest that improvement in provision of drinking water, better waste management, improved toilet facilities in slums will lead to a more sustainable and significant improvement in health status than just simple treatment. From our

point of view, investment in education, environmental infrastructure and sanitation are much more important than inverting in medical treatment or care (Mulumba, Juma, & Kakosova, 2004).

As a generalization, demand for sanitation in slums is high and the constraints relate to space, 279 affordability, limited design choice, lack of a permanent solution (linked to lack of pit 280 emptying services), land tenure and landlords not meeting their responsibilities (Jenkins and 281 Sugden, 2006).

2.4 Evaluating past Initiatives to redress Poor State of Sanitation

2.4.1 Kibera Integrated Water, Sanitation and Waste Management (WATSAN) Project

Another component of KENSUP is the Kibera Integrated Water, Sanitation and Waste Management Project (WATSAN), an initiative of UN-HABITAT's Water for African Cities program, led by UN-HABITAT and implemented by a local non-governmental organization, Maji na Ufanisi. A central goal of WATSAN is to address community inclusion, education, and economic development in Soweto East. Consequently, the program supports "small-scale community based initiatives in water, sanitation and waste management." This program recognizes the fact that past attempts to improve water and sanitation in Kibera have failed because they did not integrate water, solid waste, sanitation, and drainage, which "need to be addressed simultaneously in settlements like Kibera if there is to be a perceivable improvement in the living environment

Site identification and design for all infrastructures is complete, and construction of water and sanitation facilities has begun. Currently, deteriorating water standpipes and 110 toilets and 50 bathrooms serve the entire 70,000 residents of Soweto Village.

The WATSAN initiative is facilitating the construction of ablution blocks, which are communal water and sanitation facilities. These sanitation facilities are "all-in-one complexes with VIP [ventilated improved pit] latrines, shower cubicles and water booths."35

Community members are building the structures, which are strategically placed to provide access to all residents. Upon completion, residents will also be in charge of maintenance of these structures. There is no mention about how residents will pay for these new services.(Marie Huchzermeyer, 2006)

2.4.2 Roles of Stakeholders in Sanitation

Government

The Ministry of Local Government is in charge of formulation and administration of the Local Authorities Policy, the oversight and management of other local authority bodies through formulation of by-laws and also administration of the Local Authority Transfer Fund in order to oversee the general development of the local authorities in Kenya. Specifically the Ministry of Local Government and the Ministry of Water and Irrigation have common mandates with respect to the performance and good corporate governance of public water and sanitation utilities, as well as environmental sanitation related to disposal of excreta.

The Ministry of Health and Sanitation **is** the lead agency with respect to environmental sanitation with shared interest in the development of basic sanitation infrastructure and promotion of hygiene through continuous supply of sufficient clean water. The Ministry of Health and Sanitation, Division of Environmental Health, **has** the overall mandate for hygiene education and basic sanitation where facilities do not rely on sewerage systems, such as pit latrines which are predominant within the informal settlements and in rural areas. As stipulated under the National Health Sector Strategic Plan of Kenya (2006) and the National Environmental Sanitation and Hygiene Policy (2006), the Ministry of Health is expected to undertake national hygiene campaigns in fulfilling its mandate to provide basic sanitation and hygiene education.

The Nairobi City Water and Sewerage Company (NCWSC) is the Water Service Provider in charge of water services in Nairobi area. The NCWSC was formed to take over provision of water and sewerage services from the former Department of Water and Sewerage in the City

Council of Nairobi. The institutional responsibility for installation of water and sanitation infrastructure was handed over to the NCWSC for maintenance, while the Athi Water Services Board remained responsible for laying large scale infrastructure such as trunk mains.

The Nairobi City Water and Sewerage Company (NCWSC) has in place the Informal Settlements Department that will deal with water and sanitation supply in informal settlements. In coordination with the Athi Water Services Board, the NCWSC is targeting specific informal settlements to extend water and sanitation services through constructing water kiosks and ablution blocks (toilet and bathroom services).(Hakijamii Trust & COHRE, 2008)

Non-Governmental Organisations

NGOs play an important role in advancing the right to water and sanitation and are necessary stakeholders in the water sector. There are a number of Non-Governmental Organisations that deal with the various aspects on the right to water and sanitation in Nairobi. It is important to note that while some NGOs will assist CBOs with infrastructure development, others work purely on advocating for the human right to water and sanitation.(Hakijamii Trust & COHRE, 2008)

The various roles played by NGOs in the sanitation sector can be broadly grouped into six categories:

1. Facilitation of service delivery including direct service provision (particularly in emergency and humanitarian relief contexts or in areas characterised by extreme poverty or geographical remoteness) or playing an intermediary or broker role between communities and service providers.

2. Community education, awareness-raising, sanitation and hygiene promotion and marketing including stimulating demand, gender sensitive approaches, supply chain strengthening and implementing behaviour change programs.

3. Building partnerships and promoting networking between different sector actors including representing community views to governments and service providers and translating and communicating national policies and regulations to the local level.

4. Capacity building for local governments, service providers, in-country civil society groups and end users (households and communities).

5. Research and innovation including demonstration and piloting of innovative and locally adapted approaches and technologies.

6. Engaging in policy dialogue including promoting proven approaches and technologies, communicating lessons learnt, communicating community needs, advocating gender equity and monitoring the effectiveness of programs and government initiatives.

Community roles

Full involvement of communities in all stages of programme implementation and management is the correct pragmatic approach for the present. However, this approach does not divest Governments and NGOs of their responsibility for continuing and evolving support of the programmes which they promote. As communities change, and the needs of their water and sanitation systems change, the appropriate type of support -education, training, financial subsidy, technical assistance, maintenance, even rehabilitation - should evolve. Without support, however, few community-based water and sanitation systems will achieve anything approaching permanence

2.5 Gap Identification

Most organisations seeking to solve or provide solution to the issue of poor sanitation in informal settlements have been inclined to believe that the way to go is by coming up with projects after projects. In a snapshot, many projects have been implemented at the community level with the aim of promoting better sanitation levels but all have fell short of the their initial expectations. They have partly tried to solve the existing problems but the overall effect

of the implemented projects amount in less significant impact on the ground. With the multitude of programmes implemented in Kibera informal settlements to help in reducing the monster of poor sanitation; there is still a lot lacking to fully acknowledge that the levels attained are measureable and this can be mostly said to be because of being too reliable to the conventional project approach which has not being producing the expected output. Its planning approach is usually aimed at a given segment of the population thus does not look into sanitation chains(latrines not emptied, treatment systems not present); in terms of resources and efficiency; overlap is very common and as a result synergy is rarely achieved therefore sustainability is usually a recurrent and well-documented problem. For sanitation to be solved comprehensively, a service delivery approach need to be adopted whose planning focuses on entire population needs, factor all elements of sanitation chain and which aims to optimise resource and achieving high levels of sustainability and reliability and whose outcomes are achievable unlike the project approach which are not consistently achievable.

2.6 Theoretical Framework

2.6.1 Malthus population theory

According to Malthusian theory of population, population increases in a geometrical ratio, whereas food supply increases in an arithmetic ratio. This disharmony would lead to widespread poverty and starvation, which would only be checked by natural occurrences such as disease, high infant mortality, famine, war or moral restraint. His main contribution is in the agricultural sector. According to this theory there are two steps to control the population: preventative and positive checks. Preventative means control in birth rate, and uses of different methods to control birth; and positive checks means natural calamities, war, etc. His theory was wrong because Malthus only considered two factors when he established his basic graph: food supply and population growth. Other factors such as improvements in technology proved him wrong. He was right at his time but development made him wrong. If it wasn't for

outside influences on population growth and food supply, his mathematical reasoning which proved his theory and was right. ((Seidl, I & Tisdell, C. A., 1999)) This theory touches on population growth which has often lead to urbanization which is a major contributor to poor sanitation in informal settlements but I found the theory insufficient regarding other aspects of sanitation.

2.6.2 Sanitation and Hygiene Service Delivery Model

This service delivery model was developed by Joep Verhagen and Peter Ryan in the year 2008. The model suggests that appropriate and sustainable service for the urban poor would be safe and easy to use and would not lead to further deterioration in the urban environment. As with most complex problems, the failure to provide such services has many tangled roots. To provide sustainable and affordable sanitation services to the urban poor a number of factors have to be in place and working together, irrespective of the technology:

- Policy and political factors to create the environment to move forward
- Knowledge factors to enable appropriate questions to be asked and decisions to be made
- "Soft" factors such as skills, hygienic behaviour, norms and practices
- "Hard" factors such as suitable technologies
- Financial factors such as availability of finance for capital expenditure, ability/willingness of users to pay for services

For a service to work all of the above have to be in place. Where one or more are missing, the service is impaired or fails completely. With few honourable exceptions, there appears never to have been a comprehensive approach to planning and maintaining urban sanitation systems that has looked at these factors in combination.

In any event, in informal settlements, when it comes to sanitation, residents have by and large been left to fend for themselves. An individual household will take a decision to construct a toilet for its own use (perhaps shared with neighbours). What happens downstream in terms of

impact on water supply, or in terms of when the pit is filled, is not a central consideration, at least not to start with.

A service delivery approach focuses on the service itself, understood in terms of quantity, quality, reliability and accessibility as the main objective of sanitation (and hygiene) interventions. This contrasts with a project-based approach, which typically looks at sanitation delivery systems. Two key aspects of the service delivery approach are scale and sustainability.

Services are provided by delivery systems. These contain both hardware and software. For sanitation, the hardware includes VIP latrines, Vacutugs and treatment plants, while the software includes hygiene education and the skills of the environmental health technicians. In some situations the system and the service may seem to be almost the same thing: certain types of ECOSAN may be a case in point.(Verhagen & Ryan, 2008).

2.7 Conceptual Framework.

Service delivery approach is the best way to solve the ever resting problem of sanitation in our urban informal Settlements. As identified earlier, there are several causes of poor sanitation which could be as a result of poor governance in the area which lead to minor or at other times no planning at all for basic infrastructure like water systems, sewerage lines, roads, solid waste collection points among others. The situation is worsened by the inability of the existing population to afford the building of a sanitation block where they can dispose their faecal matter and that is why the issue of open defecation has been rampant in the informal settlements. Therefore the main pointer to the existing situation can be identified to be the prevailing poverty. The poverty is well demonstrated through the high levels of unemployment and the few with employment tend to earn very low income which cannot match up the needs to be catered for per given household.

For us to solve the issue of sanitation informal settlements we need to switch from the idea of depending on NGO's to come up with projects to build sanitation blocks but the government

should partner with these organisation to come up with an a long-term solution hence service delivery model which calls for strategic planning will concentrate on installation of sewer lines which can be diversely connected to the neighbouring affluent estates which are well provided with sewer infrastructure. Since the process of installing sewer line is very capital intensive, the government together with all other relevant stakeholders can join forces to ensure that sanitation sanity is promoted in Kibera slums through joint financing programme which will help see the problem brought to an end. Planning can be done with serious involvement of the community from the inception stage of the process. Once planning is done and the community is educated on the importance of better sanitation, then demarcation should be done where the perceived sewer line and water systems should pass and the existing households can be relocated tentatively or can be resettled in the Kibera flats which are as a result of Kenya Slum Upgrading Programme. Through these, the sewer infrastructure can commence with the local community providing the required unskilled labour which can be a source of income to them and therefore some economic empowerment in the process.

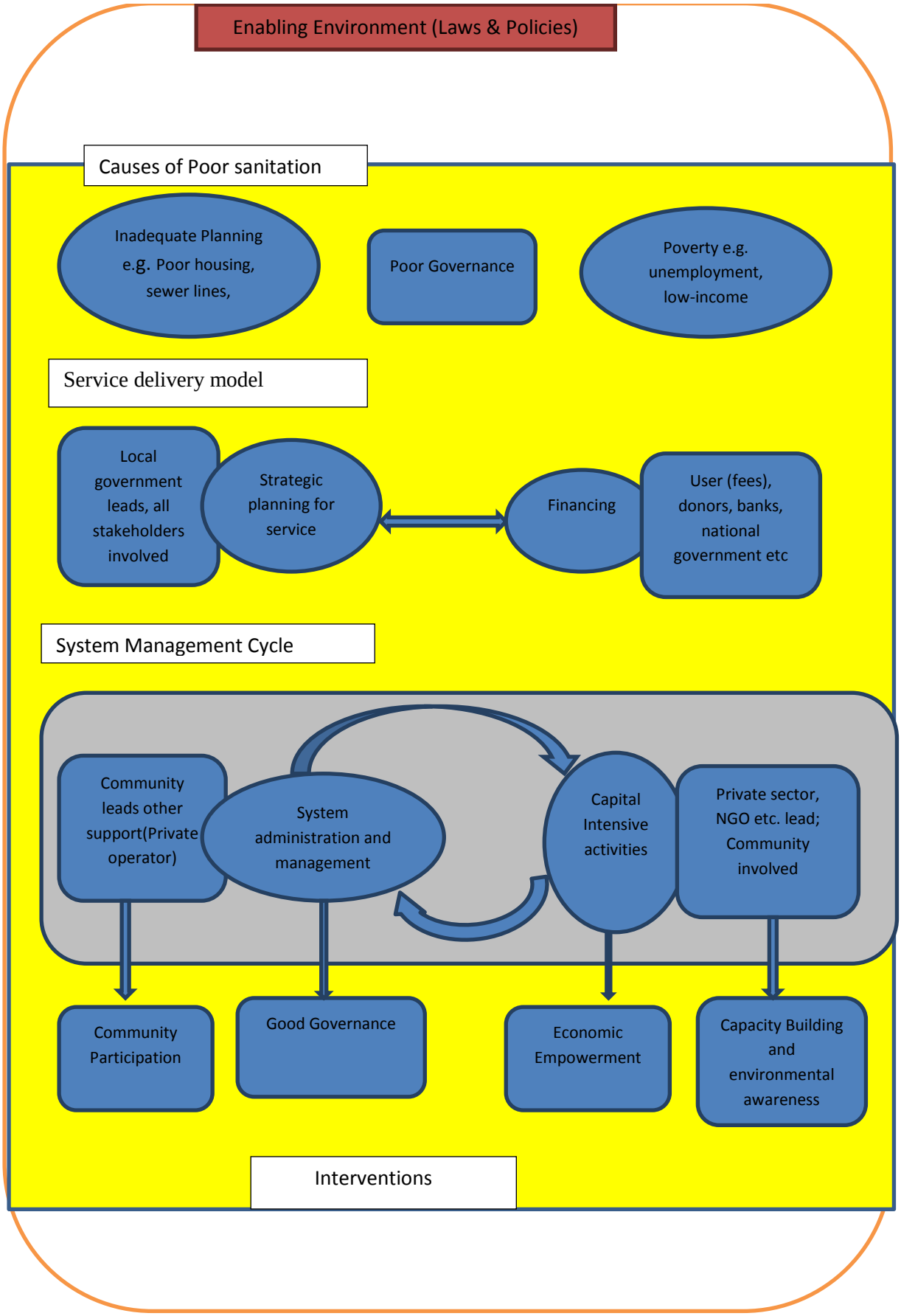
Also since a sewer line is a system that starts from collection to transportation and finally to treatment then disposal hence where the system ends needs to be improved to cater for the increased waste. Therefore the management of the treatment plant is required to be efficient and competent meeting in the required standards for their effluent of treated liquid waste.

A good local administration in place can help identify specific points where sanitation blocks can be established to serve a given number of household and assist in their establishment.

In a nutshell for sanitation to be achieved in Kibera informal settlements, good governance should be in place, which is ready to work in association with the community and also willing to partner with various stakeholders to make this dream a reality and finally the governance in place should have strategies for economic empowerment of the population in the informal settlements thus to reduce poverty index and therefore improve the living standards. This will be promoted with continuous community education on the importance of proper sanitation thus

environmental awareness can be highly inculcated in the lifestyle of these economically empowered citizens. When sufficiently and comprehensively done it will be a road map towards a successful capacity building achievement. The overall determinant of success or failure of this step of change will solely depend on the prevailing environment in terms of whether there are supporting policies and legislations which create conducive atmosphere for the implementation. The model is illustrated as shown in Figure 2.1 below.

Figure 2.1: Conceptual Framework Model



CHAPTER THREE: AREA OF STUDY

3.0 Introduction

Kibera is a province and neighbourhood of Kenya's capital city, Nairobi, and also happens to be the second largest slum in Africa. Located approximately 3.1 miles from the city centre, Kibera is an extremely densely-populated slum occupying just a few square miles of land. Population estimates vary from 100,000 to 1 million inhabitants, though getting an accurate census of the area is a challenge due to security concerns and social problems. The 2009 Kenya Population and Housing Census, reports a population of 170,070 people in Kibera.

Conditions in Kibera are among the worst seen in developing countries. The majority of residents live in crowded 12x12 shacks. These shacks are typically made of mud walls with corrugated tin roofs, which offer little protection from outside threats. Kibera residents lack access to the most basic services, including electricity and running water. Only about 20% of the residents have access to electricity. There are almost no toilet facilities in Kibera, forcing large numbers of people to share communal latrines. Kibera also lacks government hospitals and clinics. These cramped and destitute conditions contribute to the poor health and spread of disease amongst Kibera's inhabitants and children.

3.1 Location and Size

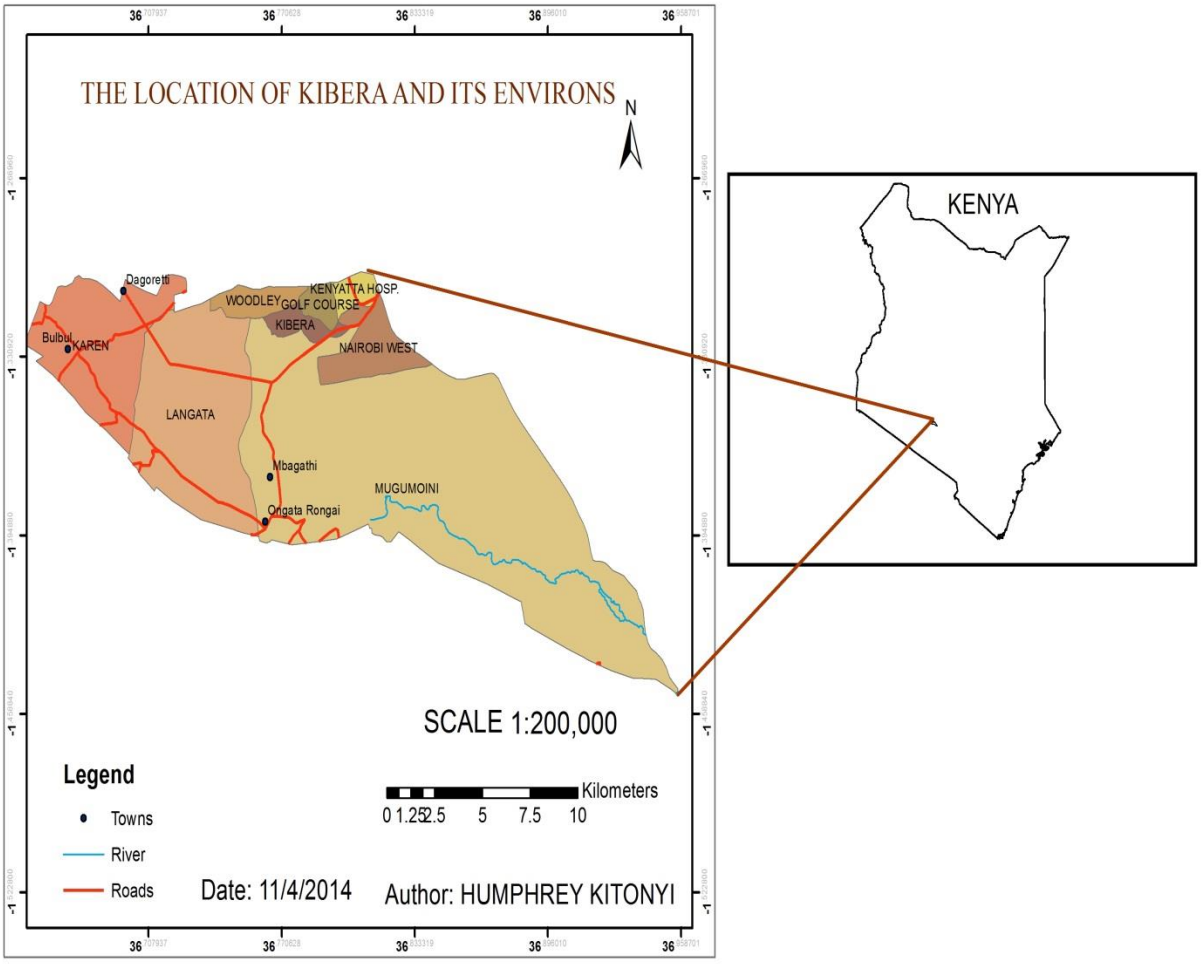
Kibera lies at an altitude of 1,670 meters above sea level, latitude 36 degrees, 50 degrees east and longitude 1 degree, 17 degrees south about 140 km south of equator.

It houses more than a quarter of Nairobi's population. The name 'Kibera´ originated from a Nubian word which means 'forest.´ (Karanja et al., 2002) Kibera is divided into nine official villages, with each village having its own elder.

They are Kianda, Soweto, Kisumu Ndogo, Lindi, Laini saba, Silanga, Makini and Mashimoni. There are no residences greater or bigger than a single storey. Figure 3.1 below clearly

positions Kibera into its immediate context locally and its location in the wider national context.

Figure 3.1: National and Local Context of Kibera



(Source: Humphrey, 2014)

3.2 Physical set up

3.2.1 Location and Extent

Kibera is located southwest of Nairobi city centre .Its geographical co-ordinates are 1degree 19minutes 14 south and 36 47 34 East. It is sited approximately 5km southwest of the city centre. Much of its southern border is bounded by the Nairobi River and the Nairobi Dam, an artificial lake that provides drinking water to the residents of the city.

Kibera as a whole is an informal settlement comprising of ten villages covering approximately 250 hectares of land with an estimated population of about 500,000 people. That gives an average population density of 2000 people per hectare although some villages are more crowded than others.

3.2.2 Topography and Drainage

Kibera generally comprises of steep hills and river valleys which ensures that the railway line that cuts across the slum had cut through a section of the hilly terrain creating steep trenches that drain the site to the Nairobi dam situated on the periphery of the slum.

3.2.3 Climate

Kibera neighbourhood presents a microclimate of Nairobi city which lies one third degrees south of the equator thus expected to experience an equatorial climate .But due to the Cities altitude of about 5,500 feet above sea level, the climate is similar to that of low latitude highlands. The site enjoys a fairly moderate climate that is very attractive for human habitation. The altitude makes the area chilly in the mornings especially in the months of June to October which is usually cloudy and misty with temperatures dropping to about 12 ^{o}C Temperatures are highest in the months of December to March dominated by strong north east monsoon winds just before the first rain season and lowest in the months of June to August accompanied by cold south east monsoon winds resulting to an annual mean temperature of 17oC. The area experiences two rainy seasons, (March to May: long rain season usually cloudy and October to December: short rain season) amounting to an annual rainfall of about

1,200mm. Nairobi being located close to the equator makes the difference between the seasons minimal: Dry and wet seasons. The sun rise and sun set do not vary tremendously for the same reasons.

3.2.4 Geology and Soils

Kibera is mainly covered by fertile red soils. The areas around Nairobi river banks are generally good for agriculture but due to pollution of the water in the river, very little cultivation is carried out near the river banks.

3.3 Economic Setup

3.3.1 Agriculture

The residents within the area practice small scale agriculture within their homes for subsistence. The farmers are not only growing food to eat and sell, but, perhaps surprisingly, becoming a source of seed for rural farmers. Kibera farmers have always grown fodder for livestock feed for both urban and rural farmers, but by establishing a continual source of seed for traditional African vegetables, they are helping dispel the myth that urban agriculture only benefits poor people living in cities.

Using very small plots of land, about fifty square meters, and double dug beds, the farmers can raise seeds very quickly. Fast-growing varieties like amarynth and spider plant take only about three months to produce seeds, with about 3,000 Kenyan shillings in profit. These seed plots are small and take very little additional time to weed and manage.

The future for these farmers continues to be uncertain. Their land could be taken away, the drought could further jeopardize their crops, and the loss of wastewater for fertilizer could reduce production; but they continue to persevere despite these challenges thanks, in part, to the work of groups like Urban Harvest and the Mazingira Institute.

3.3.2 Transport and Communication

Kibera area is accessible by road from Mbagathi Way, near the Highrise flats housing estate.

Other Villages in Kibera have poor under-developed road network with accessibility to most amenities only possible through footpaths.

A railway line passes through the area serving as a major mode of transport. The 30m way leaf allowance will have to be observed when setting the buildings and/ or the perimeter fence. The Uganda Railway Line passes through the centre of the neighbourhood, providing passengers that board the train a first-hand view of the slum. Kibera has a railway station, but most residents use buses and *matatus* to reach the city centre

Mobile telecommunication services (Safaricom, Airtel, Telkom-Orange, and Yu) are available in the area making communication easy and functional.

3.3.3 Tourism

Kibera is the most visited slum in Kenya (Asudi, 2008). Tours to Kibera slum are organized by Victoria Safaris Tours and Travel Company. It is the company currently organizing and marketing tours to the slums (Asudi, 2008). Victoria safaris started this new idea of Kenya slum tourism as a means of creating awareness of the plight of the poor in Kenya to both foreign and domestic tourists. According to Mowforth (2008), the intention was to eradicate the slums in Kenya as a long term measure using tourism business and reducing poverty by engaging the poor to participate more effectively in tourism development in Kenya and by increasing the net benefit from tourism as a short term measure to the slum community. The aims of slum tourism therefore range from increasing local employment, to involving local people in the decision-making.

It is therefore a pro-poor venture. Victoria Safaris hires and recruits its local staff for the slum tours programmers among the inhabitants of the areas where it performs the slum tours. These include tour drivers, slum tour guides and the tours' security teams.

3.3.4 Trade, Commerce and Industry

Majority of the inhabitants are workers in middle and high income homes in the nearby Lavington, Highrise estates and Langata estates. Others are casual labourers in the factories the nearby industrial area. Most of these [according to Syaga et al.2001] earn an average of $2 a day. There are exemptions of well-trained people who cannot afford better housing in other parts of the city. Some professionals have been forced into the slums following economic downturn. There exist NGOs and CBOs that are supporting groups in undertaking small scale businesses through revolving funds. Small women groups' through

Mary go round are raising funds and assisting members to raise funds. Water projects are raising funds (sale of water) e. g Maji na Usafi NGO.

Some of the residents make a living by growing vegetables at the river bank near the dam and selling them. Some rear goats and chickens to make. Several residents raise poultry and goats, but the City Council has prohibited livestock husbandry. Animals have occasionally been confiscated and exorbitant fines exacted to secure their release.

3.4 Social Setup

3.4.1 Demography

The Kibera informal settlement has continued to grow since 1970.During the 1970s it started booming with its population increasing from an estimated 6000 inhabitants in 1965 to 62,000 in 1980, 248,360in 1992, and 500,000in 1998,with an estimated growth rate of 17% per year according to the census of the Government of Kenya in 1999.

Currently the estimated population stands between 700,000 to 1,000,000 people, with a density of over 2,000 per hectare, and an average of 3.2 to 4.6 people per dwelling unit. This makes Kibera the largest slum in Africa [according to KENSUP, 2005]. The rural to urban migration has quickening the rapid growth of Kibera population .The breakdown of ethnic groups inhabiting Kibera and their gender-specific representation is Luo: 34.9% (male), 35.4% (female); Luhyia: 26.5% (male), 32.5% (female); Nubian: 11.6% (male), 9.1%

(female); Kikuyu: 7.9% (male), 6.4% (female); Kamba: 7.5% (male), 10.3% (female); Kisii: 6.4% (male), 2.2% (female); Other: 5.2% (male), 4.1% (female).

3.4.2 Educational Facilities

Most education centres in Kibera are classified as informal, but various initiatives have been underway to add schools. Some start as baby care centres, which later develop into schools. Most are not regulated by the government. Some of the notable schools are Olympic Primary School, one of the leading government schools in the country, Kibera Primary School (also called Old Kibera), Facing the Future School (FaFu), as well as several church-owned and privately owned schools. Notable Secondary schools include PCEA Silanga High School, owned by the Presbyterian Church of East Africa, Raila Educational centre, and Olympic secondary School among others. There is the vocational PCEA Emmanuel Technical Training Centre, offering self-employment skills to the residents.

3.4.3 Health Facilities

In Kibera there are no government clinics or hospitals. The providers are the charitable organisations: AMREF, MSF, churches plus some others. They do a great job. All people are encouraged to have a free HIV test and if positive to take free generic ARV medicine.

Most health problems are directly or indirectly associated with the quality of water and environmental sanitation. The top four illnesses indicated by the community are malaria, diarrhoea, intestinal worms and vomiting.

There are no public sector health services available in the settlement. Private health service providers are expensive and beyond the reach of most of the residents.

CHAPTER FOUR: RESEARCH DESIGN AND METHODOLOGY

4.1 Introduction

This chapter illustrates the methodology employed in the research project. It seeks to specify on the research design, scope of the study, respondents, data collection instruments for the area of study, data collection procedures and data analysis as well as the presentation methods. The main focus of the methodology is on safeguarding sanitation in the high population density urban settlements with my case study being in Kibera slums in Nairobi County.

4.2 Research design

This is a diagnostic research which sets to assess the causes of poor state of sanitation in Kibera informal settlements and seek to establish how sanitation can be safeguarded. This approach was adopted to cater for the collection of qualitative data as well as the use of descriptive survey design as it sought to establish and describe a prevailing phenomenon. Apart from reporting the current status, the collected data will be used to determine whether and to what extent relationships exist between and among the variables considered in the study.

4.3 Study Methodology

4.3.1 Nature of data

For the purposes of meeting the objectives, qualitative data was collected which gave different views of Kibera residents on the state of sanitation and establish how they perceive the programmes initiated at the community level to help improve the state of sanitation.

4.3.2 Sources of data

Primary data

This entails first hand gathering of data in the field and basically included the administration of questionnaires, conducting of interview schedules, use of photography and general observation during the field study. Such information was obtained from opinion leaders, youth and women, NGO's and CBO's, government institutions and private sector dealing with water and sanitation in the area of the study.

Secondary data

This information was gathered from diverse documents tackling sanitation service provision in poor urban settlements. These sources included journals, internet sources and reports. This kind of information was majorly obtained from various institutions visited, Kenyatta University Post-modern Library and Government agencies.

4.4 Population description

The study focussed on four of the eight villages in Kibera informal settlements. The areas include; Kisumu Ndogo, Soweto, Gatwekera and Raila. The villages were selected because of factors like poor drainage, few toilets in place and their proximity to the Nairobi River.

4.5 Methods of data collection

Data collection method revolved around fine-tuning of research instruments, establishment of the sample frame and sampling units and also through conduction of reconnaissance of the study area. Both the primary and secondary data were collected during the research study and these include;

4.5.1 Questionnaires

This study utilized a systematic list of questions developed geared towards achieving the objectives of the study. The questions were both open and close ended. The open ended questions were seeking to gather the resident's views on the nature and state of sanitation in

the areas and pursuing the views on what needs to be done to improve the sanitation in the area.

4.5.2 Interview Schedules

The interview schedules were conducted on various government agencies such as Nairobi Water and Sewerage Company; CBO's and NGO's such as Umande Trust and several private clinics in the area. The questions are strongly designed to help achieve the objectives of the study.

4.5.3 Observation

In this method of data collection, checklists on the observation standard were developed. The observations made were noted down immediately to ensure that no information is forgotten and this was aimed at ensuring that the reliability of data is maintained.

4.5.4 Photographs

Here, cameras helped to capture distinct pictures which were deemed fit for enhancing the credibility of the information gathered. Therefore the photographs were helpful in demonstrating the exact situation or representation of the way things are on the actual ground.

Also data from the library and various institution were helpful in complementing the above mentioned primary data sources.

4.6 Sampling methods and Sample Size

The study area consisted of four villages-within the domain of the problem- as mentioned in the scope of the study. This choice of study population was based on the non-variance in characteristics across the four villages as observed during the pre-visit. Some of these observable characteristics include flying toilets evidence, solid waste disposal , inadequate water supply which results to long queues, few toilets available which are not evenly distributed etc.

The study area was therefore divided into clusters of four villages where 10 questionnaires were administered in each of the clusters therefore totaling to 40 in number. Then simple random sampling was used for selecting study units on the basis of chance and this is because there is no formal type of planning within the settlements hence rendering the method effective.

4.7 Method of data analysis and Presentation

Various data analysis methods were employed in this stage. Both the qualitative and quantitative data analysis was utilized during the process of data analysis and presentation.

SPSS was used to develop distributions trends and graphs during the presentation of descriptive information and discussions given by respondents especially where numerical were obtained.

Comparisons were also performed between the primary data obtained and the secondary data to determine the relativity of the given trends in the ground.

The photographs were used to supplement the various data in the presentation.

4.8 Limitations of the study

During the data collection, the following constraints limited comprehensive acquisition of data;

- Financial constraints
- Some unreceptive residents
- Poor weather conditions

However, despite the above challenges, the researcher made efforts to overcome them. Financial constraints were overcame through acquiring of two friends who assisted in the collection of data and this reduced the time and cost of transport which would have resulted if done all alone. Unreceptive residents was also witnessed because they claimed that their

poverty is being used by many to seek funding which they don't extend to them and as a consequence they did not want to be interviewed but as the researcher I persuaded them by explaining to them that this was an academic research but not a sponsored research. Therefore some understood and gave their time to answer the questions while few others were adamant so had to move to the next respondents.

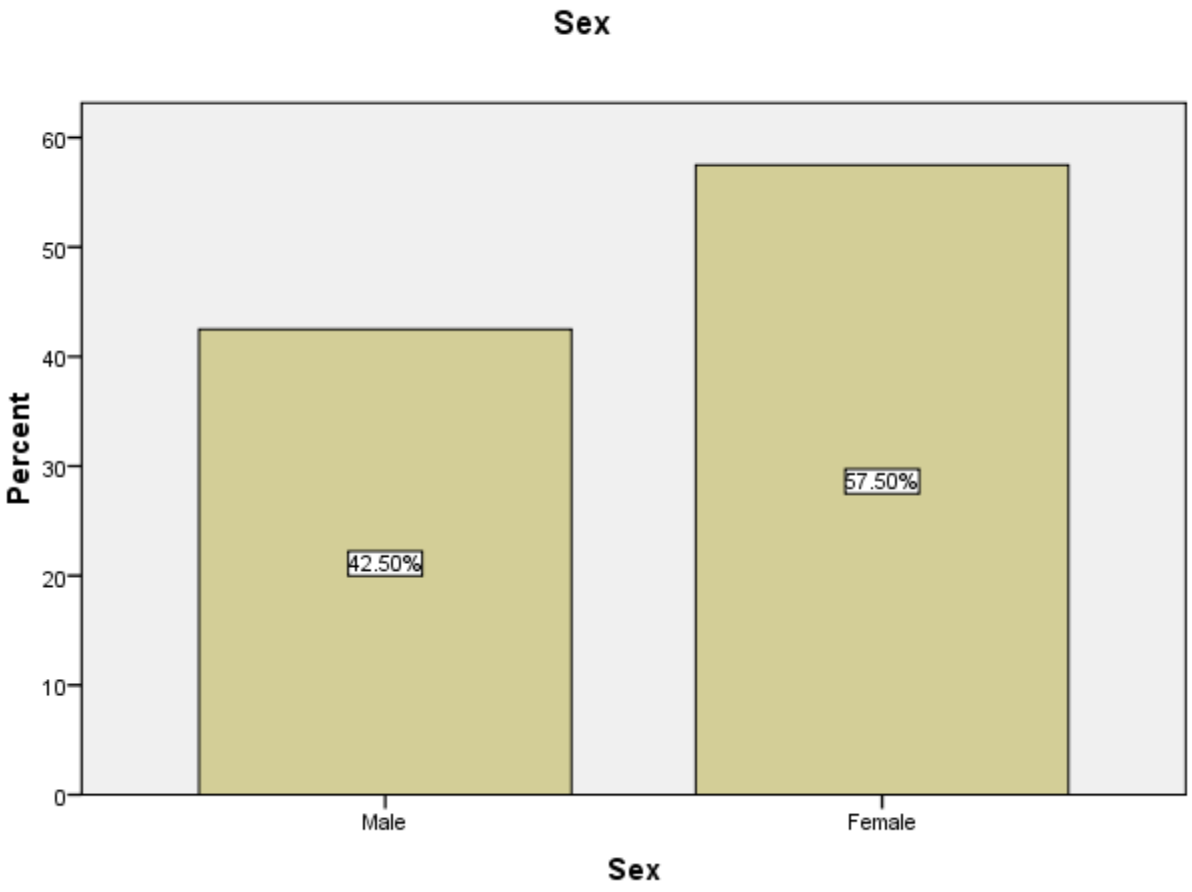
Poor weather condition was also a big challenge for the study. This was so because the frequent rains during the period caused a lot of flooding as well as making the paths impassable due the muddy nature of the existent soils. I countered this constraint through buying gumboots and raincoat so as to continue with my data collection and manoeuvre through the narrow muddy paths.

Chapter 5: DATA PRESENTATION, ANALYSIS AND DISCUSSION

5.1 Profile of the Population

5.1.1 Gender

Figure 5.1: Gender

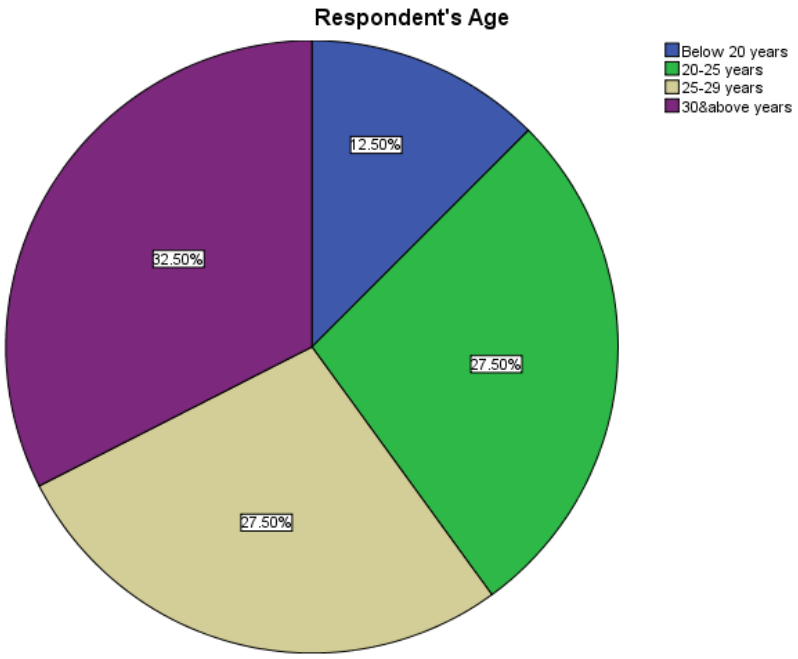


(Source: Field Survey, 2013)

The population of Kibera in the study area showed a margin that is quite significant between the male and female ratio. Female recorded 57.5% while men recorded 42.5% which displays that female are more than men in the area of study. Figure 5.1 above therefore shows the percentages of male and female in the area of study.

5.1.2 Respondents' Age

Figure 5.2: Respondent's Age

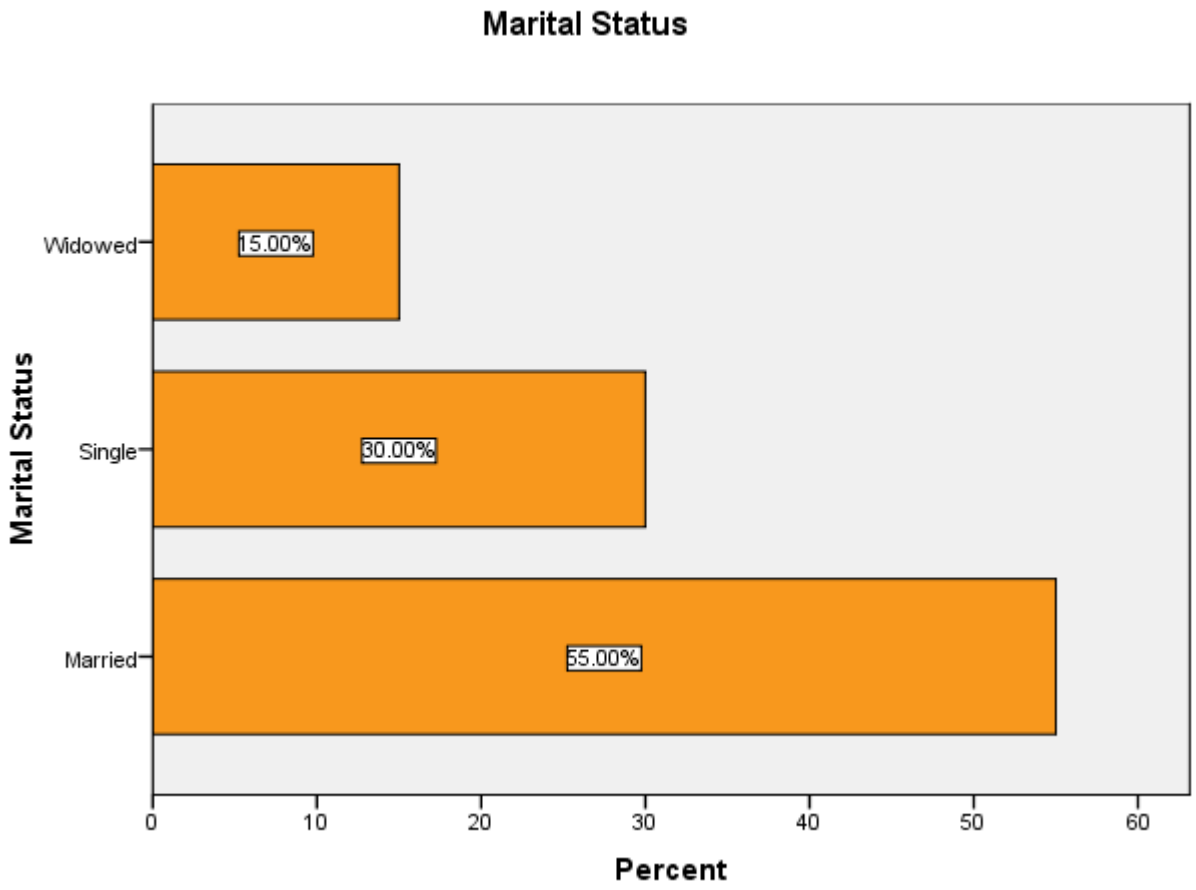


(Source: Field Survey, 2013)

Given the four different categories for the different age bracket within the population of the study area, Figure 5.2 above clearly illustrates that the bracket with the most number of people is that of 30 years and above. This bracket is the largest with 32.5% followed by an equal balance between the age brackets of 20-25 years and 25-29 years which both recorded 27.5%. Finally the least of the age bracket is indicated by the bracket of below 20 years which is represented by 12.5%. Although the larger portion of the respondents fell in the bracket of 30 and above, it was evident that the brackets of 20-25 and that of 25-29 constituted bigger group combined. Therefore this means that environmental consciousness mentality can be instituted to them at this early stage so that they can pass it to the generations after them with ease as compared to dealing with an older generation. Moreover, for sanitation to improve considerably at the moment then this young men and ladies need to be educated and capacitated to promote a clean and healthy environment for themselves and their families by adopting sound environmental practices.

5.1.3 Marital Status

Figure 5.3: Marital Status



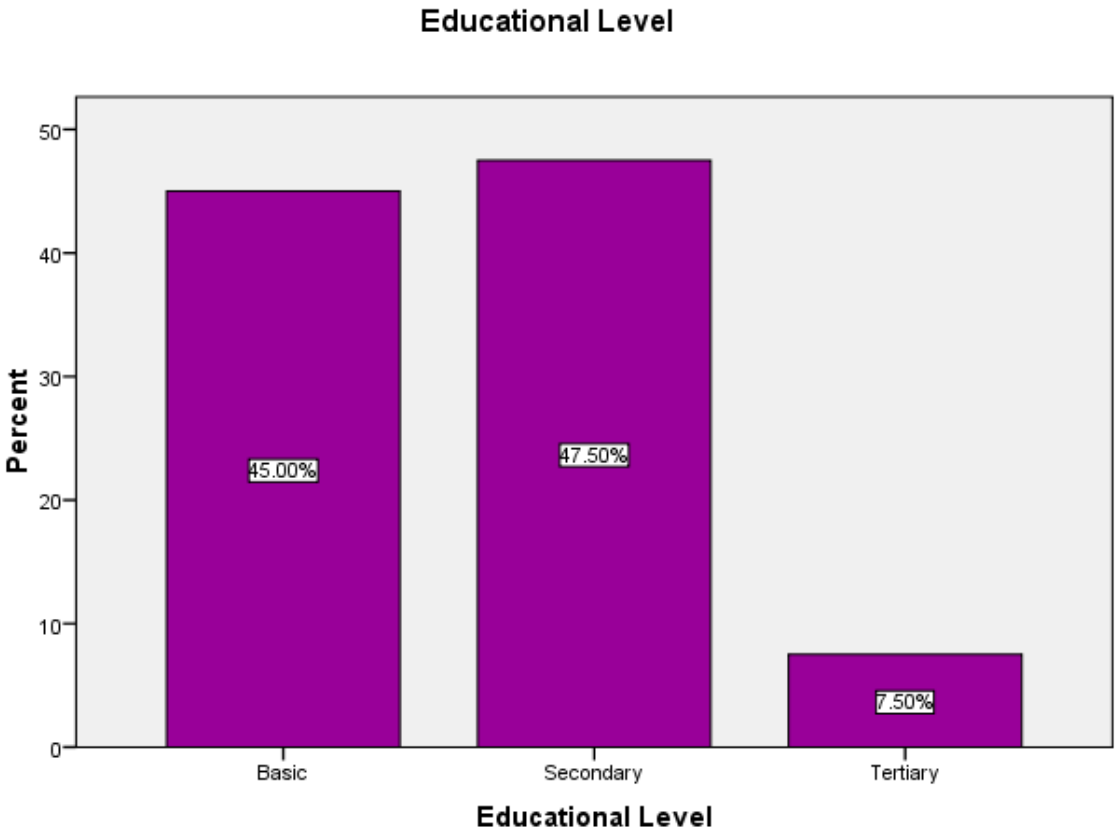
(Source: Field Survey, 2013)

This category represents the marital status of the population where the research was undertaken and it indicates that the majority of this population is married as displayed in Figure 5.3 above. It points out that 55% of the population is married while the single follow by 30% and finally the widowed are least and are represented by 15%.

Majority of the residents interviewed were married with small children. The small children were observed to be relieving themselves in drainages since the mothers were not willing to pay an extra coin for children to access sanitation facilities. This is very risky and it continues to worsen the situation exposing the same very children to the dangers of contracting diseases.

5.1.4 Education Level

Figure 5.4: Education Level



(Source: Field Survey, 2013)

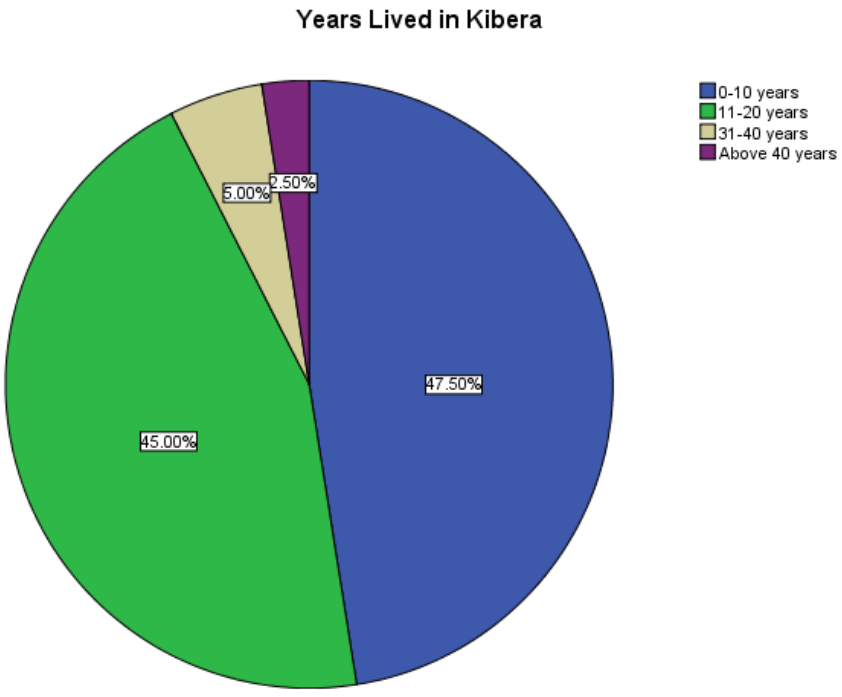
Education is important to any population since it determines the perceptions, understanding and reactions towards issues. There are four categories diagnosed by this study whether the population has acquired informal education or if they have acquired the basic, secondary or tertiary education. The study demonstrated no recordings for informal educations while most people tended to lie within the secondary level of education represented by 47.5% followed by the basic level of education which is almost at per at 45% and the least of the representation is in those people in the population that have managed to acquire the tertiary education is represented by 7.5% as presented in figure 5.4 above.

Therefore this exhibits that there is a high level of primary school drop outs as well as a good number that manage the secondary education while very few get the privilege to acquire tertiary education.

In my research, I noticed that many of the residents who managed to attain secondary education were unable to complete their form four while also there were a high number of primary drop outs. With such a low-level education population is an evidence of the poor state of environment. This is so because their understanding for the importance of a clean environment is very low leading to the unfruitful efforts of the CBOs and NGO's in sensitizing them about the essence of a clean environment. The education level is making it difficult to conceptualize the advocacy for a clean environment.

5.1.5 Years of residence in Kibera

Figure 5.5: Years of Residence



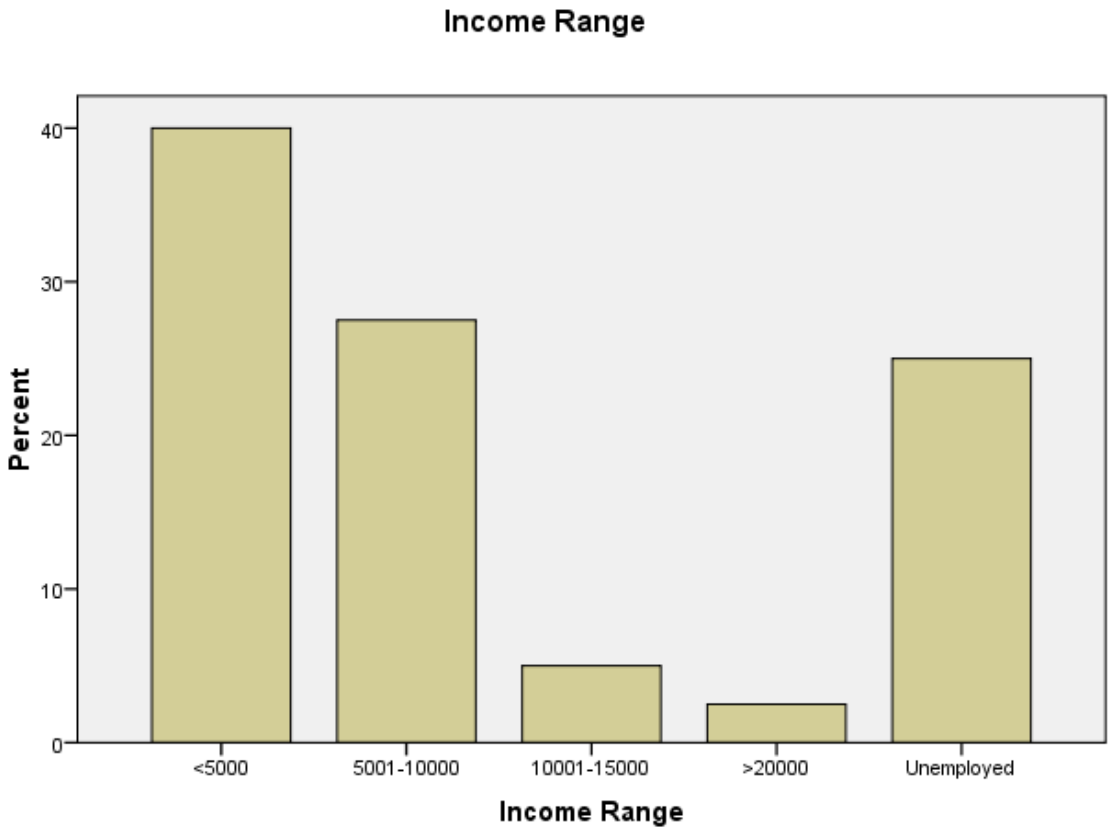
(Source: Field Survey, 2013)

Figure 5.5 above clearly exhibits the years lived in Kibera by the population interviewed. One thing that was clear was that the majority of the existing population have lived in Kibera informal settlement have existed there between 0-10 years representing 47.5% followed by

that between 11-20 years which is represented by 45% and it goes ahead to display that only 5% and 2.5% fall on the 31-40 years and above 40 years respectively. This demystifies that majority of this population is migratory population who are new to the area. Therefore this strongly supports that urbanization is still a factor causing the deteriorating state of sanitation in the urban informal settlements.

5.1.6 Income Range

Figure 5.6: Income Range



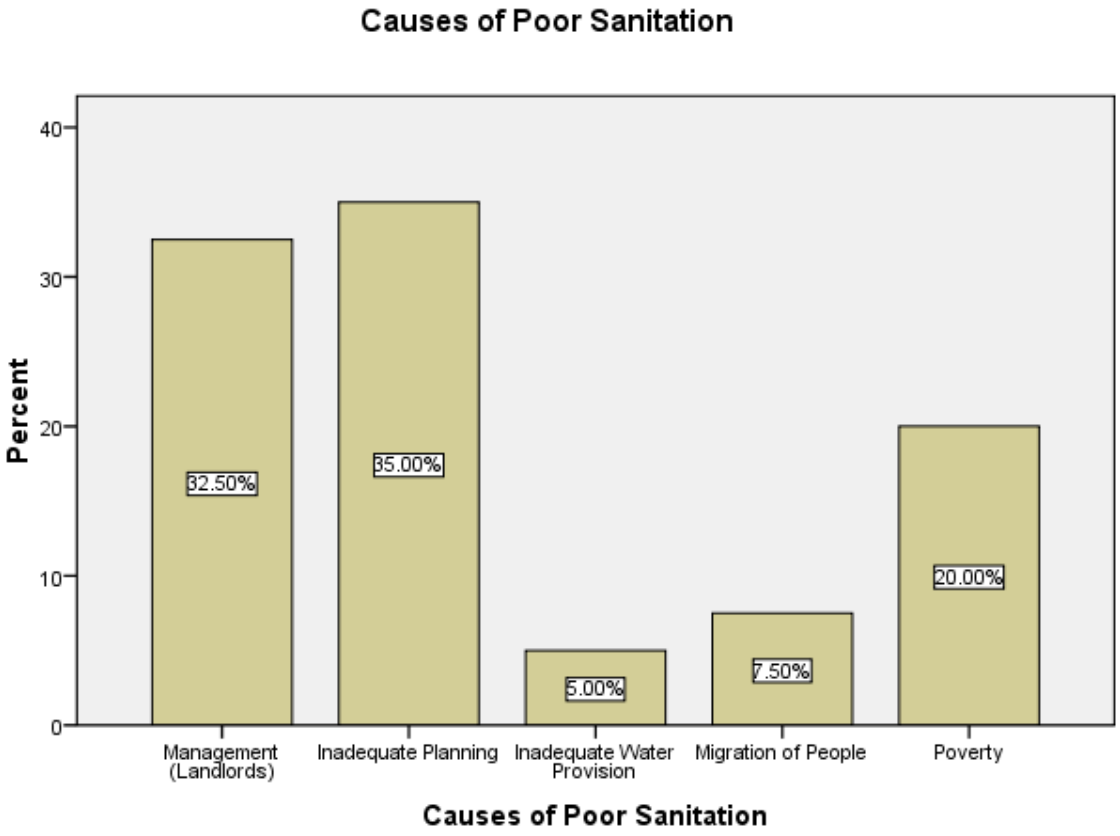
(Source: Field Survey, 2013)

Income level is a good way of measuring the economic status of the existing population. Therefore this study scrutinized the different ranges of income levels within the study population and clear and distinct analysis showed that 40% of the population are earning a meagre income of less than 5000 shillings monthly followed by 27.5% who lie with the range of 5001 and 10,000 while third came the unemployed who are substantial in number and were

represented by 25% while those in the range between 10,001 and 15,000 were represented by 5% while those earning 20,000 shillings and above per month were represented by 2.5% as shown in the figure 5.6 above. This last category was highly found in Raila village of Kibera informal settlements where the slum upgrading programme had started being implemented. Income levels were a clear indicator that poverty is a looming issue in the lives of Kibera residents. Despite the low income levels, the high rate of unemployment is not in any way making the situation any better. The two combined have made access to sanitation facilities very costly to some of the residents and also since they cannot afford to pay the small fee for solid waste collection, they end up disposing anywhere at night and all these have a damaging effect to the environment.

5.2 Objective 1: Factors of poor Sanitation in Kibera

Figure 1.7: Factors of Poor Sanitation



(Source: Field Survey, 2013)

Many people in the study population had divergent reasons as to why the level of sanitation is high but majority blamed the act of inadequate planning to be the major cause of poor sanitation and agreed by 35%. This was followed closely by the poor management by landlords. They were blamed for not constructing toilets even when they are building new houses but rather concentrated on increasing their income by creating more and this is represented by a fairly large population of 32.5%. Other causes were poverty, migration of people and inadequate water provision which are represented by 20%, 7.5% and 5% respectively as illustrated in figure 5.7 above.

Since Kibera is an informal settlement, this illustrates why planning has not taken place and as a consequence the area is lacking a lot of social infrastructure and this has in turn led to declining levels of sanitation. Inadequate planning is confirmed by a lot of variables like poor housing which has not given room for the development of drainage and sanitation infrastructure; minimal organization for systems of solid waste collection and the existing narrow, muddy pathways among others.

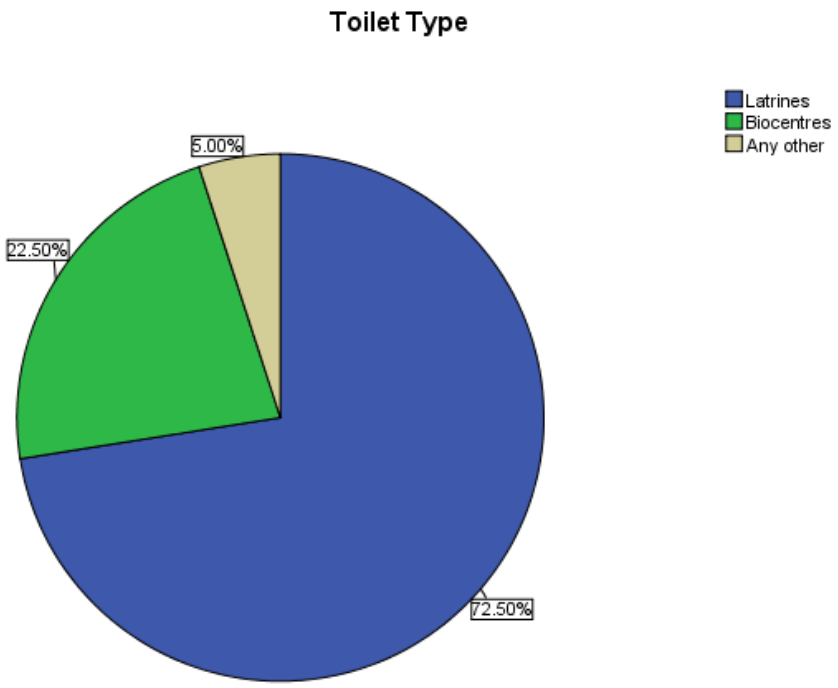
The issue of management by landlords was a surfacing issue. Landlords' were blamed because they were ignorant of the fact sanitation amenities are important when building the houses. The study population was for thee idea that they were quenching their self intersests since they were concerned with increasing their income through more houses without factoring the call of nature for the residents.

Poverty was also blamed as a contributor to the low sanitation levels because initially people regarded access to sanitation as a very costly expense thus this led to more and more of open defecation. Now the situation has changed because of the heavy presence of the Non-Governmental Organisations who have tried to subsidize the cost of accessing the sanitation facilities although a good number of them still feel that the cost of sanitation access is still high.

5.3 Objective 2: Assessing the ambience of environmental conditions and their Health impacts

5.3.1 Type of Toilet used

Figure 5.8: Type of Sanitation Facility Used



(Source: Field Survey, 2013)

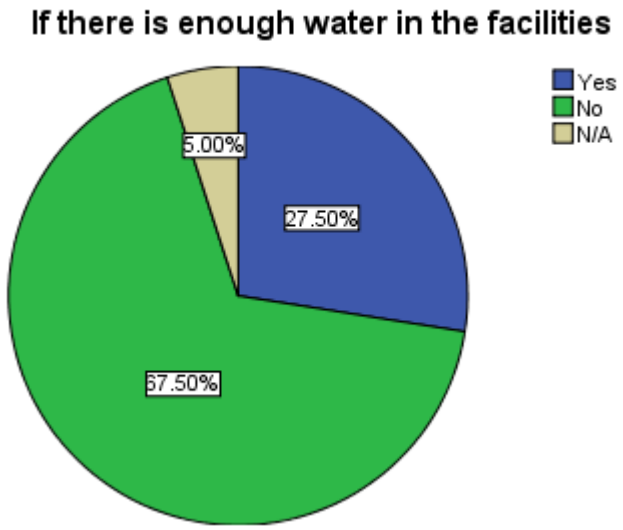
The population in Kibera highly relies on the use of latrine as their major sanitation facility and this is as expressed in figure5.8 above where the population depending on the latrines are represented by 72.5% while those relying on the biocentres constructed by the NGOs are represented by 22.5%.Surprisingly, I did not come across any ECOSAN facility in the area of study. The 5% represented those household that admitted that the cost of paying for sanitation was unaffordable to them and thus they opted to option like using jerry cans and polythene bags while others relieving themselves outside in drainages especially at night.

Majority of the people are seen to rely so much on the pit latrines which were constructed long time ago with most of them draining into Nairobi Dam while others are without outlet.

These pit latrines are seen as a major contributor to pollution because if it rains some end up over flooding and the resultant effect is the floating faecal waste all over which does not contribute to bettering the state of the environment in anyway. Rather it leaves the residents exposed to contamination, more so the children since the flooding water can easily cause infection to both children and adults. Contamination of drinking water is also a possibility because the water pipes are along the poorly maintained drainages further increasing health risks.

5.3.2 Adequacy of Water and cleanliness of Sanitation Facilities

Figure 5.9: Water Adequacy and hygiene of the Sanitation Facilities



(Source: Field Survey, 2013)

Many residents of Kibera concur that there is no enough water in sanitation facilities. It has already being established that the larger population use latrines and water is scarce in the area. This leads them to purchasing the scarce commodity thus negatively affecting the levels of cleanliness in these facilities. 57.5% agreed that there is no clean water in the facilities while 27.5% believed there is enough water in the facilities except during shortage and this is associated to the population which uses biocentres for sanitation purposes. 5% represented those who were not aware if they were clean or not and this is linked to the population that

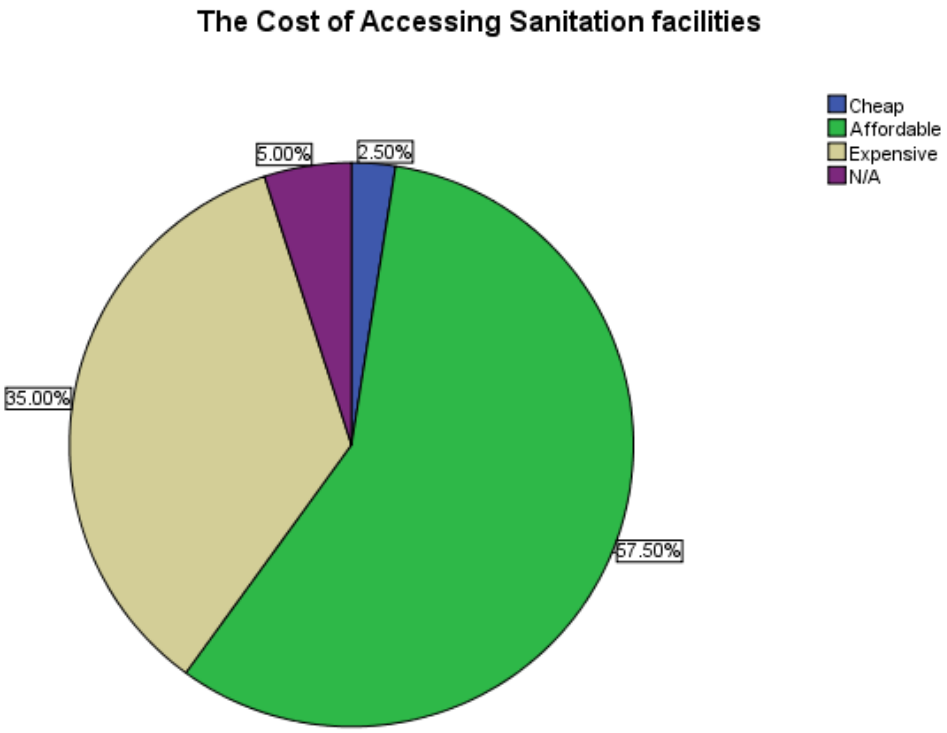
never accessed neither the latrines nor the biocentres but used flying toilets or other methods to dispose their human waste. The proportion is a s illustrated in the Figure 5.9 above

The same percentages also represented those that believed that the sanitation facilities were clean which was also represented by 57.5% while those who disagreed they were not clean were represented by 37.5% while 5% didn't know if they were clean or not.

As depicted from the Figure 5.9 above, a larger portion was of the idea that the cost of sanitation was affordable and the reason for this is because majority of them used pit latrines as opposed to other forms of sanitation facilities. Since here they use less money or none for most of the time and this is the reason why they declared the cost to be affordable. To those that the latrines are not existent within or near their homesteads were forced to use biocentres which they declared that the cost was expensive for them simply because they did not have any other option. Therefore, this is why at night others tend to turn to the use of flying toilets because the biocentres remain closed at night and the latrines might be far and since it is also insecure to walk at night they apply this popular system.

5.3.3 Cost of Accessing Sanitation

Figure 5.10: Cost of Sanitation



(Source: Field Survey, 2013)

Majority of the residents came into agreement that the cost of accessing sanitation was affordable by 57.5% while a fairly large population agreed that accessing sanitation was expensive and are represented by 35%. Only 5% thought that sanitation cost was cheap while 2.5% were not in a position to answer because they never visit these facilities. This is clearly illustrated in figure 5.10 above. The people who feel that sanitation is expensive form a significant percentage. They therefore contribute to open defecation in the environment or littering the surrounding with solid waste which contributes immensely to the poor sanitation levels in the slums.

5.3.4 State of Solid waste

The state of solid waste is wanting because the area lacks the desired solid waste collection points since the council do a formal collection once in a week or even once in a fortnight. Lack of designated points for disposal has led to the up hazard disposal of waste at inappropriate areas like as shown in the plate 5.1below where waste is disposed just beside a major road. Other areas that were highly covered with household waste were in the river and some points along the railway lines and on some pathways. This uncontrolled disposal is unhealthy because any small downpour leaves the environment with a bad stale and this forms part of air pollution. Therefore such behaviours are greatly contributing to the worsening of sanitation in the slums.

Plate 5.1: Road Side Solid Waste Disposal

(Source: Field Survey, 2013)

5.3.5 State of Liquid waste

Liquid waste is poorly disposed in Kibera simply because there is lack of adequate drainages and the few that are there are poorly maintained. Residents tend to block these drainages with solid waste especially polythene papers. This is said to be causing a lot of flooding when it rains. Also this stagnant water in the drainages is associated with the high rate of malaria in the slums because they act as breeding grounds for mosquitoes which negatively impacts on the health of the dwellers of Kibera informal settlements. Plate 5.2 illustrates the blocked drainages and how worrying they look like. Such negligence is further and further impeding the efforts for a a cleaner environment.

Plate 5.2: Poor Drainage in Kibera

(**Source: Field Survey, 2013)**

5.3.6 State of Water Supply

Water scarcity is a major problem when it comes to the residents of Kibera. Residents lack piped water in their houses and therefore they are forced to depend upon the already established projects by NGOs and some of the legal connections by NWSC especially to those who can afford. The residents go and queue for long hours at times just to fetch this precious commodity at a price though subsidized majority still consider it expensive. Others depend on the water vendors to acquire this commodity. The need for water is displayed by the rampant illegal pipe connections which are dangerously passing through drainages therefore posing a high risk of water contamination. This is demonstrated by Plate 5.3 below.

Plate 5.3: Water Pipes in the Drainage

(Source: Field Survey 2013)

Plate 5.4: Leaking Water Pipe beside a Sewer

(Source: Filed survey 2013)

Also as seen in Plate 5.4 above, this is an example of a leaking pipe in a dirty drainage full of solid and liquid waste which poses health risk to the users. These kinds of exposures really increase the vulnerability of the residents to water borne diseases and other associated risks.

5.3.7 Pollution

Pollution is what has resulted from the poor handling and management of both the solid waste and liquid waste. This is ascertained by the overwhelming proportion of 90% of population who declared that they directly dispose their household waste into the Mbagathi River as witnessed from the household questionnaires. This has resulted into high pollution of this river which can now not support different domestic purposes like washing, drinking and also cannot support aquatic biodiversity.

Plate 5.5: Pollution Levels in the River

(Source: Field Survey, 2013)

5.3.8 Health Impacts

According to Revival Health Centre, poor sanitation was reported to be a major cause of the rampant communicable diseases in Kibera. Some of the major common ailments reported in the health centre include; typhoid, diarrhoea, skin infections, respiratory tract problems, eye and ear infections among others.

Tabitha Medical Clinic is another health centre interviewed and they said that the most common ailments reported are high incidences of scabies, fungal skin infections and diarrhoea.

In reference to SHOFCO, their health facility reported the common ailments which they identified to be highly treated and experienced included; diarrhoea, typhoid, malaria, eye and warm infections.

It can be noticed that the above diseases have a correlation because they have a connected cause to the state of sanitation which means for them to be reduced then sanitation has to be improved.

5.4 Objective 3: Past initiative to address Poor Sanitation in Kibera

5.4.1 Institutions

Umande Trust

Umande Trust is an NGO in Kibera slums that is dedicated in promoting sanitation through the construction of bio-centres which have greatly improved the level of environmental cleanliness by reducing the number flying toilets. The biocentres are 42 in number and distributed in the whole of Kibera.

The Kibera area manager believes the state of sanitation is better because previously the flying toilets were rampant. The major causes of sanitation were listed to be lack of spaces to construct new and modern sanitation facilities; overpopulation which leads to competition for the scarce facilities creates more need for toilets; poor planning of the informal settlement and regulations that inhibit the use of stones in constructing sanitation facilities. He affirmed that the community is generally aware about the importance of sanitation just that they were lacking the capacity to access the level of sanitation they would wish for. About adequacy, he revealed that the sanitation facilities were not enough but confirmed that they were reliable and around 80% accessible and that the biocentres are well maintained upholding high levels of hygiene The contribution of the organization to improving sanitation in Kibera is through the: construction of biocentres which are accessible and fairly distributed; promoting awareness and capacity building; providing loans kitty(SANDEF); promoting WASH activities; sponsoring garbage collection activities; linking the community with the county council in promoting garbage collection. The organization has faced some challenges within

the course of promoting sanitation and these include; bureaucracy in approval of a site and lack of planning in the area makes things worse; insecurity has contributed to attacks of the community members accessing some of the biocentres existing in areas served by narrow paths; corruption is also high in Nairobi Water hence leading to shortage of water to be used in the biocentres. The organisation has tried to lay down some measures to counterattack the challenges. There are guards that have been put to protect the facilities; working closely with Nairobi Water, City planning and County council in order to make easier implementation and design and also for site approval. SANDEF is available for landlords to borrow and improve sanitation facilities. Umande Trust has partnered with various organisations and some of them include; CORDAID, WASH UNITED, Oxfam GB, Athi Water Service Board, French Development Agency (FDA), Nairobi Water and Sewerage Company. They ranked their success rate of their partnerships that they have made to be good and they are planning more of them in the future.

Nairobi Water and Sewerage Company

The Technical Manager described the sanitation issue in Kibera to be poor and wanting. This is due to overpopulation that has led to congestion and the attitudes of landlords who prioritize building more rooms without thinking of providing sanitation facilities. NWSC stated that the major causes of poor sanitation can be attributed to poor congestion, landlords ignorant of the importance of sanitation and inadequate planning in the slums. The community was described to be much aware of the importance of sanitation but they are just incapacitated to do so. The sanitation facilities were described to be inadequate, unreliable, somehow accessible and well maintained as long as water is there. The contribution of the organisation in promoting sanitation has been demonstrated through partnerships with other partners like the Athi Water Service Board whom there have an on-going joint project of extending water pipes and constructing sanitation blocks; Regularly, liaising with the informal settlement department of the Council and NGO’s to promote sanitation; Extension projects for

sewer lines and by promoting connection of sanitation blocks with water to promote their cleanliness.

The organisation has faced a number of challenges in the quest of promoting sanitation in Kibera and these include; inaccessibility, illegal connections, insecurity, poor piping and materials and misuse of sewer systems leading to frequent blockages. Some of the measures undertaken to deal with the challenges includes; Barazas with CBO's and local administration, sensitization of the community during barazas and unblocking of sewers. NWSC has partnered with Athi Water and Service Board, Practical Action, Water and Sanitation for Urban People, Umande Trust among others. The recommendations given to improve sanitation include; proper planning, harmonizing water connection by establishing chambers for all meters to regulate water shortages and by sensitizing people to stop taking water as a commercial resource but as a basic commodity.

Shining Hope for Communities (SHOFCO)

This is an NGO in Kibera that is dedicated in providing water services to the community; also it has an education centre for the girl child and a health centre where they treat the community members for free. SHOFCO described the state of sanitation to be deplorable characterized with poor solid waste management strategies. Also the organisation stated that some of the major causes of poor sanitation in Kibera included: poor solid waste disposal, practices of Open defecation, poor drainage systems and inadequate sanitation facilities. The community general awareness was described to be high and it was connected to the many NGOs that are present in Kibera. The sanitation facilities were described to be inadequate, not reliable, and not accessible at 40% coverage and most WATSAN were said to be not that properly managed. SHOFCO has contributed positively to the community by building a water tower and many water kiosks within Kibera. The state of sanitation has negatively led to many cases of diarrhoea being reported. Some of the challenges encountered are the high cost of operation, community resistance. The measures put in place to remedy the challenges are;

resource mobilization, community involvement and implementation of M&E. SHOFCO has partnered with various CBO's, youth groups and NGO's such as Umande Trust. The success rate of these efforts with other partners was described to be fair. There are future plans to partner with WATSAN networks. The recommendations to improve sanitation suggested include; WASH education, Advocacy, infrastructural development, political goodwill, community involvement in project implementation and proper resource mobilization.

Carolina for Kibera (CFK)

The state of sanitation was described to be wanting thus leaving a lot still to be desired in relation to improving on the current sanitation level. CFK believes that poor planning has been the major cause for poor state of sanitation and this has been aggravated by the lack of sewers and toilets. Land issues which are not legally owned end up inhibiting the construction of permanent buildings. The community is termed to be quite aware of the importance of sanitation due to the frequent sensitizations conducted by various NGOs. The sanitation facilities were labelled to be moderately adequate, not reliable, quite accessible and sufficiently maintained. The organisation has partnered with public and private schools, organisations directly dealing with sanitation like: WSUP, WASREB, county council, Umande Trust among others. The organisation has faced a number of challenges in its pursuit of promoting sanitation and the major one is the negative attitude of the residents where they believe that some NGOs are there to exploit them. Limited resources inhibit the organisation's scope of operation therefore limiting them to select areas. The success rate of the partnership can be ranked to be good. The recommendations suggested by CFK include: encouraging stakeholders to come together to promote the noble course of better sanitation; More awareness need to offered; the national and county governments need to play their role and people and the community in general need to be sensitized toward changing their attitudes.

Tabitha Medical Clinic

This organisation described the state of sanitation to be very poor. The major causes of sanitation were identified to be; inadequate toilets, poor drainage system, lack of clean water and congestion. Tabitha Medical clinic differed with majority of organisations that the general level of awareness is low. They termed the sanitation facilities to be not adequate, not reliable, majority not accessible and they are not well maintained. The organisation has contributed in promoting health education to the community. Despite of the efforts made to promote better sanitation, some of the undermining challenges that limit these efforts include; lack of adequate water, lack of sewers and lack of adequate awareness on sanitation. The measures undertaken to remedy the challenges are; distributing water guards, soaps and promoting health education. Tabitha Medical clinic has partnered with Carolina for Kibera and their success rate was excellent. The recommendations suggested for better improvement of sanitation include construction of adequate toilets and sewer construction and clean water supply. Also sanitation problems can by reducing over congestion in the through slum upgrading programme.

Revival Health Centre

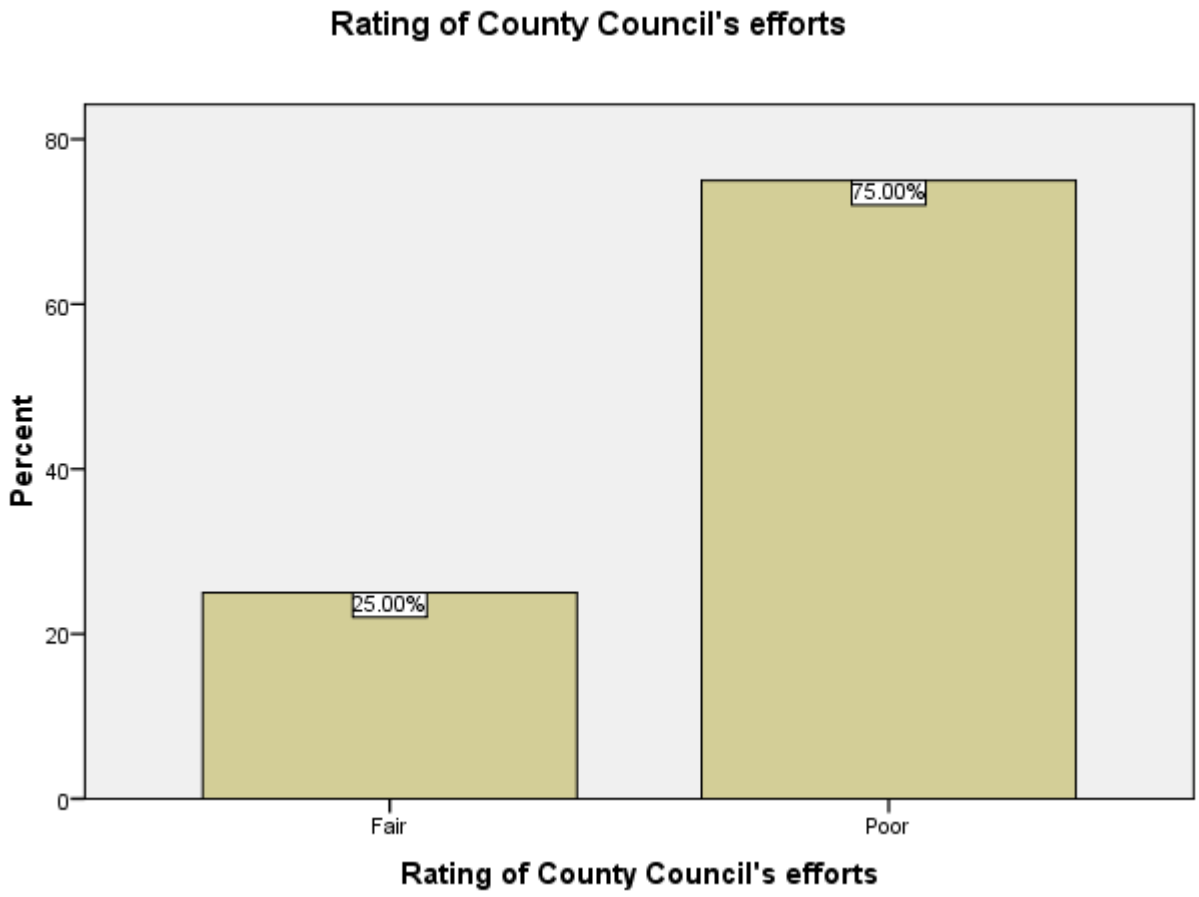
The doctor in charge of the facility described the state of sanitation in Kibera as being pathetic. Poor sanitation was described to being contributed by factors like high poverty levels, low levels of awareness, congestion and poor infrastructure. The level of community awareness is referred to be fair as NGOs have greatly tried to promote to increase awareness levels among the residents of Kibera. According to Revivals Health centre, the sanitation facilities are very inadequate, some are somewhat reliable, they are accessible and majority are coupled with poor maintenance due to lack of water and at times the irresponsibility of the users. The contribution of the institution towards promoting better sanitation can be referenced from its activities of promoting appropriate hygiene level through hosting programmes in local radio station like Pamoja FM. Also the institution has been for a long time consistent in giving health talks in schools, churches and at community level. The

challenges noted by this health institution are to do with the resistance of the residents to projects and he associated this to ignorance, illiteracy and poverty. And this was because of the negative responses of the community members to people from the local institutions. This challenge has been well addressed by utilization of community health workers who have been acting as ambassadors for the organization thus enhancing better relations.

This organisation has partnered with a couple of organisations like the Saving Ministries from Germany, Muttice International and local organisations like Carolina for Kibera. The organisation rated the success of these partnerships as good and the organisation is ready to partner with like-minded partners in improving sanitation and health of the residents of Kibera. The organisation suggested some recommendations that they saw deems fit in improving sanitation in Kibera and these include availability of support from the government, Infrastructural developments, formalising the entire slum, perform subdivision of the plots and then give title deeds.

5.4.2 Performance Level of the County Government

Figure 5.11: Rating of County Council's Efforts



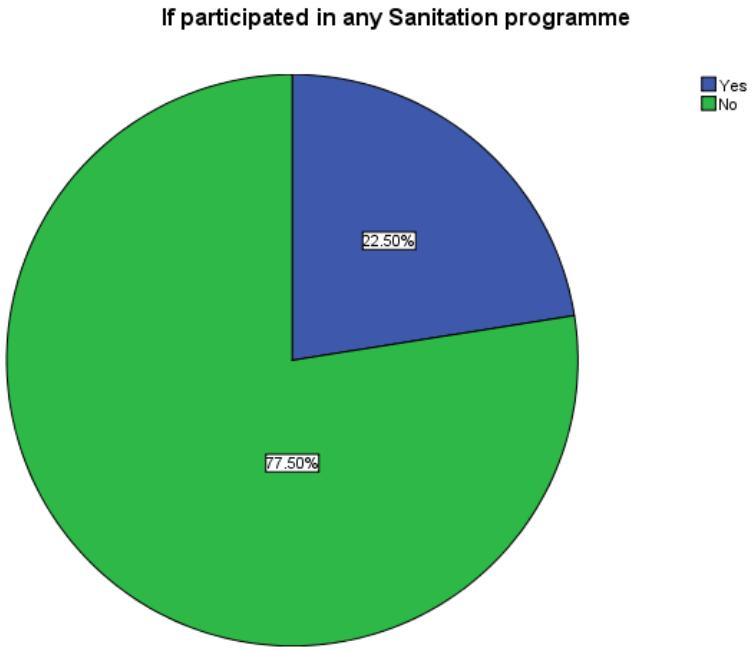
(Source: Field Survey, 2013)

Residents had no kind words to describe the mean efforts channelled by the council towards improving their sanitation levels. And therefore, in describing the efforts of the council toward promoting this constitutional entitlement, they termed their efforts to be poor by an overwhelming 75% while only 25% tried to appreciate the little that was done by rating the council's effort. This is as shown above in figure 5.11.

The reason for their opinions were influenced by the reluctance of the council to issue title deeds to facilitate better housing and better services and also due to the negligence expressed by the county council in the collection of the solid waste in the informal settlements.

5.4.3 Participation in Sanitation Programmes

Figure 5.12: Participation of Residents in Sanitation Programmes



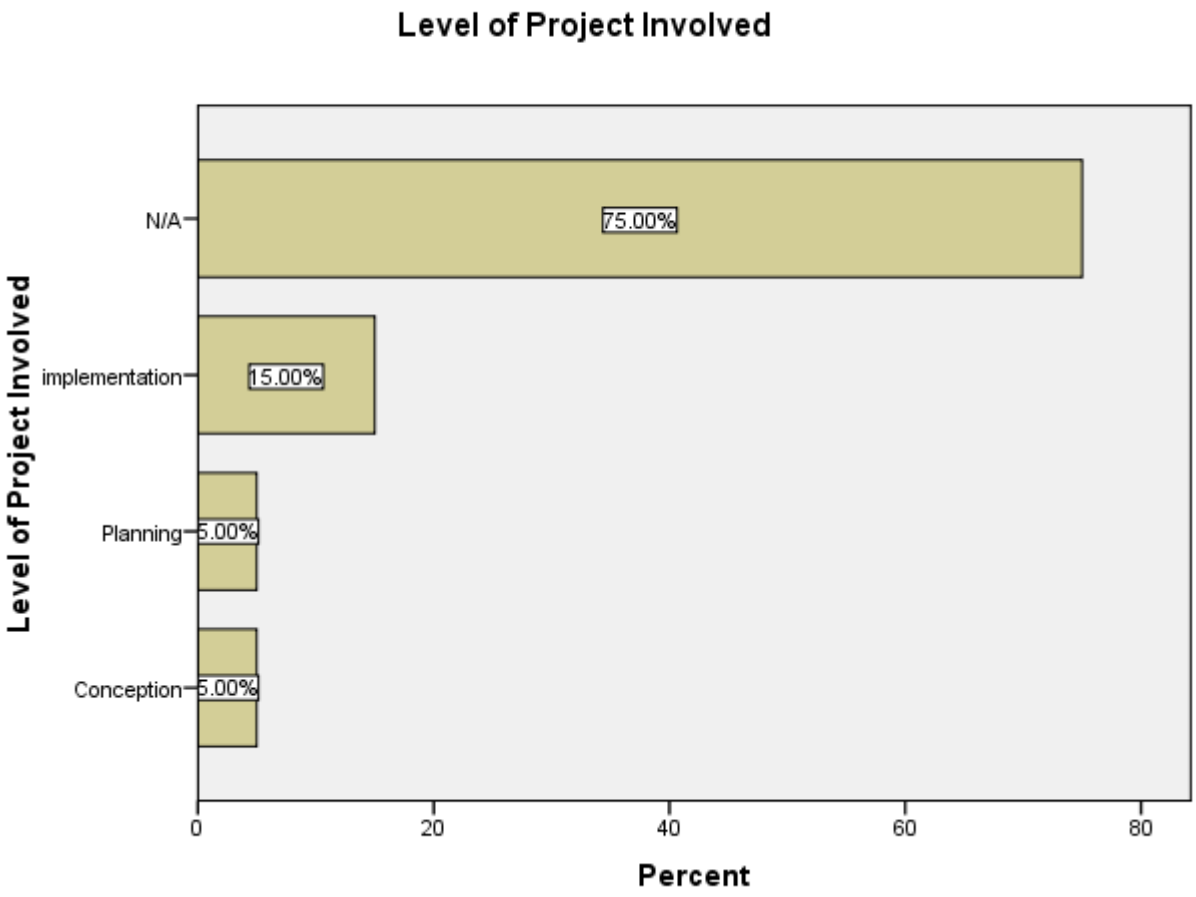
(Source: Field Survey, 2013)

Findings from the field indicated that only 22.5% were certain that they had participated in sanitation projects while a whole 77.5% boldly refused that they had ever been engaged in any sanitation programme as shown in figure 5.12 above.

Participation in sanitation programme is low simply because the residents are not offered the chance to get involved in the programme in any stage of planning, implementation or monitoring and Evaluation. This has made people less concerned hence inhibiting the success level of many projects which ends up in less impact than planned.

5.4.4 Project Level Involvement

Figure 5.13: Stages of Involvement in Sanitation Projects



(Source: Field Survey, 2013)

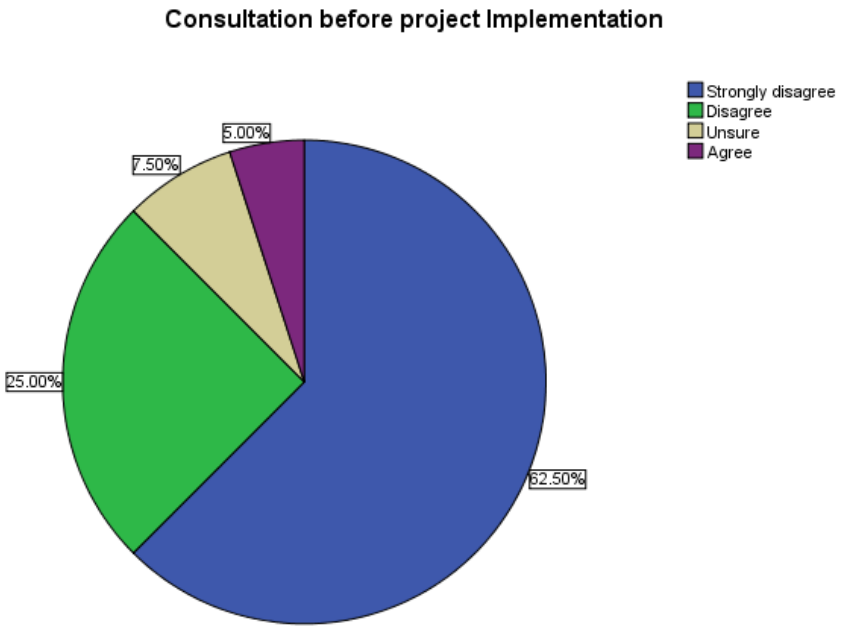
Community participation is usually imperative in the success of a project. In Kibera, the level of participation is poor in general. As displayed in the figure 5.13 above, only 5% recorded that they had been involved in the conception stage of the project while another 5% agreed to have been involved in the planning stage and 15% recorded that they had been involved in implementation stage. A large proportion of 77% found this question not applicable simply because they had never being involved in any level of projected development.

As indicated in the figure above, the residents of Kibera are partly or to some extent not involved in the different stages of the project and that's why they end up shunning away most of the projects which were intended to help them thus they end up not. Therefore, the project

initiators should adopt down-top planning strategy so as to factor in the needs of the citizens which will help them accept and own the projects which will be vital in improving the survival chances of the projects in place. Thus the people will reap maximum benefits of the implemented projects because they own them hence they offer the necessary support required.

5.4.5 Consultation Levels

Figure 5.14: Consultation of Residents at the Onset of a Project



(Source: Field Survey, 2013)

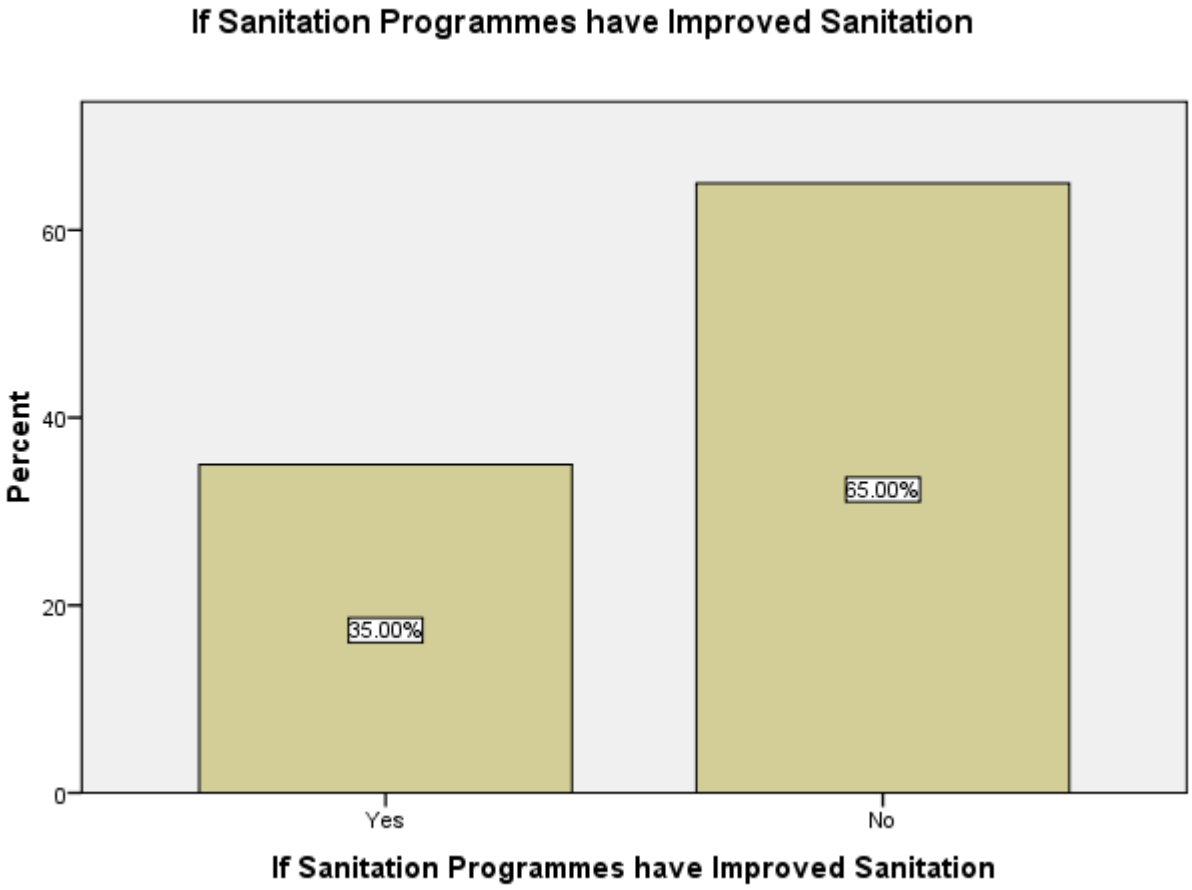
Consultation before implementation of a project is highly recommended when it comes to involving the relevant stakeholders. As shown in figure 5.14, this research confirmed that 55% strongly disagree that they have never been consulted before any project implementation.25% just disagreed while 7.5% were unsure and 5% agreed to have been involved consulted at point before implementation. The reason why sanitation levels are not improving is still strongly linked to lack of consultation with the community members and

this leads to a stepping aside mechanism by the residents which become an impediment to the promotion of a clean and safe environment. The study population showed that consultation is still as its knees when it comes to project initiation in Kibera.

5.4.6 Impact of Sanitation Programmes

Influence of programmes on sanitation

Figure 5.15: Sanitation Improvement by the implemented Programmes



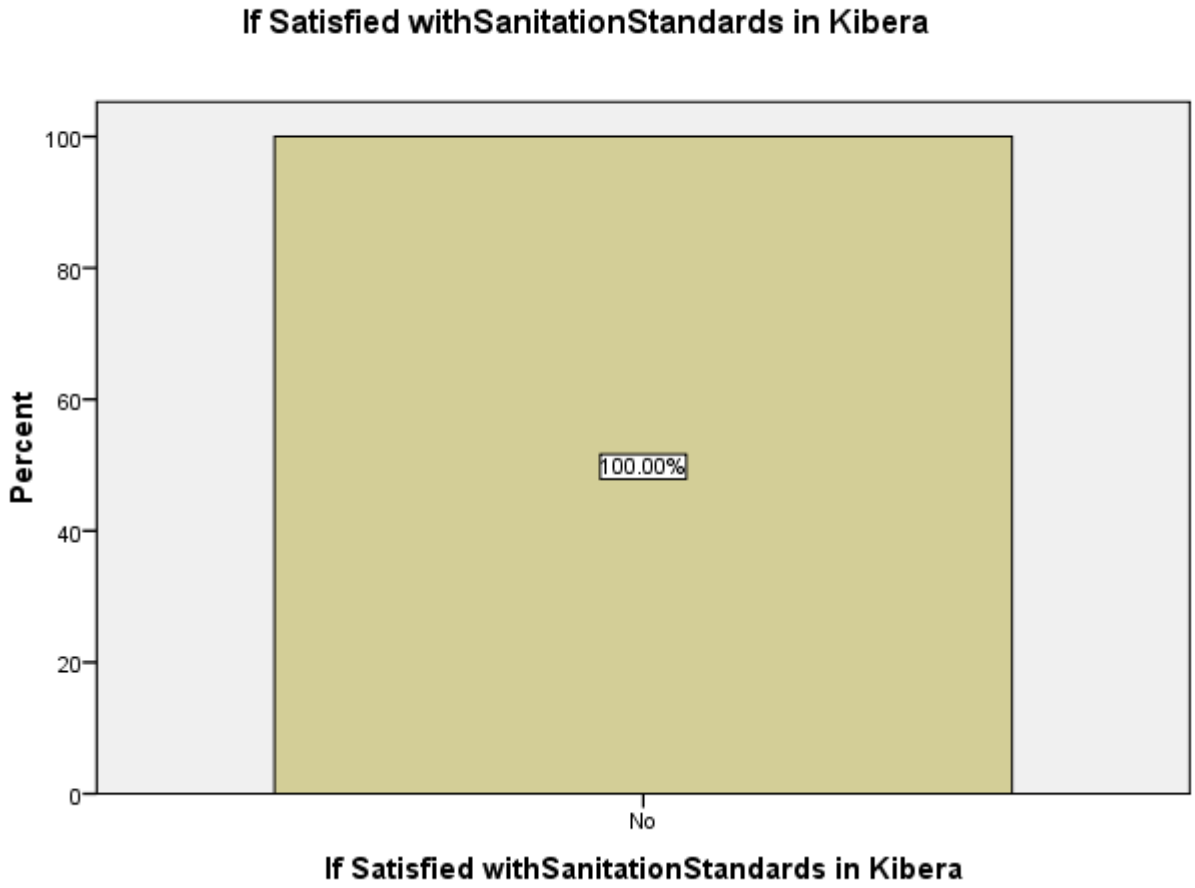
(Source: Field Survey, 2013)

Mainstream population tend to think that the sanitation programmes have not improved the level of sanitation in the area and this is as represented in figure 5.15 above where by 55% of the study population were of the opinion that the programmes have had no impact in changing

the sanitation state while 35% agreed that this sanitation programmes have significantly improved sanitation levels. The reason as to why majority of the people think that the sanitation programmes have hardly changed the existing situation is because the state of environment has never changed. It is described to be still dirty and wanting because the drainages are poor as they have been, solid waste is highly spread all over, others still apply the flying toilet system (although it is said to have reduced significantly), poor housing among others. So majority think that though there are many initiated projects in place, they still hold the opinion that there is little to be celebrated about.

Satisfaction Levels by Existing Sanitation Standards

Figure 2: Satisfaction by the Existing Standards of Sanitation



(Source: Field Survey, 2013)

A 100% of the population declared to be unsatisfied with the current levels of sanitation. This shows that there is still a lot to be desired regarding the sanitation of Kibera area. Every of the interviewed resident in the four villages out rightly displayed their discontent in the existing standards of sanitation. They said that things stagnated a very long time ago and thus sanitation issues have become a norm that's why no efforts are being made to increase the sanitation levels of the informal settlements.

CHAPTER SIX: RECOMMENDATIONS AND CONCLUSIONS

6.1 Summary of Findings

As per objective one from the data collected, it is clearly evident that inadequate planning is pointed out to be the greatest cause of the increasing levels of poor state of sanitation. Also, mismanagement by the landlords is of significant impact and contributes in magnifying the already existing problem of sanitation. Thus the study findings showed that the issue of inadequate planning is the major cause for the problem of sanitation.

In reference to the second objective, latrines' are the major type of sanitation facility which most people are accustomed to. This shows that the problem of sanitation is far from being explored appropriately. Flooding during rains amplifies the existing problem by resulting to overflow of the much relied latrines thus deteriorating the environmental outlook of the informal settlements. Majority of the residents in the four villages visited agree that there is shortage of sanitation facilities and also believe that the facilities have not attained the desired hygiene standards. Water proved to be a scarce and at the same time an expensive commodity thus an extension channel to the high level of poor sanitation.

The poor sanitation levels are negatively impacting on the health standards of Kibera residents. With analysis conducted in three health facilities in my area of study, the major outcome was that the most trending diseases emanating from the state of sanitation in Kibera include; diarrhoea, typhoid, malaria, skin infection s and other various infection are always on the rise thus these vulnerability is greatly escalated by the existing sanitation levels.

The third objective showed that the relevant stakeholders who include the government, CBO's and NGO's were all trying to play a significant role to elevate the sanitation levels but their efforts were not without challenges which were always emerging thus inhibiting their

impact levels. One of the encouraging things with these institutions is that they have in place counteractive measures to submerge the challenges but time is crucial for the impact of their actions. Findings showed that the most of the existing institutions in Kibera concurred with that the fact that inadequate planning was the major cause of the sanitation woes in this informal settlement. Community indulgence was found to be very low and therefore for the success of these projects, the ideas as well as planning with the community should form a primary foundation of the project initiators. Therefore, lack of being involved has led to the high dissatisfaction levels and negative attitudes from the community who ought to be served by these projects. Again the findings showed 100% of the community not being in mutual agreement with the existing sanitation standards which they termed to be poor and that's why the county government efforts were rated to be very poor thus leaving a lot to be desired from the dispensation of their mandate. And finally, as per the research findings, past initiatives have had little impact to the lives of the slum dweller hence leaving a lot of room for improvement.

6.2 Conclusion

For proper levels of sanitation to be promoted in Kibera, then a something must be done to address this thorny issue. We appreciate that right a reasonable standard of sanitation is a right of every citizen of Kenya and thus all relevant stakeholders with diverse interests in Kibera need to come together and see how this 'right' can be transformed from a mere desire in paper to become a reality. Since promotion of sanitation is a collective effort then community involvement should be instituted at every level of project development. Better governance from the local leaders and project developers and all stakeholders will help yield sustainable results. Perhaps, for the service delivery of amenities and infrastructure to materialise, it is high time for the government to do a formal planning for this settlement and issue title deeds that will ensure permanent houses can be availed to this noble Kenyans. Therefore since

project-based sanitation promotion has not yet given the community the ripe fruits that it first promised, let's turn to service delivery approach and turn around this nightmare of sanitation that has held back this fundamental right from these precious Kenyans.

6.3 Recommendations

Short-term

- The private sector and NGO's need to empower the local residents through organisation of workshops, seminars as well as trainings which will help teach this population on the importance of achieving sustainability when it comes to promoting environmental cleanliness.
- The council need to establish a better solid waste management systems by establishing even if its large containers that will be used as disposal points to promote a clean environment.
- The government should introduce community health workers to be visiting the homes in the informal settlement to ensure that the children health is upheld even in this dilapidated environment.
- Environmental education needs to be extended to the community so that residents can be involved in reducing household waste by re-using the recyclables and disposing the other waste appropriately without disposing it on the drainages and on the river at night. Even the ones using flying toilets will benefit from this education.
- The existing drainages need to be enclosed so as to avoid these exposed breeding sites that are increasing the potential of vulnerability to small children as well as various contamination that may result due to this exposure.
- The county government should institute a frequent say monthly environmental clean-ups project campaigns to help upgrade the environmental outlook in the informal settlement.

- Community participation should be made a priority in any development or project being established in Kibera so as reduce level of resistance and thus increase the chances of acceptability and success of the undertaking.
- More CBO's need to be formed in order to supplement the works of NGO's and private sector in the area .e.g. to help in sensitization and educating the community on hygiene promotions and WASH activities

Medium-term

- The government need to address the issue of title deeds and thereafter provide incentives to the landlords as they encourage them to build better houses which will give the government an opportunity to lay down the required service infrastructure. Title deeds will effectively be done once mapping for the informal settlement is appropriately done and thereafter subdivision of plots to be effected.
- The county government together with the NGO's should collaborate in organising pro-environment campaigns that will encourage responsible water usages since it has been established to be a scarce resource. These campaigns should focus on re-use; reduce consumption and recycling to avoid unnecessary shortages.
- Better Governance should be adopted by all local leaders and representatives of the area so that they have one mind towards the destiny of solving the sanitation problem once and for all without politicizing the process so as to achieve as sustainable development.

Long-term

- Since inadequate planning is coming out as a strong factor leading to poor sanitation levels, the national government should adopt the service delivery approach rather than concentrate on the over-relied project based approach which is not yielding sustainable solutions. Therefore planning for infrastructure and utilities need to be

focussed. This will be achievable once a master plan for the large informal settlement is developed.

- Government should construct a hospital in Kibera to help promote health education to the residents and treat the unending health-related diseases brought about by the poor sanitation levels e.g. malaria, diarrhoea, typhoid, eye and skin infections, cholera among others.

An Integrated Action Plan to Solve Sanitation Problem

Issue	Proposed Interventions	Actors	Time Frame
Inadequate Planning	Formalize the settlement through; • Submission &Issuance of title deeds • Doing a plan for the informal settlements	County government, Ministry of Lands	3 years
Poor Governance	Promote institutional capacity through; • Proper legislations • Accountability sessions	County Government, NGOs, Local administration, community	1 year
Poor infrastructure	Improve service delivery systems through; • Road construction • Sewerage connections • Water supply connections • Free Sanitation blocks to be constructed • Permanent housing to promoted through incentives	National government, international Financial institutions e.g. World Bank	5 Years
Poor Health standards	Promoting better health standards through; • Building a hospital within Kibera • Government employing community health workers.	County Government, Ministry of Health, Private Sector	3 years
Low environmental Awareness	Sensitization through; Trainings, campaigns workshops, conferences etc.	NGOs, CBOs, Private Sector	Continuous

6.4 Areas of Further Study

The following can be explored for further study;

- ✓ Public-private partnerships can be the road towards improving service delivery in the informal settlements. This is because it has a high financial implication and thus would be straining to the government's budget.
- ✓ There is need for promoting better governance among various stakeholders in informal settlement for effective and sustainable sanitation solutions.

REFERENCES

Akatch, S. O., & Kasuku, S. O. (2002). Informal Settlements and the Role of Infrastructure: The case of Kibera, Kenya. *Discovery and Innovation*, *14*(1), 32–37. doi:10.4314/dai.v14i1.15421

Allen, Adriana, & Hofmann, P. (2008). Moving down the ladder: Governance and sanitation that works for the urban poor. In *Essay for the IRC Symposium on Urban Sanitation*. IRC International Water and Sanitation Centre. Delft, The Netherlands.

Birongo, J. M., & Le, N. Q. (2005). An Analysis of Water Governance in Kibera, Kenya. Retrieved from http://rudar.ruc.dk:8080/handle/1800/863

Eales, & Kathy. (2008). Partnerships for sanitation for the urban poor: Is it time to shift paradigm? In *Essay for Symposium on Urban Sanitation.* IRC International Water and Sanitation Centre. Delft, The Netherlands.

Ghosh, G., Karanja, B., & WSSCC. (2003). Water, Sanitation and Hygiene for All, The WASH Campaign in Kenya. NETWAS. Retrieved from http://www.netwas.org/newsletter/articles/2003/309/9

Hakijamii Trust, & COHRE. (2008). Summary Description of Water Sector Institutionsin Nairobi, Kenya and their Roles.

Henry, R. K., Yongsheng, Z., & Jun, D. (2006). Municipal solid waste management challenges in developing countries–Kenyan case study. *Waste Management*, *26*(1), 92–100.

K'akumu, O. A., & Olima, W. H. A. (2007). The dynamics and implications of residential segregation in Nairobi. *Habitat International*, *31*(1), 87–99.

Lubaale, G. ., & Musyoki, S. . (2011). Pro Poor Urban Sanitation and Hygiene: Turning Challenges to Opportunities. Presented at the East Africa Practitioners Workshop, LAICO Umubano Hotel, Kigali, Rwanda.

Lubaale, G. N. . (2011). *The Challenges of Urban Planning for Poverty Reduction: Nairobi's LASDAP* (Draft PhD Thesis). University of Witwatersrand, Johannesburg.

Marie Huchzermeyer. (2006). "Slum Upgrading Initiatives in Kenya within the Basic Services and Wider Housing Market: a Housing Rights Concern,." COHRE Africa Program.

Mulumba, J. A. ., Juma, O., & Kakosova, B. (2004). Health status of people of slums in Nairobi,Kenya.

Munguti, K.-K., & McGranahan, G. (2002). *Public private partnerships and the poor: case study-Kibera. Small enterprises and water provision in Kibera, Nairobi*. \copyright WEDC, Loughborough University. Retrieved from https://dspace.lboro.ac.uk/dspace-jspui/handle/2134/9628

Oxfam GB. (2009). Urban Poverty and Vulnerability In Kenya. Oxfam GB Kenya Programme.

Seidl, I, & Tisdell, C. A. (1999). Carrying capacity reconsidered: from Malthus' population theory to cultural carrying capacity. Ecological Economics,.

Sijbesma, C., Diaz, C., Fonseca, C., & Pezon, C. (2008). Financing Sanitation in Poor Urban Areas. Essay for IRC 40 Symposium.

Tannerfeldt, G., & Ljung, P. (2006). *More urban less poor: an introduction to urban development and management*. Routledge. Retrieved from http://books.google.com/books?hl=en&lr=&id=gEHv3BtjU24C&oi=fnd&pg=PA2&dq=inadequate+planning+of+kibera+slums&ots=E8AEhaJrOC&sig=Z9nZCcj9rItdAZ6UitWB39oBDTk

TRUST, J. B. (2009). THE PEEPOO BAG, SILANGA VILLAGE, KIBERA, NAIROBI-KENYA. Retrieved from http://www.susana.org/docs_ccbk/susana_download/2-1028-en-peepoo-bags-assessment-kibera-2009.pdf

UNCHS,Habitat. (2001). Cities in a Globalizing World: Global Report On Human Settlements. Gutenberg Press. Retrieved from http://www.unchs.org

UN-Habitat. (2008). The State of African Cities. UN-Habitat,Nairobi. Retrieved from http://www.unhabitat.org/pmss/listItemDetails.aspx?publicationID=2574

UNHSP,Habitat. (2003). The Challenge of Slums Global Report on Human Settlements. Earthscan Publications Ltd,London and Sterling, VA. Retrieved from www.unhabitat.org

Verhagen, J., & Ryan, P. (2008). Sanitation Services for the Urban Poor: Symposium Background Paper. Presented at the IRC Symposium:Sanitation for the Urban Poor Partnerships and Governance., The Netherlands: Delft, The Netherlands.

Water Aid (2006). Bridging the Gap: Citizens' Action for Accountability in Water and Sanitation. Water Aid.

Water Sanitation Programme. (2008). Improving Water utility Services through Delegated Management. World Bank Water and Sanitation Programme.

Wegelin-Schuringa, M. (1997). Sanitation and communication situation analysis for peri-urban and rural areas in Zambia. IRC Delft, The Netherlands.

WHO, & UNICEF. (2006). Meeting the MDG drinking water and sanitation target : The Urban and Rural Challenge of the Decade. World Health Organization,Geneva.

WHO/UNICEF. (2010, update). Progress on Sanitation and Drinking-Water. WHO Press.

APENDICES

Appendix 1 Household Questionnaire

KENYATTA UNIVERISTY

Department of Environmental Planning and Management

HOUSEHOLD QUESTIONNAIRE

Introduction

I am a Kenyatta University undergraduate student pursuing Environmental Planning and Management and am carrying a research on Safeguarding Sanitation in High Population density, Urban Settlement my case study being in Kibera informal settlements. I am kindly requesting for a few minutes of your time to answer some questions. The information provided will solely be used for academic purposes.

A. Background Information

Please tick the appropriate box

1. Sex: 1.Male ☐ 2. Female ☐
2. Age:
    1) Below 20 years ☐
    2) 20-25 years ☐
    3) 25-29 years ☐
    4) 30&above years ☐
3. Marital status: 1. married ☐ 2. single ☐ 3.widowed ☐

4. Educational level

1. Basic ☐ 2.secondary ☐ 3. Tertiary ☐ 4. no formal education ☐

5. How many years have you lived in Kibera?

   1) 0-10years ☐
   2) 11-20 years ☐
   3) 20-30years ☐
   4) 30-40 years ☐
   5) Above 40years ☐

6. Please tick the correct income range

1. <50000	
2. 5001-10000	
3. 10001-15000	
4. 15001-20000	
5. >20000	

B. <u>Other information</u>

a) Which of the following do you use for ;

   1) Toilets ☐
   2) Biocentres ☐
   3) Ecological sanitation (EcoSan) ☐
   4) Any other (specify)…….

b) What factors do you think are contributing to the poor state of sanitation?

1.	Management(Landlords)	
2.	Inadequate Planning	
3.	Inadequate water provision	
4.	Migration of people	
5.	Poverty	

Any other (specify) ……

c) Where do you dispose your household solidwaste?.....

d) How long does it take you to access the nearest sanitation facility?.....

e) Do the facilities have enough water?

1. Yes ☐ 2. No ☐

f) Are they usually clean for use?

1. Yes ☐ 2. No ☐

g) What is the cost of accessing sanitation facilities?

1) Cheap ☐
2) Affordable ☐
3) Expensive ☐

h) Do you think the county council is doing enough to improve sanitation in Kibera?

1. Yes ☐ 2. No ☐

i) Rate the efforts of the county council in promoting sanitation services in Kibera

1. Excellent ☐ 2. Good ☐ 3. Fair ☐ 4. Poor ☐

j) Which programmes have been initiated in the community to upgrade the level of sanitation?.....

.....

k) Have you ever participated in any sanitation programme?

1. Yes ☐ 2. No ☐

l) Please indicate at which stage were you involved in the sanitation project

Level/Stage of the Project	Tick
1) Conception	
2) Planning	
3) Implementation	
4) Monitoring &Evaluation	

m) Are Kibera residents always consulted every time a sanitation project is implemented?

1.	Strongly Disagree	
2.	Disagree	
3.	Unsure	
4.	Agree	
5.	Strongly Agree	

n) Do you think the sanitation programmes have improved the situation?

1. Yes ☐ 2. No ☐

o) What are some of the problems that are you have faced as a result of poor sanitation?

……

……

……..

p) Are you satisfied by the standards of sanitation in Kibera area?

1. Yes ☐ 2. No ☐

q) What recommendations can you suggest to improve sanitation?.....

.....

.....

Appendix 2: Interview Questionnaire

KENYATTA UNIVERISTY

Department of Environmental Planning and Management

INTERVIEW SCHEDULE

I am student Kenyatta University undergraduate student pursuing Environmental Planning and Management and am carrying a research on Safeguarding Sanitation in High Population density, Urban Settlement my case study being in Kibera informal settlements.

I am kindly requesting for a few minutes of your time to answer some questions. The information provided will solely be used for academic purposes.

Name of the Institution…….

Position of the interviewee……...

1. What do you think about the state of sanitation in Kibera slums?**.....**

   .....

2. What do you think are the major causes of poor sanitation state in Kibera?

   ……

   ……

   ……

   ……..

3. What is general awareness in the community regarding importance of better sanitation? .....

4. In your opinion, what is the state of sanitation facilities in Kibera slums?

    a) Adequate ☐

    b) Reliable ☐

    c) Accessible ☐

    d) Well maintained ☐

5. What has been the contribution of the organisation in promoting sanitation in Kibera slums?

    .....

    .....

    .....

6. How has the state of sanitation impacted on the health of Kibera residents?.....

    .....

7. What are the common ailments that you treat relating to poor sanitation in Kibera?……

    ……

    ……

8. What are some of the challenges you have encountered in your strife towards promoting sanitation in Kibera slums?

……..

……..

……

9. What measures have you put in place to remedy the challenges stated above?

……

……

……

10. Have you partnered with any organisation with the view of promoting sanitation?

Yes ☐ No ☐

If yes;

i. Which one……

ii. What was your success rate?

Excellent ☐ Good ☐ Fair ☐ Poor ☐

iii. Are there any future plans on the same?.....

11. What do you think should be done to improve sanitation levels in Kibera slums?……

……

……

……