

**INFLUENCE OF PREFABRICATED HOUSES ON THE CITY HOUSING
PROBLEM: A CASE OF KIBERA SLUMS IN NAIROBI, KENYA.**

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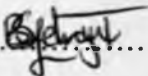
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A research project report submitted in partial fulfillment for the award of a Master of Arts degree in Project Planning and Management, University of Nairobi.

2012

DECLARATION

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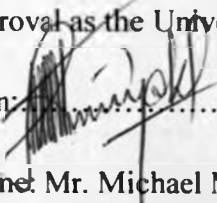
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DEDICATION

I would like to dedicate my work to my Mum: Mrs. Veronica Oranga who has stood by me all this time. I am forever grateful.

ACKNOWLEDGEMENT

I thank God, for giving me good health throughout the whole period of my research project. I also acknowledge persons who were instrumental in completion of this research project. I am indebted and thankful to Mr. Michael Musyoka my supervisor for his profound resourcefulness, his steadfastness in ensuring I kept focus and his belief in my abilities. I am also grateful to my colleagues and friends: especially Godela for her constructive criticism which has helped me in coming up with this research project, I am also grateful to my family for their constant encouragement. May God bless you all.

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ABBREVIATIONS AND ACRONYMS

MPPPU:	Ministry of Physical Planning and Public Utilities
DARE:-	Development Association for Renewable Energies
UN:-	United Nations
Oxfam GB:-	Oxfam Great Britain
BMF:	Blue Moon Fund
IRIN:	Intergrated Regional Information Network
MRM:	Mabati Rolling Mills Ltd.

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ABSTRACT

The question of housing is the most fundamental of social problems relating to the environment. All over the world people are trying to find ways of reducing the city housing problems so as to provide its people with decent housing for living and upgrade their living conditions. This study sought to investigate the influences of prefabricated houses on the city housing problem, a case of Kibera slum in Nairobi, Kenya. The research objectives outlined were to: investigate the influence of cost of prefabricated houses on city housing problem; establish the influence of sanitation of prefabricated houses on the city housing problems and the impacts of security of prefabricated houses on the city housing problems. The literature review has an overview of Kibera slums as well as a detailed review of the variables under study. The literature review also highlights how prefabricated houses have been used to address the city housing problems around the world with the use of affordable locally available materials. Conceptual framework has also been discussed and illustrated indicating the variables under study which include sanitation, cost and security of prefabricated houses against the city housing problems. The conceptual framework has also illustrated the moderating variables (enforcement of building codes, Iso standards and government policies) and intervening variables (socio economic activities and perception of the residents) and their effect on the main variables under study. The study adopted a mixed mode research approach with a descriptive research design. The target population under study was the households of Kibera in the following villages; Makina, Mashimoni, Laini Saba, Silanga, Kambi Muru, Katwekera, Kianda, Lindi, Kisumu Ndogo, Kichinjio, Raila and Soweto. Data was collected from a sample of 50 households out of the target population of 1,214 households by use of questionnaires for the residents. Focus group discussions based on the variables under study was held with a sample of four key people from each village. The data collection instruments were pretested using the key informants from the villages in Kibera before full application was done. Triangulation was done to ensure validity by asking the same question in different ways to ensure validity. A pilot test was also done with the key informants before conducting the study to ensure reliability. Operationalization of variables was presented to show the overview of the study. The data collected was processed through tabulation and tallying, thereafter it was coded and analyzed by use of measures of central tendencies, dispersion, percentages as well as content analysis. The data was presented using tables and frequency distributions. The summary of the findings have also been outlined and discussed based on the variables under study. Conclusions have been made based on the information obtained. Finally study recommendations have also been made and suggestions for further research recommended as such will add great value to this research project.

CHAPTER ONE

INTRODUCTION

1.1 Background of study

The housing question is the most fundamental of social problems relating to environment, the lack of domestic life will unmake a nation, this is because the home is the character unit of society and where there is little or no proper housing we must expect social degeneration and decay (Crozier, 1993).

The world is experiencing a global housing crisis; about 1.6 billion people live in substandard housing and 100 million are homeless (Kothari, 2005). Each week, more than one million people are born in, or move to cities in the developing world. (D. Kissick, et al). One billion people (32 percent of the global urban population) live in urban slums, hence if no serious action is taken, the number of slum dwellers worldwide would increase over the next 30 years to nearly 2 billion (UN Habitat, 2003).

According to the magazine Africa Renewal, the world is still scrambling to meet its ambitious targets, (The Millennium Development Goals, poverty eradication being one of them), and about 2.5 billion have no access to adequate sanitation, (Mutume, 2004). African Renewal continues to mention that on most indicators such as; sanitation and human settlements, Africa remains slowest in the world's poorest region and it further emphasizes on the UN habitat report mentioned above that almost one billion people from developing countries live in slums and the figure is expected to double over the next 30 years.

We however notice the issue of affordable housing has been a challenge because people who live in poverty cannot afford decent houses to live in hence they search for places where they can afford accommodation. According to Woods (2008), poverty is the cause of slums, he further states that most people who do not have money and have little prospect of getting any, don't have adequate food, drinking water, medical care, education or any way to escape their poverty

by moving away or up. Their living in poverty impacts on all aspects of life and does not offer many opportunities to escape this vicious circle.

However the Indian designer Altamash Jiwani in an attempt to provide decent affordable housing for the slum dwellers, has proposed a modular and prefabricated housing system designed especially for impoverished areas. The designer emphasizes that, modular and inexpensive housing materials are one appealing way to help provide more adequate homes than the often decrepit existing structures. (Bridgette, 2011). This project is still in the concept design phase.

In the United States, 95 million people have housing problems: these include; overcrowding, poor quality shelter and homelessness. (National Low Income Housing Coalition, 2004). In Romania, Europe however the situation is not any better. According to the Guardian newspaper by Emil (11th Nov 2011), the former president of Romania indicated that they are facing serious overcrowding because of the lack of affordable housing for young people. He goes further to say that Western Europe is also not immune from housing issues, and we see the next generation struggling in many places to access affordable accommodation.

In an attempt to provide affordable housing, the International Network for Bamboo and Rattan (INBAR) together with the Blue Moon Fund (BMF); an American organization conceived in 2002, has come up with a prefabricated bamboo module project to help give decent and affordable housing to the poor (see, www.inbar.int). INBAR has been promoting bamboo for the construction of affordable housing to contribute both to poverty alleviation and environmental conservation. It has firsthand experiences of building schools with bamboo in Ghana and China, and the construction of affordable housing in Ecuador, Nepal and India. One of its recent projects was started in 2006 in China and completed in 2008.

Africa is not spared either. We find that, according to the department of Physical Planning and Urban Design, University of Khartoum (2009), in their report on incremental housing, about 80% of households in Greater Khartoum are classified as being of low-income, these people cannot afford decent housing which results in over-crowding, doubling-up, as well as in massive growth of informal housing settlements devoid of basic services on the fringes of town. (UN Habitat and Khartoum State MPPPU, 2008:94). Nigeria is also experiencing rapid urban growth

which has led to slums, according to the Daily times (2011), the relevant authorities are being urged to take charge of the slum situation through urban renewal and slum upgrading programmes. Out of this need for housing and an oversupply of plastic bottles, the Development Association for Renewable Energies (DARE) in Nigeria came up with an ingenious solution of a prefabricated house made of bottles, packed with sand, placed on their side and stacked up, and bound together with mud. (Jonny, Nov 9th 2011).

In Kenya however, housing has been a problem for quite some time. Shelter is one of the basic commodities for any human being and included in the international human rights. According to the 2009 census, the population of Kenya stands at 38,610,097. (Central bureau of statistics 2009). It is estimated that 56% of Kenya's Population is currently living under the poverty line hence cannot afford decent housing.

With the high poverty level in Kenya, we have witnessed growth of slums which has led to overcrowding, poor living conditions and high crime rates hence lack of safety for the majority of the population. This problem needs to be urgently addressed by the Government and the urban planners so as to offer affordable decent living to all the people of the country. We have also witnessed mushrooming of many apartments come up, especially in Hurlingham and Lavington. However, we still find these houses empty as they are not affordable to the general population. And yet the people in Kenya are struggling to afford decent shelter, hence the need for affordable houses to cater for low income people and address the city housing problem in Kenya. Prefabricated structures will offer one solution to this challenge and need.

Clean, affordable, and stable housing provides more than just a roof over someone's head. It also provides stability for families and children; sense of dignity and pride; health, physical safety, and security; increase of educational and job prospects and above all safe homes and neighborhoods that help to build social stability and security.

1.2 Problem statement

Wafula Nabutola (2004) in his research on affordable housing states that, shelter is a physiological human need that must be met even for those who cannot afford it economically. However, we have observed that lack of appropriate housing has led to lack of proper sanitation, worrying levels of insecurity and increased crime rates, amongst other challenges.

The 2009 census report released by the Ministry of Planning and National Development, Vision 2030, reports that currently Kenya's population is increasing yearly by one million people and this high rate of population growth has adverse effects on spending in infrastructure, health, education, environment, water and other social and economic sectors (Census report, 2010). The shortage of housing has been more critical in urban than rural areas (Wafula, 2004). An annual report by Oxfam GB (2009) on urban poverty and vulnerability in Kenya; indicates that, in Nairobi, 60% of the population lives in slums and levels of inequality are dangerously high, with negative implications for both human security and economic development. Oxfam GB further states that given the pace of urbanization, urban poverty will represent almost half of the total population in Kenya by 2020.

Kibera slums is one of the biggest slums in Kenya, however there has also been a lot of controversy about the population of Kibera. The 2009 Kenya's Population and Housing Census reported Kibera's population as 170,070 and yet the Kibera slum was previously thought to be one of the biggest informal urban settlements in the world. Davis (2006) a well known expert on urban slums in his book "The Planet of Slums", estimates a population of about 800,000 people; International Housing Coalition (IHC,2007) states about more than half a million people; UN-Habitat in the report, Africa on the Move and the Water and Sanitation Programme website, had released several estimations ranging between 350,000 and one million people while, IRIN in the article, "Kibera the forgotten City" (2006), estimated a population density of 2000 residents per hectare. As observed above it is very difficult to estimate the actual population of Kibera residents but then all we observe are the everyday growth of the slums despite efforts by the government and Nongovernmental organization to upgrade their current situation, most people

live below poverty line hence decent affordable houses with proper sanitation and good security remains a mirage.

On the other hand, we find that there are many housing agents with various types of residential accommodation trying to let out. Some of the agents include, Knight Frank, Dunhill consulting and Tysons Limited, who enjoy a profitable and flourishing business. There are many decent houses with proper sanitation and security in places like Kitisuru, Loresho, Karen and Spring Valley that actually lie vacant for months on end. The question then remains; If there are so many decent houses available, how come many Kenyans still end up in slums?

There is a gap on how these houses are viewed from the two angles mentioned above in that, the lack of proper housing has been mostly pegged to the fact that good houses are very expensive hence all the people who cannot afford it are entitled only to non good living conditions, herewith known as slums. Then, the researcher's interest was therefore to bridge this gap between how the wealthy are able to live in decent houses and yet the poor have no access to decent houses by investigating the influence of prefabricated houses on the city housing problem: A case of Kibera slums in Nairobi.

1.3. General Objective

The general objective of the study was to establish the influence of prefabricated houses on City Housing problem. The area under study was Kibera slums in Nairobi.

1.4 Specific Objectives

1. To investigate how the cost of the prefabricated houses influences the city housing problem in Kibera slums.
2. To establish how sanitation of prefabricated houses influences the city housing problem in Kibera slums.
3. To investigate how security of prefabricated houses impacts on the city housing problem in Kibera slums

1.5 Research Questions

1. How does the cost of prefabricated houses influence the city housing problem in Kibera slums?
2. To what extent does sanitation of prefabricated houses influence the city housing problem in Kibera slums?
3. To what extent does security of prefabricated houses impact the city housing problem in Kibera slums?

1.6 Significance of the Study

This study will help the following entities:

The people of Kibera; This study will empower the people of Kibera in that it will help them realize that they too can live comfortable lives despite the fact that they earn less and if the project is implemented it will help uplift their living standards.

The Ministry of housing and Planning; This study will enlighten the ministry because their mandate is to give every Kenyan a comfortable living environment.

The government; The findings of this study will assist the government on at the policy level while making policies on low cost housing.

1.7 Delimitation of the Study

The study was carried out in Kibera slums in Nairobi to identify the influences of prefabricated houses on the city housing problem. The villages under study were : Makina, Mashimoni, Laini Saba, Silanga, Kambi Muru, Katwekera, Kianda, Lindi, Kisumu Ndogo, Kichinjio, Raila and Soweto. The study focused on three key areas; the cost, sanitation and security of prefabricated houses against the city housing problem.

1.8 Limitation of the study

The researcher had access to all the villages in Kibera under study because the researcher was lucky to have key informants who had lived in the area since birth. The key informants also assisted the researcher to explain to the people that the research was for academics purposes only hence ensuring confidentiality to the people of Kibera and mitigating the issue of ethical challenges.

1.9 Assumptions of the study

The researcher assumed that the target population had an in-depth understanding of the factors contributing to their housing problems and that the respondents were honest and truthful to the questions administered to them. The researcher also assumed that the information gathered from the study represented other slums in Nairobi.

1.10 Definition of Significant Terms

For the purposes of this study, the following terms carried the following meanings.

Housing:

Building or shelters in which people live in to protect themselves from weather elements

Sanitation:

Any system that promotes proper disposal of human and animal wastes, proper use of toilet and avoiding open space defecation to improve and protect health and well being of the people.

Slum:

An area that combines to various extents the following characteristics; Inadequate access to safe water, Inadequate access to sanitation and other infrastructure, poor structural quality of housing, overcrowding and insecure residential status.

Prefabricated houses:

Type of houses which are manufactured in advance by use of local and cheap materials in standard sections that can easily be transported, combined, extended and assembled on site.

Poverty:

The inability to attain a minimal standard of living' measured in terms of basic consumption needs of income required for satisfying them, characterized by the failure of individuals, households or entire communities to command sufficient resources to satisfy their basic necessities and also people who survive in less than a dollar a day.

Security:

The degree of protection against danger, damage, loss, and crime.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

Housing is one of the most important needs of every human being. Without housing one would be exposed to adverse effects resulting from vagaries inherent in an environment like exposure to bad weather that would lead to ill health (Gichunge. N, 2001).

Shortage of housing is a big problem becoming an enduring feature in many countries. This problem has been exacerbated by high rates of population growth and internal migration to urban areas in search of better opportunities. The extent of such a problem varies with urban centers but the results are the same: high population densities, inadequate sanitation, unhealthy living conditions and insecurity of tenure (Seong-kyu, 1987). The consequence of the above results is the mushrooming of slums and shanty suburbs in cities.

2.2 Overview of Kibera Slums

Kibera, is one of the slum settlements in Nairobi which is located 7km southwest of Nairobi City, it is the largest and most densely populated informal settlement in sub-Saharan Africa. It covers an area of approximately 250 hectares (IRIN, 2006). IRIN continues to state that the sprawling, unregulated slum originated during World War I, when the land was a temporary residence to the Nubian (Sudanese) soldiers from the Kings African Rifles. Kibera is now made up of 12 interlocking villages, namely; Makina, Mashimoni. Laini Saba, Silanga, Kambi Muru, Gatwekera, Kianda, Lindi, Kisumu Ndogo, Kichinjio, Raila and Soweto, (Genesis, 2012). The name 'Kibera' comes from the Nubian word 'kibra', meaning forest or jungle.

Due the congestion in Kibera, there are many problems that are associated with the housing situation, these include: poor sanitation, high crime rate, poorly ventilated houses, poor shelter and overcrowding – all contributing to high risks of infection of diseases. For the purposes of this study focus will be given to three key aspects namely; affordability, sanitation and crime.

2.3 Review according to Study variables

There have been efforts to upgrade Kibera by many international organizations as well as the government. The recent being the Kibera Slum Upgrading Program (KSUP), but then this has been met with challenges; according to the standard newspaper by Augustine Oduor, “The Kibera Slum Upgrading Programme may remain a mirage as details emerge that beneficiaries of the scheme have rented their rooms and returned to live in the slum.” This is very disturbing bearing in mind that the slum dwellers prefer to live in the slums and rent out their better homes for money, or maybe the slum dwellers feel that the new houses does not entirely solve all their problems because they are used to certain lifestyle and socio economic activities which should be improved rather than them being relocated to new places.

2.3.1 Influence of cost of the prefabricated houses on the City Housing Problem

Poverty is the cause of slums, most people who do not have money and have little prospect of getting any, don't have any way to escape their poverty by moving away or up. Their living in poverty impacts on all aspects of life and does not offer many opportunities to escape this vicious circle (Woods, 2008).

There are more than 30,000 structures in Kibera slums which are mud walled and thatched with corrugated iron sheets (Amnesty International, 2009). A household in the slums comprises seven members on average and usually stands on a 12ft by 12ft structure costing almost US\$15 per month. The local authorities usually issue temporary occupation licenses to the owners. Around 10% of Kibera residents own the structures and sub-let them to the remaining 90% (UN-Habitat, 2003). The structures are owned by informal owners who are recognized by the tenants, but they have no legal ownership. The tenants pay a monthly micro-lease to the owners.

As noted by World Bank (2006) study, in contrast to many other cities of the world, an extraordinary 92% of the slum dwellers in Nairobi are rent-paying tenants rather than squatters who own their units. Unit owners are mostly absentee landlords who provide extremely poor housing units, which are mostly illegal and sub-standard in quality, often being constructed of semi-permanent materials such as polythene bags and splinter wood. They are also over-crowded

and lack on-site services such as toilets, water supply or electricity supply, yet charge high rents. The study concludes that: In sharp contrast to the widely-held notion that slums provide low-quality, low-cost shelter to a population that cannot afford better standards, Nairobi's slums provide low-quality but high-cost shelter. The average monthly rent is around Ksh. 790 and the median rent Ksh. 700, although the rental levels vary considerably according to location, reaching a maximum of Ksh. 3230 per month.

Prefabricated houses are famous for their low cost, below are some highlighted cases indicating how prefabricated houses have addressed the issue of cost on the City Housing Problem.

a) Modular prefabricated Housing System

An Indian designer, Altamash Jiwani, proposed a modular and prefabricated housing system designed especially for impoverished areas. With over one billion people living in slums around the world, modular and inexpensive housing materials are one appealing way to help provide more adequate homes than the often decrepit existing structures.

The concept is very simple and relies on prefabricated plastic panels that are assembled into houses by connecting them together with bolts. The panels are made out of recycled polyethylene and polypropylene and are lightweight, durable and inexpensive. Single story houses can be put together to build whatever size house is necessary for a family and found materials like straw and cardboard can be added for insulation (Bridgette,2011). Jiwani goes further to highlight that the advantages of the system which includes; recyclability of the materials at the end of their life and modularity, which adds the capability of adding more rooms. Another benefit of the system is that the home can be disassembled and transported if necessary. This project is still on pilot and design phase.

b) Prefabricated Bamboo Housing

We also find that prefabricated Bamboo housing has also been used in curbing the city housing problem in big cities such as China and USA. A project funded by Blue Moon Fund (BMF) and INBAR has recently been implementing a project entitled "Development and Promotion of Prefabricated Bamboo Module Housing to provide both Income and Housing to Poor People". The

project has contributed to the replacement of unsustainable use of timber by promoting the use of environmentally sustainable bamboo resources and its main objective has been to develop technology and promote local industries producing bamboo based pre-fabricated module houses, which benefits the environment, local building enterprises and families, particularly poor rural people, slum dwellers and homeless disaster victims who can't afford expensive houses. These kinds of modules has its own advantages such as low processing requirement, as there is no need of initial big investments, versatile designs and elegant appearance. One of their completed projects has been in China between 2006 to 2008, INBAR has also firsthand experience of building schools with Bamboo in Ghana and China and also construction of affordable housing in Ecuador, Nepal and India.

c) Prefabricated Bottled House

Out of a desperate need for housing and an oversupply of plastic bottles, the Development Association for Renewable Energies (DARE) in Nigeria also came up with an ingenious solution; a house made of bottles, packed with sand, placed on their side and stacked up, and bound together with mud. (Jonny, 2011).

The idea provides a cost-effective, environmentally-friendly alternative to conventional building bricks. Yahaya Ahmed of Nigeria's Development Association for Renewable Energies estimates that a bottle house will cost one third of what a similar house made of concrete and bricks would cost. Compacted sand inside a bottle is also nearly 20 times stronger than bricks according to Yahaya. Built to withstand bullets, fires and earthquakes, each one bedroom house uses around 7,800 plastic bottles and also includes a living room, bathroom, toilet and kitchen.

d) Eco Homes

Eco homes which is a limited company set up in partnership with Bamburi cement, has embarked on using modular building so as to ease the housing problems in Kenya. Eco homes uses techno-crete components in conjunction with modular building concepts which are ideally suited towards supplying quality affordable houses, offices, schools and classrooms as well as a

range of many other convenience buildings. According to their website, Eco homes states that their buildings offer a solution which is 40% cheaper than the conventional way of construction.

e) Mabati Rolling Mills Ltd (MRM)

MRM is the flagship company which is the leading manufacturer of flat and long steel products in Africa. MRM has entered the low-end housing market by offering prefabricated houses as it races to tap that segment of Kenya's real estate, which investors targeting quick returns have shunned. The manufacturer of roofing materials is seeking a piece of the property market from selling ready-made steel houses that will retail at Sh80,000 and Sh160,000 for two and four-room homes respectively for the structure and the roof. MRM goes further to state that the low income earners care more about the price than the complexity of the designs hence they have simple models that can be custom-made for clients depending on their tastes and preferences and the walls of the houses have an option of being completed using bricks, iron sheets, wood or mud depending on the preferences of the buyer.

f) Prefabricated IKEA products

There is also the idea of IKEA which has been used all over Europe to offer low cost in house solution to people. IKEA produces lots of well designed ready to assemble home furnishing products, (www.ikea.com). These products offer affordable housing solution to people and have since spread to other parts of the world. They are liked for their flexibility in terms of design and their affordable costs. This could offer future low cost solution to the interiors of the houses.

2.3.2 The Influence of sanitation of prefabricated houses on the City Housing Problem.

Kibera is heavily polluted by human refuse, garbage, soot, dust, and other wastes. The slum is contaminated with human and animal feces, due to the open sewage system and the frequent use of "flying toilets". (Hardy, Mitlin & Satterthwaite, 2003; Hodson & Marvin, 2009). The lack of sanitation combined with poor nutrition among residents accounts for many illnesses and diseases (Heynen, Kaika & Swyngedouw, 2006; Kumar, Shigeo & Harada, 2003).

According to IRIN report: Water and sanitation are fundamental concerns to the residents of Kibera. The insufficient amount of available water is of very poor quality. Kibera's 800,000 residents must share 600 toilets, meaning that on average one toilet serves 1,300 people.

Open channels are flooded with human waste and they have no access to urban sanitation services. Nairobi city council cleaning services do not cover the slums and as a result the residents dump solid waste in open drains or in small lanes within the slums. Liquid waste oozes from houses into the lanes, forming pools of dirty waste within the areas. Most of the Nairobi slums have a few pit latrines which serve a great population, while few slums have none; thus there is an eruption of “flying toilets.” A report on the urban environment sanitation project by UNDP-World bank on regional water sanitation in 1997 also indicated that about 150 people share one pit latrine and up to 54% households do not have bathing facilities. Most of the people defecate in plastic bags and then wrap and throw them like other solid wastes. This gives the slums an additional bad smell and predisposes the community to many diseases associated with poor hygiene (G. Gulis et al.2004).

Due to the issues associated with sanitation in the area some efforts have been put across to manage them. They include;

a) The Peepoo Concept

With the issue of Sanitation, the The 6th World Water Forum, came up with the invention of Peepoo. Peepoo represents a personal, single-use, self-sanitising, fully biodegradable toilet that prevents faeces from contaminating the immediate areas and thus, endangering the people's health. After the plastic bag with the human excreta was closed and grabbed into the soil, Peepoo turns human waste into a fertiliser. This happens in only a few weeks. Hence, Peepoo is able to make a problem – that is often regarded as a serious problem to health if it is not dealt with in an appropriate way – into a valuable resource, (Ulrikejulia, 2012).

b) The Sanergy prefabricated Toilets

Sanergy is an upgrade from Peepoo, by using a waste management model that aims to turn human waste into power and profit. the project started last year hoping to offer a solution in a

four-part process. First, they build low-cost sanitation centers, each one designed to service 77 people with hot showers and clean toilets. These centers are then franchised to local entrepreneurs, financed by a local microfinance bank, who earn income through pay-per-use fees, membership plans and sales of additional products. Human waste is collected in air-tight containers and transported daily using handcarts to an immediate processing plant. Trucks then transfer the waste to a central processing facility where it's converted into energy which can be sold to the national grid. The conversion process also produces organic fertilizer, which can supply commercial and small hold farms. (Katharina, 2011).

2.3.3 The impacts of security of the prefabricated houses on the City Housing Problem.

The majority of people living in Kibera have no title deed to the land they live on. Crime and disease is rife, and unemployment is rampant. Those who are employed spend many hours, usually on foot, travelling to and from their low-paid jobs in Nairobi, (IRIN,2006).

The incidence of crime, robbery and gang violence, as well as gender based domestic violence in informal settlements; undermine both macro and micro economic growth and productivity of a country's development, as well as social and individual well-being (UN Habitat 2007). Ammensity international (2009) goes further to indicate that these slums have little or no police presence. Even in Kibera, Kenya's largest informal settlement where up to one million people live, there is no permanent police station or post. This is a clear indication that crime rate at Kibera is very high. one has to be very alert in the area because in most cases one could be mugged and even worse women and children raped.

Moreover, as tenants, households have no titles over the land on which the structures are built, and live under the threat of eviction either by the government or by private developers. This limits them from enjoying their rights as urban citizens. This fear of eviction and/or demolition of their structures by authorities or by their landlords are pervasive in low-income areas. The recent Amnesty International Report on tenure insecurity in Nairobi recounts several recent incidents in which hundreds of families were forcibly evicted, their houses bulldozed at night with no prior warning and little or no explanation. (Oxfam GB 2009).

According to Mwangi in his article report, the nature of rental housing in Kenya, states that, the supply of informal rental housing built without following planning procedures or local authority by-laws is growing much faster than formal housing. House-building in the slums and squatter areas by either landlords or squatter families takes place continuously hence in the informal sector, house construction is done without regard to planning rules or construction standards, not only posing threats in the statics of buildings but also not appropriately considering sanitation capacities and its connection and connectivity with overall city sewerage and other health hazards to the inhabitants. He then concludes that growth appears to be fastest for site and service housing where construction of rental units frequently exceeds what is stipulated in purchase agreements (Mwangi , 1997).

Prefabricated houses must be properly planned by use of the current building codes which include;

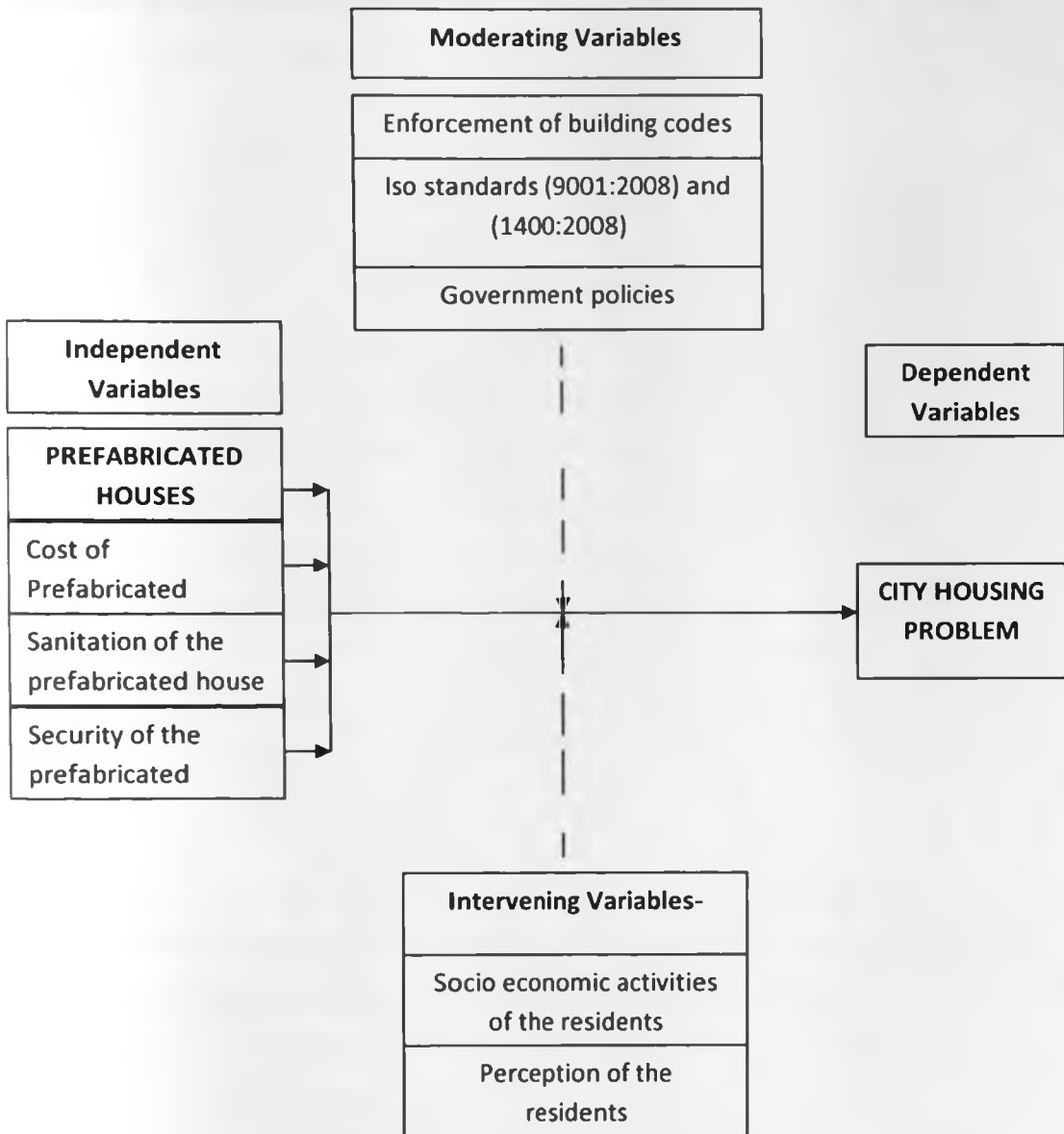
- a) The Land Planning Act, Cap. 303, 1968
- b) The Housing Act, Cap. 177 of 1953
- c) The Streets Adoption Act, Cap. 406 of 1963

Prefabricated houses have also better material as compared to the existing structures. According to Eco homes website, the prefabricated houses have stable structures that when finished it can be difficult to tell the difference compared to the traditional masonry houses. With proper planning and enforcement of building codes this may offer the solution to security issues in the housing sector.

2.4 Conceptual Framework

From the secondary data obtained, the researcher came up with a number of key implications of the study. These implications have helped the researcher develop a conceptual framework that explains how the housing situation in Kibera can be solved. The following schematic drawing explains the relationship between the independent variables and dependent variables.

Fig 2.1: The Conceptual framework



This framework depicts the relationship among all variables under study. The independent variables consisting of the cost, sanitation and security of the prefabricated houses affect the city housing problem. The moderating variables; building codes and Iso 9001:2008, Iso 1400:2008 and government policies act like the independent variable and are reinforced in building of the prefabricated houses while the intervening variables indicated below also have some effect on

the prefabricated houses, but their impact is minimal in this study hence were not considered, though they could not entirely be ignored.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter outlines the research methodology that has been used to answer the research questions. It also explains the sampling procedure as well as the data collection methods. Validity and reliability of the data collection instruments are very vital in any research, hence these have been well defined and the way to achieve them well outlined. Lastly the data analysis and presentation techniques are discussed and the operationalization of the variables presented.

3.2 Research design

The researcher applied a mixed mode research approach; Cooper and Schindler (2003) define qualitative research as a study that is based on data collected mainly about the ideas and theme rather than quantities. Descriptive data was also collected and categorized in the field survey using questionnaires. The major purpose of descriptive research design is the description of current state of affairs as it exists at present, (Kothari,1999).

3.3 Target population

The target population is the population to which the researcher wants to generalize the results, (Mugenda and Mugenda, 2003). The target population in this study was the households of Kibera slums in the following villages; Makina, Mashimoni, Laini Saba, Silanga, Kambi Muru, Katwekera, Kianda, Lindi, Kisumu Ndogo, Kichinjio, Raila and Soweto. The developed villages such as Ayani were not considered in this research. At the moment according to the Kenya census report in 2009, Kibera stands at a population of approximately 170,000 and on average a household in the slum comprises of seven members,(UN Habitat, 2003) hence there are approximately 24,286 households in Kibera. A plot in Kibera comprises approximately twenty households; hence my target population was 1,214 plots, which consists of 24,280 households.

3.4 Sampling Procedure

Stratified sampling was used in this study. Since Kibera is already subdivided into twelve villages namely; Makina, Mashimoni, Laini Saba, Silanga, Kambi Muru, Gatwekera, Kianda, Lindi, Kisumu Ndogo, Kichinjio, Raila and Soweto. These villages constituted the stratas. The households were then randomly selected from the stratas.

3.5 Sample Size

The target number of plots the under study was be 1,214. Yamane Taro's (1967:886) provides a simplified formula for sample sizes ($n=N/1+N(e^2)$), where n is sample size and N is the population and e is the error margin, thus $n=1214/(1+1214(0.1^2))$ which is equivalent to 92 plots. This formula assumes a 90% confidence level and $P = 1.0$ (being estimated variability/or distribution of attributes in the population) and margin of error e of +10% or -10%. 92 plots translate to 1840 households considering each plot has 20 households. The above formula applied in two stage sampling, our sample households were 50 hence 4 households per strata.

3.6 Data Collection Instruments.

Data was collected using questionnaires administered by the researcher and her assistant(s). Clusters of structured questions targeting each variable were prepared as shown in appendix II and III, these included both open ended and closed questions covering issues on housing problems in Kibera. The open ended questions helped the researcher collect more information from the respondents because they could express themselves freely. The close ended questions enabled the respondents to be limited to the stated alternatives. These alternatives were designed in such a way so as to be simple for both the respondents and the research assistants to understand. The researcher also used focus group interviews; the questionnaires had opened ended discussion questions which helped the researcher obtain more information on the subject.

3.7 Data collection procedures

An introductory letter from the University of Nairobi was obtained to enable the researcher administer the questionnaires. The researcher and her assistants administered the questionnaires to different households within the plots as well as the caretakers per plot. The key informants

assisted the researcher and her assistants to obtain four key people from each strata for the focus group discussions.

3.8 Validity and Reliability

Validity is the degree to which evidence supports inferences based on the data collected using a particular instrument. It is concerned with whether the information is relevant to the purpose of the study or not. It is enhanced by preparing easy to understand instruments, free from ambiguity as well as pre-testing the instruments before full application. The prepared questionnaires were pre-tested by being administered to the key informants before full administration to the selected sample. Triangulation was also used to ensure validity.

Reliability is a measure of the consistence of results or scores obtained. It is improved by standardizing the conditions under which the measurement takes place. Rehearsals were done with the research assistants to ensure that they fully understood the instruments and were motivated enough to carry out the work without introducing any auxiliary questions which may have distorted the responses. A pilot test was also done with the key informants before full administration of the questionnaires.

3.9 Data Analysis and presentation

After collection of both primary and secondary data, information was generated by analyzing the responses. This data was coded and analyzed using qualitative and quantitative techniques as well as using excel spreadsheets. Descriptive statistics was also applied by use of measures of central tendencies such as mean and measures of dispersion such as standard deviation as well as content analysis. The information was presented in the form of tables and frequency distributions for better understanding. Qualitative information was presented in prose form.

3.10 Operationalization of Variables.

The table below indicates the overview of the study.

Table 3.1: Operationalization of variables chart.

Objective/ Research question	Variable	Indicator	Measurement	Measurement scale	Research Design	Data collection method	Data analysis
How does the cost of prefabricated houses influence the city housing problem?	Independent variable Cost of Prefabricated houses	*Rent payable monthly *Cost of Maintenance. * Cost of construction *Time frame of construction	*Amount of money spent monthly on each household. *Comfort gained.	*Interval *Ordinal	Case study	*Questionnaire *Focus group discussions * Document reviews	*Descriptive * Content analysis
	Dependent Variable City Housing Problem	* Living standards	* Number of toilets per household *Proper planned houses.	*Interval *Ordinal	Case study	*Questionnaire *Document reviews	*Descriptive * Content analysis
To what extent does sanitation of prefabricated houses influence the city housing problem?	Independent variable Sanitation of Prefabricated Houses	* Toilet facility *Refuse collection. *Drainage of the toilets.	*Number of households per toilet. *Frequency of refuse collection. *Frequency of draining the toilets. *Efficiency of drainage within the slum.	*Interval * Ordinal	Case study	*Questionnaire *Focus group discussion *Document reviews	*Descriptive * Content analysis
To what extent does security of prefabricated houses impact the city housing problem?	Independent variable Security of Prefabricated Houses	*Police posts *Proper planning *Security lights	*Number of police posts within the area. *Number of households per given area. *Well Lit alleys.	*Nominal *Ordinal	Case study	*Questionnaire *Focus group discussions * Document reviews	*Descriptive statistics * Content analysis

CHAPTER FOUR

DATA ANALYSIS, PRESENTATION AND INTERPRETATION

4.1 Introduction

The purpose of this chapter was to analyze, present and interpret data in order to answer the research questions. The main data collection tools were questionnaires - both open ended and close ended, structured focus group interview and document's review. The area under study comprised of three main variable: how affordability of prefabricated housing influences city housing problems in Kibera; how sanitation of prefabricated houses in influences city housing problem in Kibera and how security of prefabricated houses influences city housing problem. The purpose of data analysis was to determine to what extend these variables can influence the city housing problem in Kibera slums. Data is represented in form of tables and percentages.

4.2 Response rate

Questionnaires were personally administered to 50 households as per the sample size. Data was analyzed on this sample size as all the questionnaires were returned.

4.3 Response per gender and duration of stay in Kibera

The sample under study was analyzed in terms of gender as a formality, it was found out as per the table 4.1 below that 68% of the male were interviewed and 32% of respondents were female.

Table 4.1: Gender of respondents

Gender	Male	Female	Total
Frequency	34	16	50
Percentage	68	32	100

The respondents were also asked how long they had stayed in Kibera, This question was asked to gauge how much information they would have of the area. The table below indicates that 24 % of the respondents had lived in Kibera for five years or less, 8% of the respondents had lived in

Kibera between 6 to 10 years and 11 to 15 years, 4% of the respondents had lived between 16 to 30 years and 56% of the respondents were born in Kibera.

Table 4.2: Duration of stay for the respondents

Years	0 to 5	6 to 10	11 to 15	16 to 30	Born	Total
Frequency	12	4	4	2	28	50
Percentage	24	8	8	4	56	100

The respondents were also asked if they liked living in Kibera, This was asked to identify why they live in Kibera. As per the table below, it was deducted that 40% of the respondents like to live in Kibera and would not move to another place if given a chance, while 28% of the respondents just love the area because it is where they live and they have to make the best out of it. 16 % of the respondents disagreed to liking the area while the other 16% strongly disagreed to liking the areas and given a chance they would definitely move out of Kibera.

Table 4.3: Indicates how much respondents like Kibera area

	Strongly Agree	Agree	Disagree	Strongly Disagree	Total
Frequency	20	14	8	8	50
Percentage	40	28	16	16	100

4.4 Affordability situation in Kibera

The respondents were then questioned as to their source of income and how much they earn averagely per month. The table 4.4 below indicates 72% of the respondents are self employed, some of the business activities they engage in are tailoring, photocopy, sell of alcohol, some have shops and others are food vendors; 8% are permanently employed as messengers and receptionists in offices, while 12 % are casual laborers in building sites or touts, the 4% work in Saudi Arabia as there are people who send them there, mostly being Nubian in tribe earning

about Kshs.50,000/- and the other 4% of the respondents are not employed but married to working husbands.

Table 4.4: How the respondents make a living

	Self Employed	Permanently Employed	Casual Laborer	Not employed	Others	Total
Frequency	36	4	6	2	2	50
Percentage	72	8	12	4	4	100

Out of all the above type of employment, the below table shows the salary scales of the respondents; 28 % of the respondents earn between Kshs. 2,000/- to Kshs 5,000/-, 44% of the respondents earn between Kshs 5,000/- to Kshs 10,000/-, 16% earn between Kshs. 10,000/- to 20,000/-, 4% earn between Kshs. 20,000/- to Kshs 30,000/- while another 4% earns Kshs. 50,000/-, while the other are not employed.

Table 4.5: Salary of the respondents

	2,000 to 5,000	5,001 to 10,000	10,001 to 20,000	20,001 to 30,000	Others	Total
Frequency	14	22	8	2	4	50
Percentage	28	44	16	4	8	100

The researcher sought to find out if the houses in Kibera are adequate for the residents, most of these houses usually being on average 12ft by 12ft. This question was asked to seek if they would prefer having bigger houses 16 % of the respondents strongly agreed that the space is adequate; amongst the 16% are the people who own such houses and have built them to adequate size, 12% agreed to having adequate space while 40% disagreed that the space is sufficient and finally 32% of the respondents strongly disagreed to having sufficient space.

Table 4.6: Size of the house sufficient for the respondents

	Strongly Agree	Agree	Disagree	Strongly disagree	Total
Frequency	8	6	20	16	50
Percentage	16	12	40	32	100

The respondents who agreed to have inadequate space also expressed interest in having more space if opportunity arises. When asked about the rent they pay, on average a Kibera resident pays about Kshs1,400/- which ranges between about Kshs. 800/- to Kshs. 2,500/- and they have to pay an additional Kshs. 350/- for power which ranges between Kshs 250/- to 500/- per month per household. At the end on the day on average a Kibera resident for the house only pays a total amount of Kshs. 1,750 /-. It was also noted from the focus group discussions that some residents who live next to the road where there is good security actually pay between a rent of Kshs. 4,000/- to Kshs. 8,000/- a month. There are some who stay in worse situations in villages such as Lindi pay about Kshs. 2,500/-. From the data collected, the researcher found out that out of the sample population 24% were living in their own houses, while the rest of 76% live in rented houses.

4.4.1 Focus group discussion

The researcher also held a focus group discussion, it was found out that most of the people who live in their own houses are not necessarily landlords to the other houses. On average the landlords of Kibera do not live in Kibera instead they employ one of the Kibera residents to take care of their houses, then these care takers collect the rent on behalf of the landlords.

There are several ways in which one can own a house in Kibera, such include:

A situation known as “ Jenga yako jenga yangu”. This is a situation whereby the landlord has some land that he has identified as his, - this normally happens to the Nubian community- but this same landlord does not have enough money to construct houses. The tenant who has money then comes in as developer and builds himself a house on the landlord’s land and builds the

landlord a few other houses that will be rented out to bring in some income to both parties and the tenant who comes in as developer ends up being a landlord as well and doesn't pay rent to the owner of the house.

The second way is where by a resident identifies a house that is run down and the landlord has no capacity to renovate it, he/ she then purchases this house from the landlord at about Kshs. 20,000 to Kshs. 35,000 depending on the situation of the house, the location and the size. The buyer then renovates the house or demolishes it then puts up another proper house thereby becoming the owner of the house. This is usually a legal agreement endorsed by the chief of the area. Appendix iv shows such an agreement.

The last way in which a resident acquires a house is when the owner of the house has an emergency and needs to use the money elsewhere. In this case a buyer purchases a proper house of about Kshs. 20,000/- to Kshs 35,000/- depending on the location, situation of the house and the size thereby becoming the owner.

On a general note the focus group discussion brought to light that the government do not permit the residents to build permanent houses, that is the reason most have mud houses and the residents own the houses but not the land in which the house occupies. The government has also promised the Nubian communities a community title deed; the Nubian communities mostly reside in the following villages: Makina, Lindi, Kambi muru. Laini saba, Mashimoni and Kambi.

4.5 Sanitation situation in Kibera

The researcher further sought to find out how sanitation in Kibera is being handled with emphasis on toilets and drainages, hence questionnaires were structures in such a way that the respondents were asked if they had access to toilets. As per the table below, the analysis indicated that 8% of the respondents have toilets constructed in their houses, 64% have to pay to use toilet facilities with the price ranging from Kshs. 5/- to Kshs 10/- per use and this same percentage most of the times uses flying toilets when need arises, the rest 28% has the toilets within the plot in which they have to share so many other residents.

Table 4.7: Situation of toilet facilities for the residents

	In the house	Pay/ flying toilets	In plot	Total
Frequency	4	32	14	50
Percentage	8	64	28	100

The respondents were also questioned if they have access to bath facilities 60 % of the respondents have bath in the house and clean it after use, while the other 40% pays to use the bath facilities, normally ranging from Kshs. 5 to Kshs. 10 when using cold water to Kshs. 10/- to Kshs. 15/- when using hot water.

Out of the respondents who use pay toilets or use the plot toilets, the respondents were then asked if the toilet facilities they have are well maintained; 17% of the respondents said they strongly agree and these goes for the high charging toilets facilities, 13% agreed to the well maintained facilities, 26% disagreed and 44% strongly disagreed.

Table 4.8: Well maintained toilets in Kibera

	Strongly Agree	Agree	Disagree	Strongly disagree	Total
Frequency	8	6	12	20	46
Percentage	17	13	26	44	100

The researcher then sought to find out if the sample population would rather pay more for a well maintained facility, out of the respondents who said the facilities are not well maintained, 56% of the respondents strongly agreed, 19% agreed, 16% disagreed to paying more while 9% strongly disagreed. The residents with the toilets in the house usually maintain them by themselves and the ones with the toilets in the plot either contribute for maintenance or clean it in turns.

Table 4.9: Sample population that would pay more for a well maintained toilet facility

	Strongly Agree	Agree	Disagree	Strongly disagree	Total
Frequency	18	6	5	3	32
Percentage	56	19	16	9	100

Based on sanitation the researcher also sought to find out whether drinking water used by the residents was safe. 24% agreed to having extremely safe water as they believe the water they buy is from city council of Nairobi which normally costs Kshs. 5/- per 20 liters capacity, 4 % agreed to the water being safe, 32% said the water was somehow safe but they have to boil to use the same; 40% reported the water not being safe at all because most of the time there are burst sewers and pipes and most of the time the water gets contaminated. The table below shows the results

Table 4.10: Sample population that considers drinking water safe

	Extremely safe	Safe	Somehow Safe	Extremely Unsafe	Total
Frequency	26	2	12	10	50
Percentage	52	4	24	20	100

4.5.1 Focus group discussions

Out of the focus group discussion the researcher held, the following were brought to light; some toilets have septic tanks in which all the other toilets are connected to. But this happens in the villages next to the road which neighbors properly constructed houses such as Ayani and Woodley, such villages include: Karanja and Kianda.

In the interiors of Kibera the toilets are usually pulled by exhausters when filled up: the exhausters charge Kshs 3,000/- for small trucks and Kshs 5,000/= for larger trucks. In situation where the exhausters can't reach the areas, the residents hire the youth to empty the toilets for Ksh. 500/= per drum or the same for 5 buckets. The latter waste removal procedures are usually dangerous to the residents, this is because when these guys carry such waste, most usually fall off the wheelbarrows making the situation even worse for those who live in such paths leading to the river where these wastes are disposed.

Peepoo papers are also being used in Kibera, this is used by less people because of the embarrassment it causes. The residents buy the peepoo bag for Kshs. 3/-, use them, then when returning they are given back Kshs. 5/- hence making a profit of Kshs.2/- per bag. Such waste is then collected and used to produce biogas. This biogas is also manufactured in the pay toilets which is turn used for cooking by the residents. The residents normally pay Kshs. 10/- to use the gas. Appendix v shows such pay toilets.

The residents also complained about the wastes in front of their houses and they expressed that if these houses can be properly planned with proper drainages, they can take care to make sure they keep Kibera clean. As it is at the moment each neighbor usually sweeps away the waste in front of their houses to the next and the same goes till it is all pushed to the river (appendix vi shows the river). The residents also expressed concern with the water they are drinking, in most cases they are burst pipes and they still end up drinking and using such water which they buy. They also say they suffer water born diseases especially during the rainy season.

It was also found out that some residents of Kibera especially the Nubian community have in built toilets which are connected to septic tanks. Such communities have been living in Kibera for so long that they even have well plastered mud houses with tiles floor (appendix vii shows such a house).

4.6 Security situation in Kibera

The researcher also sought to find out about the security of the area, the respondents were asked if they feel safe both in the house and in the neighborhood, it was found out that 12% of the sample population feels extremely safe in the neighborhood, 16 % feel safe, 32% feel somehow

safe and 40% do not feel safe at all. As for in the houses, the following results was reported: 36% of the sample population feel extreme safe, 28% feel safe; 20% feel somehow safe while 16% feel extremely unsafe.

Table 4.11: Safety in neighborhood

	Extremely safe	Safe	Somehow Safe	Extremely unsafe	Total
Frequency	6	8	16	20	50
Percentage	12	16	32	40	100

Table 4.12: Safety in the house

	Extremely safe	Safe	Somehow Safe	Extremely unsafe	Total
Frequency	18	14	10	8	50
Percentage	36	28	20	16	100

The sample population was also asked if there are theft cases, 84% of the people agreed the theft cases were present and mostly pegged it to dark alleys and lack of proper locking doors while 16% disagreed to theft cases being present.

Table 4.13: Theft cases in Kibera

	Yes	No	Total
Frequency	42	8	50
Percentage	84	16	100

The respondents were then asked if there are police posts around the neighborhood and if the available police posts are helpful to the community, 52% of the respondents said there are police posts while 48% of the respondents said there are no police posts nearby, but then out of the 52

% who said there are police posts available, 8% of them the police post are extremely of importance, the other 8% also agreed to the police posts being important, 38% disagreed to their importance while 46% strongly disagreed to their importance.

Table 4.14 Availability of a Police post in the neighborhood

	Yes	No	Total
Frequency	26	24	50
Percentage	52	48	100

Table 4.15: Importance of police post to the residents

	Strongly Agree	Agree	Disagree	Strongly disagree	Total
Frequency	2	2	10	12	26
Percentage	8	8	38	46	100

Since the majority of residents feel the police posts are not very important 64% of the sample population, as shown in the table below, have gone ahead and formed up their own security measures that go by the names, gaif, vigilante, siafu, shimo la tewa amongst others formed by youth groups. The residents all strongly agree that these extra security groups are very effective in curbing crime.

Table 4.16: Security measures formed by residents

	Yes	No	Total
Frequency	32	18	50
Percentage	64	36	100

4.6.1 Focus group discussions

The focus group discussion revealed that the residents prefer to use their own security measures because they believe the police posts around do not offer much help. In most cases the police never patrol within the interiors of Kibera and when they are called in case of an incident they take too much time to respond.

The residents also said there was a high crime rate, especially people stealing from one's house. In most cases this can happen at night when the tenant is not in the house or anytime from 7 p.m while one is walking home. The residents peg the high crime rate to congestion and dark alleys as well as unemployment.

There are also gangs of youth employed by non residents of Kibera. Guns are given to these residents to rob car users on the road and this money is then given to the youth groups to divide amongst them raising the crime rates in Kibera.

Having raised the above issues, the residents also acknowledged that the security lights that have been installed in Kibera has been very helpful in so many ways; one being because of the light at night, the attacks on the residents when walking at night has reduced. It has also helped reduce the number of accidents as residents can see their paths clearly.

4.7 The types of houses found in Kibera

As per the researcher's observation, 96% of the houses are made of mud while the other 4% are made up of tin walls as per the table below. The floor is majorly made out of earth this constituting 56%; 36% is made out of screed and 8% is made out of tiles. 96% of the roof is made of iron sheets while the other 4 % is made out of tin.

Table 4.17 Type of houses in Kibera

	Mud house	Tin wall	total
Frequency	48	2	50
Percentage	96	4	100

Table 4.18 Type of flooring used in Kibera

	Screed	Earth	Tiles	Total
Frequency	18	28	4	50
Percentage	36	56	8	100

Table 4.19: Type of Roofing used in Kibera

	Iron sheet	Tin	Total
Frequency	48	2	50
Percentage	96	4	100

Aside from the above observation, the researcher also realized most commercial spaces are made out of iron sheets or tin walls and roof. When asked the residents said, the tin structures take less time when building and are cheaper hence a perfect way to make such. They also said iron sheet is easy to manipulate in terms of making the structure bigger or smaller. Appendix viii shows the houses in Kibera.

The residents of Kibera also expressed that ventilation is another issue in Kibera. The structures are so close to each other that most houses do not have ventilation, the only available ventilation is through the door. The other reason why the residents prefer not to have ventilations is because of security. Windows are usually an access to thieves especially in gated plots where the back of the houses faces the outside of the compound.

The researcher also noted that there are many power suppliers from Kibera, such is called “Kibera Power”. Such suppliers use very thin wires that are usually used for cabling within the houses. They normally charge between Kshs. 250/- to Kshs. 500/- per household depending on how many bulbs a household has or the location of the area. During rainy season this usually becomes very risky as the water mixes with naked wires and usually there are many electrocution cases which go unreported. This usually happens to children who play without knowing the danger they are exposing themselves to. Appendix ix shows such lines in Kibera.

4.8 Summary of data analysis from the sample group

The researcher summarized responses from the sample group to get the opinion of the importance that was attached to the variable under study. This was done by a further summary using the likert scale to measure the mean and standard deviation.

Likert scale was coded as follows:

Strongly Agree : - Was assigned Number. 4

Agree : - Was assigned Number 3.

Disagree : - Was assigned Number 2

Strongly Disagree : - Was assigned Number 1

Variable	Mean	Variance	Standard Deviation
Respondents like the area they live in	2.92	1.19	1.09
Size of the houses sufficient for Kibera residents	2.12	1.07	1.03
Toilet facilities in Kibera are well maintained	2.04	1.26	1.12
Kibera residents would pay more for a well maintained toilet facility	3.2	1.04	1.02
Safety of drinking water in Kibera	2.12	1.34	1.18
Safety in the neighborhood	2.00	1.04	1.02
Safety at home	2.84	1.17	1.08
Importance of the police post to the Kibera residents	1.77	0.79	0.89

The mean and standard deviations from the summary above deduces that, most of the Kibera residents like the area as the mean is almost 3 which standards for agree and the standard deviation is 1.09 hence it is skewed to the positive. As observed earlier the percentages were 40% for strongly agree and 28 for agree. As for the size of the house being sufficient the mean is

2.12 which indicate disagreement with a standard deviation of 1.03 which is skewed to the negative, as observed earlier 40% disagreed and 16% strongly disagreed to the same statement.

We also deduct that the toilet facilities in Kibera are not well maintained as the mean is 2 and the residents would rather pay more for a well maintained facility, as shown above this statement has a mean of 3.2. The residents feel safer at home than in the neighborhood, but above all the police post in the area are not helpful at all to the residents. The table above shows a mean of 1.77 with a standard deviation of 0.89, as observed in table 4.15, 46% of the residents strongly disagreed to their importance and 38% disagreed.

CHAPTER FIVE

SUMMARY OF FINDINGS, DISCUSSIONS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter provides a summary of findings, discussions, conclusions and recommendations for further research. The researcher compares the study findings with the body of knowledge obtained from the literature review in chapter two and then draws the conclusion.

5.2 Summary of findings

The researcher's first objective was to investigate how the cost of prefabricated houses influences the city housing problem, by doing so the researcher sought to find out how financially empowered the people of Kibera are. The researcher summarized the data as follows:

On average about 96% of the people in Kibera are employed, either as casual laborers, self employed or permanently employed. 28% of the residents earn between Kshs 2,000/- to 5,000/- while 44% earn between Kshs. 5,000/- to Kshs 10,000/-; 16% earns between Kshs. 10,000/- to Kshs 20,000/-, 4% earns between Kshs. 20,001 to Kshs. 30,000/-

In terms on expenses and average Kibera resident spends Kshs. 3,800/- on housing alone broken down as follows: Rent Kshs.1400/-; Power, Kshs. 350/-; Security, Kshs.600/-, Water Kshs. 1,000/-; Toilet and bath facilities Kshs. 450/-

The researcher also found out that 68% of the residents actually enjoy living in Kibera most being born in Kibera, 40% of these strongly agreeing to liking the area, the 32% do not like the area, they just live there because of their situation.

The researcher's second objective sought to find out how sanitation of the prefabricated houses would influence the city housing problems in Kibera. By doing do the researcher sought to find out the current situation of sanitation in Kibera. 64% of Kibera residents use pay toilets which also translates to the same percentage using flying toilets, 28% have them in the plot while the other 8% have them in the house. Out of the 92% who either pay to use or have them in the plot,

13% agreed that the facilities are well maintained, 17% of this strongly agreed while the other 26% disagreed to the facilities being well maintained, 44% of the respondents strongly disagreed to the same. The researcher further questioned the residents who did not agree to the well maintained facility if they would pay more for a well maintained facility, 56% strongly agreed; 19% agreed; 16% disagreed and 9% strongly disagreed.

The researcher also found out that the drainages in Kibera are in such poor state because they are used as toilets especially at night. The flying toilets are usually thrown at night and when it rains they are washed down to the drainages increasing the chances of diseases.

The researcher's third objective was to investigate how security of prefabricated houses influence the city housing problem, hence the researcher sought to seek the current security situation in Kibera. The following findings were noted:

About 12% of the residents feel extremely safe in the neighborhood, 16% just feel safe while the other 32% feel somehow safe within the neighborhood and the rest 40% feel extremely unsafe, when asked how safe they feel in the house, only 16% said they feel extremely unsafe in the house.

The researcher also found out that 84% of the sample population agreed to have theft cases in Kibera. The residents peg this to dark alleys at night and congestion as well as high rate of unemployment within the youth.

5.3 Discussions

The first objective was to investigate how the cost of the prefabricated houses influences the city housing problem. As observed from the literature review in Chapter two, the website for Mabati rolling mills clearly states a two roomed house retails at about Kshs. 80,000, yet the data collected clearly indicated that the residents can buy a rundown house for an average of Kshs. 20,000 and construct another room for Kshs. 20,000/- hence a one roomed house costs Kshs. 40,000/- which is half what Mabati Rolling mills offers for two roomed house. Further as for the tenants in terms of affordability, already an average resident of Kibera uses Kshs. 3,800/- per month on the house only and most are willing to pay more for a better place, this is noted by

World Bank (2006) study that in contrast to many other cities of the world, an extraordinary 92% of the slum dwellers in Nairobi are rent-paying. The tenants can still pay Kshs. 4,000/- per month and they are provided with water, power and security. Once these houses are well planned, part of the rent can be used for maintenance of the houses. The landlords or house owners who are willing to invest in the same project would take about a year roughly to recover their capital hence it makes so much sense for proper planned prefabricated houses to be constructed in Kibera. The government has to get involved in such a project because as indicated earlier, the chief usually endorses the sale of the house and not the land because the land belongs to the government and only the Nubian families might get a community title. This is also observed in chapter two whereby The UN-Habitat (2003) reports that local authorities usually issue temporary occupation licenses to the owners. Around 10% of Kibera residents own the structures and sub-let them to the remaining 90%. All in all, the literature review seems to concur with the fact that prefabricated houses made of cheap locally available material would influence the city housing problem positively by offering a solution to the current situation in Kibera.

The second objective of the study was to find out how sanitation of prefabricated houses influences the city housing problem. The data collected indicated that 64% of Kibera residents use flying toilets at night and during the day they opt to pay for the facilities. This is a very big percentage no wonder the drainages meant for water act as sewer and toilets. The river that passes in Kibera is contaminated by all types of dirt. The literature review in chapter two states that Kibera is heavily polluted by human refuse, garbage, soot, dust, and other wastes. The slum is contaminated with human and animal feces, due to the open sewage system and the frequent use of "flying toilets". (Hardy, Mitlin & Satterthwaite, 2003; Hodson & Marvin, 2009). This is agreeable with the data collected. We also find there is no city council sewerage system in Kibera as noted by the IRIN (2006) report, Nairobi city council cleaning services do not cover the slums and as a result the residents dump solid waste in open drains or in small lanes within the slums. Liquid waste oozes from houses into the lanes, forming pools of dirty waste within the areas. The data collected also shows that some initiatives have come up with pay toilets to be able to eliminate this menace, such include the Ushirika toilets and the Katwekera tosha bio centre which in turn makes the waste into biogas. As much as the above initiatives have helped

reduce the flying toilets, a resident being asked to pay every time they want to use the toilet is not as viable as there are times when nature calls and one does not have money. Besides some of these pay toilet are not near some of the villages as residents have to walk long distances to such facilities. Picture a resident with a bad stomach, who has to walk long distance to such a facility, the facility would not be helpful to them.

As observed the residents hate to use Peepoo bags because it is shameful for them to carry such bags to the collection centre. As observed above sanitation of the prefabricated houses would influence the sanitation situation in Kibera positively, in that the houses can be properly planned in plots and every plot would have toilets that are either connected to one septic tank or one that can emptied after a certain duration of time by the exhausters. As indicated above the rent of the residents would include maintaining such facilities so that at all times the facilities are clean to be used. This would highly reduce the amount of dirt in Kibera especially the ones caused by the flying toilets. And also the Kibera residents would be encouraged to collect the household wastes once a week or the youth groups in Kibera would be given such contracts so as to make money and keep the area clean. This way the residents will take ownership of the cleanliness thereby greatly influencing the city housing problem.

The third objective was to investigate how security of prefabricated houses impacts on the city housing problem, as observed in the data collected, 84% of the residents say there is a high rate of theft cases in Kibera and when asked about their safety most of the residents feel safer in the house than when walking around in the neighborhood. 52% of the residents admit to having a police post near the villages but when asked how effective this police posts are 84% report that the police posts are not important at all hence most of the residents have decided to form their own security groups to aid in protecting the residents. A report by Amnesty international (2009) indicates that these slums have little or no police presence. Even in Kibera, Kenya's largest informal settlement where up to one million people live, there is no permanent police station or post. This is a clear indication that crime rate at Kibera is very high, one has to be very alert in the area because in most cases one could be mugged and even worse women and children raped. This is true because the data collected reports the little presence available is not of importance to

the residents. Reports of rape cases usually come from the non residents. From the focus group discussion, it was noted that mainly the people raped are usually the new comers in Kibera or non residents who do not know exactly which routes are dangerous thereby becoming victims especially girls and women.

Katwekera is one village where crime is rarely reported because the security group is very alert that one can be killed for stealing an orange from the vendors. The villagers of Katwekera have formed this group to help protect them. Other villages have also come up with such groups but the residents at times fear that such groups could also be dangerous to them, especially because of the fact that most of the Kibera residents youth male are involved in big gangs that goes in good neighborhoods to carjack residents and once in a while there are usually shoot outs between the police and the gangs killing innocent residents. The Kibera residents peg these issues to lack of employment. Most of these youths usually drop out of school and are lured by the easy money into such gangs. The residents also attribute the insecurity to dark alleys and congestions.

Security of prefabricated houses would influence this city housing problem in Kibera positively, this is because if the houses are properly planned with proper path ways that are well lit and police posts constructed in the villages where the police actually respond to residents calls, the crime rate would go down, as the gangs that do such acts would not want to be arrested and all the other residents would keep an eye for each other and protect each other. Kibera residents should also be recruited to aid the police posts in the community policing. This way they would take ownership which in turn would greatly reduce the crime rate. All in all, the youths in Kibera need to be empowered about ways of self sustaining and be involved in community group organization that helps uplift their living standards. This would also be a great way of lowering the crime rates in the area.

5.4 Conclusions

The first objective was to investigate how the cost of prefabricated houses influences the city housing problem in Kibera. The factors that the researcher considered were the amount of income earned by the residents against the expenditure by the residents. This was then compared

to the cost of prefabricated houses made out of locally available material. The researcher hence concluded that cost of prefabricated houses influences the city housing problem in Kibera positively as if the prefabricated houses are constructed, the Kibera residents could actually afford to maintain them and the landlords could easily afford such structures.

The second objective was to investigate how sanitation of prefabricated houses influences the city housing problem in Kibera. The factors considered in this objective are how much the residents pay to use such facilities and if they are well maintained. The researcher also sought to find out if the residents would prefer to pay more for well maintained facilities. It was found out that the prefabricated houses influence the city housing problem in Kibera positively. Once the houses are build in a well planned manner with proper drainage channel and all the residents have toilet facilities as well as bath facilities, this would highly help eliminate the sanitation problem in Kibera.

The third objective was to investigate how security of prefabricated houses impacts on the city housing problem in Kibera. The researcher sought to find the causes of theft and insecurity in Kibera. It was found out that most theft cases occur because of the narrow dark alleys caused by poor planning of the houses. The researcher then concludes that properly planned houses with well lit alleys would positively influence the city housing problems in Kibera by lowering the insecurity rate.

In summary, prefabricated houses have been tried and tested in several countries to eliminate the city housing problems; the researcher believes this would greatly be of importance here in Kenya if incorporated to reduce the city housing problems, especially in terms of affordability, sanitation and security in Kenya's slums. Since Kibera residents, as observed above, still pay rents for the substandard houses, prefabricated houses that are well planned, designed and built would be very instrumental and part of the rent paid by the tenants would go towards maintaining such houses.

5.5 Study Recommendations

From the findings, discussions and conclusions presented above, the researcher concluded that prefabricated houses positively influence the city housing problems in Kibera slums. The researcher believes the city housing problems in the slums can be reduced if prefabricated houses are constructed. The researcher hence urges the policy makers, government and other stakeholders to embrace this scheme in elimination of the housing problem in all the slums in Nairobi especially in issues concerning affordability, sanitation and security.

5.6 Recommendations for further research

The researcher in the course of the study realized there are other factors that also influence the city housing problem in the slums; Such include but not limited to the following:-

1. Socio economic activities of the residents.
2. Perception of the residents

The researcher suggests further research to the above will greatly add value to this study as the socio economic activities of the residents have to be considered during planning as well as the residents being empowered about the benefits of such projects. Respondents from different slums may also portray a wide range of view as opposed to those drawn from the samples slum as is the case in this study.

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APPENDICES

Appendix 1: Transmittal Letter

Dear Sir/ Madam,

You are invited to participate in a survey that constitutes a part of Master of Arts Project Planning & Management research project at the University of Nairobi (UoN). The Survey is to investigate the effects of prefabricated houses in curbing city housing problem, case study of Kibera slums in Nairobi.

You have been randomly selected to participate in this research. Your participation is very important to this research if the results are to be accurate. Your answers will be completely anonymous and confidential. No personal details will be reported in the thesis or any resulting publication.

I will be pleased to discuss any concerns you may have about your participation in the research. Your assistance will greatly contribute to the success of my research. Each and every response is important and I appreciate your willingness to help. Thank you very much.

Yours Sincerely

Beryl Oranga.

Appendix II:

Questionnaire to the Households

INTERVIEW GUIDE FOR HOUSING PROBLEMS EXPERIENCED BY THE KIBERA RESIDENTS

Please tick one where appropriate

1. Name of the village.....

2. Sex of the Respondent

(a) Male

(b) Female

3. State your age group

(a) Between 15 to 20 years old

(b) Between 20 to 35 years old

(c) Above 36 to 50 years old

(d) Others.....

4. How long have you lived in this area?

(a) 0 to 5 years

(b) 6 to 10 years

(a) 11 to 15 years

(b) 16 to 30 years

(c) Others.....

5. Do you like this area?

(a) Strongly Agree

(b) Agree

(c) Disagree

(d) Strongly disagree

6. How do you make your living?

- (a) Self Employed
- (b) Permanently Employed
- (c) Casual Laborer
- (d) Others.....

7. Salary / Wage Earning per month in Kshs.

- (a) 2,000/- to 5,000/-
- (b) 5,001 to 10,000/-
- (c) 10,001 to 20,000/-
- (d) 20,001 to 30,000/-
- (e) Other.....

8. How much rent do you pay (Kshs.) per month?

9. Do you have electricity in the house?

- a) Yes
- b) No

10. If yes how much do you pay for electricity per month?.....

11. How many people live in this house?

12. Do they all belong to the same family?

- (a) Yes
- (b) No

13. The house is sufficient for all of you.

- (a) Strongly Agree
- (b) Agree
- (c) Disagree
- (d) Strongly Disagree

14. Where do you go for nature calls?

.....
.....

15. Where do you take baths from?

.....
.....

16. In reference to question 14 and 15, do you pay to use this facility? (Please explain and state the amount)

.....
.....

17. In your opinion, these facilities are well maintained

- (a) Strongly Agree
- (b) Agree
- (c) Disagree
- (d) Strongly Disagree

18. If disagree above, you would rather pay more for a well maintained facility

- (a) Strongly Agree
- (b) Agree
- (c) Disagree
- (d) Strongly Disagree

19. It is the responsibility of the residents to keep Kibera clean

- (a) Strongly Agree
- (b) Agree
- (c) Disagree
- (d) Strongly Disagree

20. Where do you get water for daily usage? (Please explain)

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

21. In your opinion, the water is safe for drinking.

- (a) Extremely Safe
- (b) Safe
- (c) Somehow Safe
- (d) Extremely Unsafe

22. Explain briefly to support your answer.

.....
.....

23. You feel safe in your neighborhood.

- (a) Extremely Safe
- (b) Safe
- (c) Somehow Safe
- (d) Extremely Unsafe

24. You feel safe when in the house.

- (e) Extremely Safe
- (f) Safe
- (g) Somehow Safe
- (h) Extremely Un safe

25. Explain briefly to support your answer in both question 23 and 24

.....
.....

26. Are there usually theft cases around the neighborhood?

(a) I agree

(b) I disagree

27. Is there any police post around where people can call for help?

(a) Yes

(b) No

28. These police posts are important to the residents.

(a) Strongly Agree

(b) Agree

(c) Disagree

(d) Strongly Disagree

29. In case of any crime or theft cases, the police posts react promptly to the situation.

(a) Strongly Agree

(b) Agree

(c) Disagree

(d) Strongly disagree

30. Are there any other security measures the people of this village have put in place? (Please explain)

.....
.....

31. These measures are sufficient in ensuring security in the area.

- (a) Strongly Agree
- (b) Agree
- (c) Disagree
- (d) Strongly Disagree

32. In your opinion what is the cause of insecurity within the area. (please explain)

.....

.....

.....

HOUSE HOLD DETAIL INFORMATION

(Please observe and tick as appropriate)

1. Type of structure

- (a) Carton boxes
- (b) Iron Sheets walls
- (c) Tin walls
- (d) Masonry block walls
- (e) Others

.....
.....

2. Type of flooring in the house

- (a) Floor screed
- (b) Earth floor
- (c) Others

.....
.....

3. Roof

- (a) Iron sheets
- (b) Tin roof
- (c) Carton roof
- (d) Thatched roof
- (e) Others

.....
.....

Appendix III:

GROUP DISCUSSION

As residents of Kibera;

1. What do you think would improve your living conditions to make them better?

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

2. How do you think the houses can be improved?

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

3. How do you think Sanitation can be improved?

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

4. How do you think security can be improved?

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

Thank you for your time

Appendix iv: Endorsement Letter

DEED: SELLING OF THE HOUSE OF MR. ISMA I

BY THE SON MR. IBRAHIM HAMISI ISMAIL

ID NO. 130606/76

I MR. IBRAHIM HAMISI ISMAIL. I sold my House to MR. ANDREW O. OTIENO on 27/7/1995 at a cost of Kshs. 4,000.00.

The House behind Kibera, Primary School. It is a Kuru House 12 x 12 Feet. So from 27/7/95 the owner of the house is Mr. Andrew Ooko Otieno.

SELLER: MR. II
ID NO.

SIGN: *[Signature]*

WITNESS: 1.
2.

"
" *[Signature]*

BUYER: MR. I

SIGN: *[Signature]*

WITNESS: 1.

SIGN: *[Signature]*

2.

SIGN. *[Signature]*

[Handwritten Signature]

JUMA M. ALI
ASSISTANT CHIEF
KIBERA/NOOLEY

CHIEF:

Appendix v

Katwekera bio centre



This centre converts human waste into biogas.



Ushirika pay toilets are the majority within Kibera.

Appendix vi



Polluted river in Kibera

Appendix vii



Tiled living room in Kibera



Tiled family room in Kibera



Self contained toilet within a Kibera house

Appendix viii

Houses in Kibera



A house in Kibera made out of mud walls and iron sheet roof.



The interior of a house made out of iron sheets.



A shared toilet in one of the plots in Kibera



The interior of one of the shared toilets in Kibera plots

Appendix ix

Power line in Kibera



Power lines in Kibera that “Kibera power” uses to transfer power passing over drainages posing a threat to residents.



Power line to one of the Kibera houses.

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