IMPLICATIONS FOR CONVERSION OF AGRICULTURAL LAND USE IN PERI URBAN AREAS OF GITOTHUA WARD, RUIRU SUBCOUNTY

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DECLARATION

This thesis is my original work and has not been presented for examination ordegree award in any other University.

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This thesishas been submitted for examination with our approval asUniversity Supervisors

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DEDICATION

This thesis is dedicated to my family members Mrs. Lilian Karanja and Master Paul Karanja and Andrew Karanja for their unconditional support throughout the period of my study at the department of Urban and Regional Planning, University of Nairobi.

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ABSTRACT

Ruiru subcounty has witnessed increased changes from its initial agricultural land use to a more urbanized residential and commercial land use. These land-use and land-cover changes affect directly and indirectly the environment, economy and society at Ruiru subcounty, Kiambu county and Kenya in general. Although their impacts have been recognized long ago, it's only a few years back that they became a cause of countrywide concern.

The result is an intricate web of impacts that threaten the long-term viability of natural and social systems.In other words, the sustainability of the total environment–society–economy system is under threat.Various studies have been done but most of them are concerned with land use management and development control measures in Ruiru. This study aimed at determining the cause and effects of land use change and to understand the reason the land use change is increasing instead of decreasing.The study determined the current land uses in Gitothua ward, examined the cause of conversion of land use in Gitothua ward, established the impacts of conversion of land use conversions in Gitothua ward, explored intervention measures to be taken to reduce adverse effect of land use conversions.

The research used semi-structured questionnaires to interview 370 households and 5 Key informants as well as observation and photography to collect the data. The population of Gitothua ward is mostly composed of immigrants and the people who have stayed in Gitothua ward all their life. This is because of the sprawl from Nairobi that attracted people from different places to Gitothua ward. Rapid urbanization took place in Gitothua ward only recently as indicated by the population that has resided in Gitothua ward in the last 10 years. The study established that there is low public participation on land policies in Gitothua Ward resulting to weak and ineffective land institutions which have led to increased land conversions in the in

Gitothua ward to a very great extent. The reasons given by the respondents were that the Ruiru Land Control board, which is mandated by Land Control Act Chapter 302 to protect agricultural land from conversions, is incompetent due to inadequate staff, funds and technical capacity. Also, it was noted that land conversion in Gitothua ward has led to increase in land values to a great extent. In addition, land conversion in Gitothua ward has led to job creation to a very great extent and thatland conversion in Gitothua ward has led to has led to pressure on the existing infrastructure to a great extent.Moreover, the study revealed that policy framework to regulate agricultural land use conversions in Gitothua ward is inadequate and ineffective. The respondents cited lack of a national land use policy, urban sprawl and wanton destruction of agricultural land as evidence of inadequate policy. The respondents indicated that there must be deliberate efforts national policy to regulate agricultural land use conversions. It was also revealed those regulatory and institutional frameworks to regulate agricultural land use conversions in Gitothua ward are inadequate and ineffective.

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ACRONYMS

GIS	Geographic information system
MOL	Ministry of Lands
CGK	County Government of Kiambu

CHAPTER ONE

INTRODUCTION

1.0 Introduction

Over the years the landscape of Gitothua ward in Ruiru County has been constantlychanging from the once quite area to a beehive of activities induces by constantly changing landuse from a typical rural agrarian use to a more modern urban use (Cardenas, 2005).

While land and its resources are finite, the size of human population relies on it for survival has continued to increase. This has led to an ever increasing pressure on land resources, creating competition between urban development, agriculture and conservation of natural environment. In urban areas there are conflicting demand for land for industry, housing, commerce, agriculture and open spaces for recreation. The practices that are unsustainable in the rural places include exploiting marginal plots and ecological encroachment on areas known to be fragile by population growth that is ever increasing (Kihagi, 2000).

Gitothua ward was initially an area covered by large farming plantations which dealt mostly in coffee and sisal. These farming estates were owned by the white settler community that was in the country before independence. After independence the farms were bought by land buying companies and cooperative societies since they were too expensive for the average African. The companies continued with farming until the 1980s when the sessional paper no.1 of 1986 – Economic Management for renewed growth which essentially set out strategies on the liberalization of the economy. The large scale cooperative farms and company farms were to be operated as private entities with the aims of making profit (Muendo, 2004). This opened up room for the companies to subdivide the land to its members and also sell some of it to real estate

developers. The shareholders further subdivided the land and sold them off to interested parties who would build their houses thus transforming the face of Ruiru forever.

According to Kihagi (2000) the absence of a policy in the way a land is used has brought inappropriate land use in both rural and urban areas. Vital water catchment areas and wetland are destroyed while arable land parcels continue to be subdivided to uneconomical land units. There are different systems of areas of tenure of land in peri-urban sites. These systems determine the availability of land for urban use. Agevi (1981) notes that; the rampantdesign of land tenure in any given site have a subtle effect on city patterns and the adapting flexibility to the pressure of rapid urban growth. The land tenure affects not only the land use or land acquisition but also the way the land uses respond to growing urban pressures created among different competing uses. Even more important is that various forms of tenure systems will determine the amount of control that municipal authorities can assert over a given piece of land.

The land use conversions have been spurred by a weak control and regulatory framework from the defunct local authorities coupled with a nonexistent policy on land use from the ministry in charge of lands. The consequence is land subdivision and conversion to urban land uses (residential, commercial and light industrial) leading to massive social economic and environmental impacts. Although natural change happens initial, an unpredictable chain of statistic, monetary, and social changes happen that kickback to the earth (Briassoulis, 2008).

Land is one of the factors of production in classical economics (along with labor and capital) and afundamental input for housing and food production. Therefore, land use is the heart of agricultural economies and it provides valuable economic and social benefits. Land use change is therefore imperative for economic development and social progress.

Nontheless, there are many challenges that comes with land use change. There is a reduced land availability for food production when land is converted to urban centers mostly for housing. The erosion of soil, cutting down of trees therefore, reduces the productivity of any land use and future use of land may also be affected in the process.(Wu, 2008).

Land use conversions, usually occasioned by urban sprawl and poor land use management, is not a unique land use planning challenge to Kenya but a global challenge. For instance, Gerrit, et. al. (2007) noted that development is sprawling, not only in North America but in Europe as well. Urban containment, aimed at reducing agricultural land use change, is a target which is greatly desired yet seldom achieved on both sides of the Atlantic. In countries where land use is largely decided by property owners, urban sprawl is difficult to controlbecause of the rising demand for houses and lots. Both North Americans and Europeans are battling these challenges with mixed success. In Scotland, greenbelts have been the policy of choice at both the national and local level and the subject of extensive research. Scotland greenbelts have challenges, much reserved land within greenbelts has been developed and sizable development has extended to exurban region. Despite these limitations, however, the Scottish Executive has continued to recognize the need to manage urban growth and re-endorsed the notion of compact city (John et al. 2006). Farmland preservation programs are recognized in the United States of America (USA). In Germany, the once compact and walkable city has given way to a scrambled egg with no clear city centre and continues development at the urban fringe (Frece et. al. 2007). The discussed scenarios share many features with the land use management framework in Kenya. Land use is governed primarily at the local level with a preparatory (comprehensive) land use plan and a legally binding (zoning) land use plan.

1.1 Research Problem

Agricultural land use change into residential use in the urban fringes has been of great concern, not only to Kenya, but the world over. For instance, Alex Krieger (2007) of Havard University made an observation “people have migrated to the periphery of the cities to find more housing for less money. Until this advantage is neutralised, sprawl will remain our future." Renwick Rubenstein (1995) seems to concur by observing that “as long as the demand for separate single-family homes remains high, land on the fringe of urbanised areas will be converted from open space or agricultural use to residential land use, but this has not been done systematically. The rural-urban fringe in U.S. cities therefore looks like Swiss cheese, with pockets of development and gaps of open space. Donald et. al (2002) also noted that “land use planning is a persistent challenge for rural communities. Rural residential development presents a planning challenge to counties throughout the western United States”.

Ruiru Sub County has undergone rapid urbanization and tremendous economic growth during last few decades. Most of the economic development activities are situatedwithin Ruiru township. These changes have steadilychanged Ruiru from an agrarian economy into a dense residential hub. The urbanisation in the periphery of Nairobi city has encouraged changes in the land use pattern.

Ruiru provides an excellent example of an area with conflicting land uses. On one side there exists rural land use which comprises of land forms and estates and a recently upcoming land use of residential. The conflict emanates from different land uses which share a common location that has different service delivery needs. It is worth noting that agricultural activities underpins around 80 percent of Kenyans and contributesstraight forwardly and otherwise, around 53 percent of the country's Gross Domestic Product. Agroecosystems cover around 19 percent of

the land, and backings around 75 percent of the nation's populace. Just around eight percent of the aggregate land region is arable, in any case, and Kenya has a lower normal populace to-cropland proportion than sub-Saharan Africa by and large, with an expected 160 ha of land for each thousand individuals contrasted with 280 ha, respectively(IFPRI, 2007).

Ruiru subcounty is the most populated sub-county in Kiambu County with a population of 201,986 as per the 2009population census; this has led to a lot of pressure on the land resource. Gatongora ward in Ruiru subcounty was home to large tracts of agricultural lands; these include Githunguri ranching company, Peponi ranch and Mwalimu farm, Murera farm amongst many others. Many of these cooperative farms have been subdivided to the members as smaller land parcels of between one acre and three acres. With time as a result of poor returns on agriculture the title owners have further subdivided the land parcels into plots for mainly residential and light industrial purposes. In some cases real estate investors have bought large estates of agricultural land and subdivided and gated communities and golf estates.

The consequent effect is that areas that were under commercial large scale agriculture are now in residential land use. All the employment opportunities that were created by these agricultural estates and other supporting agro based industries like bags and cordage in Juja are now gone, further more the foreign exchange that was being generated by the industry is no longer being generated. In addition to the economic effect at a macro and micro level of subdivision and selling of land by the shareholder has left some individuals destitute. This is because in some instances they have no other asset to rely upon for their livelihood.

To compound those problems is the environmental issues being created by the land conversions. Most of the soils that have remained uncovered since uprooting of the cash crops have been

severely eroded and leached. In addition the evapotranspiration that was taking place in the area has seized leading to extremely high temperatures. The conversion of land use to the west of Ruiru subcounty has created a desertification effect which will have adverse effects to the communities.

The manner in which the subdivision and land use conversion is done leaves a lot to be desired, the proliferation of unplanned settlements have manifested in varied forms. Unregulated urban development and neighbourhoods, structures that areillegal and unapproved like buildings are a main phenomenon. Kiosks and small shops that are poorly constructed and other adhocstructures have emerged. The developments are in most cases as a result of private sector initiatives completely oblivious of land use planning standards, regulations and legal controls. (Kiptoo, 1995)

In this research study we attempt to understand why are this cases of land conversion so rapid and what are the socio-economic and environmental impacts of the conversions.

1.2 Objectives of the Study

1. To find out existing land uses in Gitothua Ward.
2. To determine the causes of conversion of land from agricultural to urbaninGitothua Ward.
3. To establish the outcome of conversion of agricultural land to urban use.
4. To explore intervention measures can be taken to minimise adverse effect of land use conversions.

1.3 Research Questions

1. What are the existing land uses in Gitothua Ward?

2. What are the causes of conversion of land from agricultural to urban in Gitothua Ward?
3. What is the outcome of conversion of agricultural land to urban use?
4. What are intervention measures can be taken to minimise adverse effect of land use conversions?

1.4 Scope of the Study

This study has theoretical scope, geographical scope and subject scope.

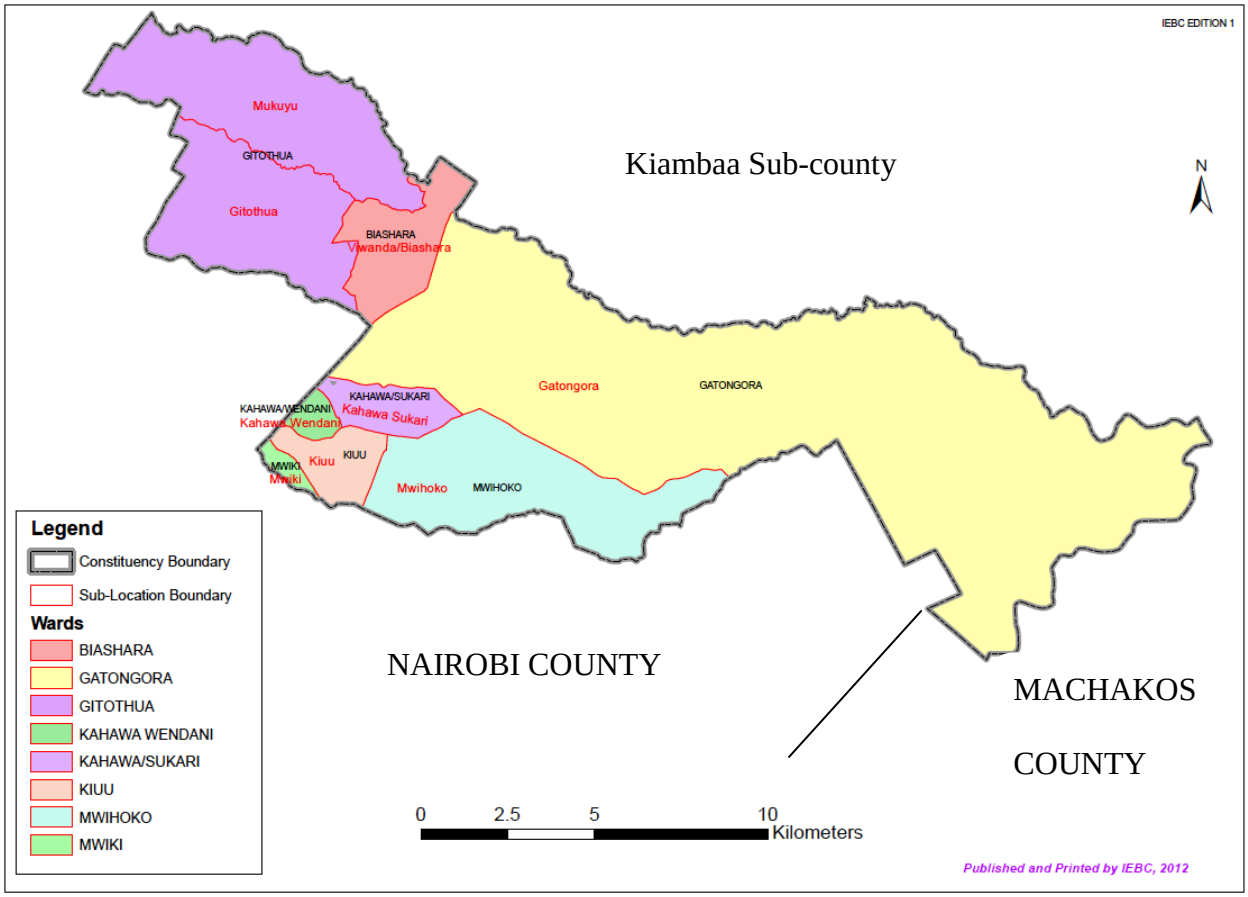
1.4.1 Theoretical Scope of the Study

The issues that were covered include state of competing land uses like agriculture, residential, commercial, light industrial users. Other aspects of the study covered include; uncontrolled land subdivision, implications of land use changes and the possible intervention measures.

1.4.2 Geographical Scope of the Study

Ruiru sub-county is the general study area but due to limitations in finances and research will be confined to Gitothua ward covering approximately 20 square kilometers. The ward was found to be representative of subcounty owing to its location and general characteristics. It is partially rural and urban.

Figure 1: Ruiru Constituency Wards.



Source:IEBC, (2007;63)

1.4.3 Subject Scope of the Study

The main objective of this research was to study the issues aponthe conversion land (agricultural use) in Peri urban areas of Gitothua Ward, Ruiru Subcounty. Specifically, the study sought to establish the causes of agricultural land conversions in Gitothua Ward, the Outcome of Conversion of Agricultural Land in Gitothua Ward, and to determine the state of management framework to regulate agricultural land conversions adoptedinGitothua Ward

1.5 Justification

This study to the authorities will be of great especially those dealing with management of agricultural land use conversions, especially in the peri urban areas.policies can be formulated by the recommandations by enforcing laws and enforcing the constitution hence making a strong framework for the suitable land use and the management of land. Consequently, the relevant authorities can make informed decisions in future thus reducing the negative effects of unsustainable agricultural land use conversions. Property owners, developers and landed professionals will be enlightened on how to assist authorities in agricultural land use conversions to achieve twin goals of improved agricultural production and sustainable development as envisaged in the Kenya Vision 2030 and Sustainable Development Goals (SDGs).

Gitothua being next to the capital Nairobi is dynamic and fluctuations and changes are expected as a consequence of either natural or human activity. Thus experiences of rapid land use changes caused by rapid population influx and resulting urbanization phenomenon. As the population keeps expanding, more demand is placed on the land, which in turn is converted into diverse users. In an area of fragile ecological balance like Gitothua, these land use dynamics ought to be closely monitored and resultant conflicts resolved.

This study provides the researcher with an opportunity to examine the cause and effects of land use changes and to finding intervention measure which will be essential in conservation of the ecosystem of Gitothua. This is necessitated more by lack of spatial framework to guide growth in the greater Ruiru area. Additionally the study findings will be useful to various stakeholders including but not limited to; County government of Kiambu, professional bodies like Institutions of Surveyors of Kenya, Kenya Institute of Planners, Law Society of Kenya among others, the

Academia, the private sector, including community and Non-governments organizations, International Organisations and general members of the public.

1.6 Assumptions

The assumptions of the research study will be:

No land use policy will be formulated for the area to radically alter existing land use patterns. This assumption will be important since a land use policy will regulate land uses in the area thereby it will render the recommendations irrelevant.

The land market dynamics will remain unchanged for the period of this study. The supply and demand of land will be vital since it will determine the use of land, in case the prices escalate or fall the investors will make different decisions so as to maximize their profits.

Much of the pressure on land is based on the increase in population. In addition to the population the purchasing power of the population will also affect the pressure on land. Therefor the population and economic growth in the country will be expected to remain the same.

1.7 Definitions of Terms

Land : According to the constitution "land", is the subsurface of the rock and the land generally, any water body beneath the water or above is what is reffered to as land, the water in owed sea and any zone of economy any natural resource that might be contained in water or on its surface and also the above surface air.

Urban Area: An area that is mostly developed with residential and industrial land use, not rural. Agriculture is not the main land use.

Peri-urban Area: Peri-urbanareais an area that surroundsurbanareasit has characteristics that are neitherpure rural nor pure urban.Peri-urban areas are often considered grey areas with a variety of land uses such as agricultural, industrial, residential and commercial.

Environment: The environment may be defined as a set of interlocking systems which include the physical, biological and social systems.Any issue that is arround anyone. And issue sorrounding an organisim or a sorrounding circumstance of a group ofliving things animals and plants externally physical condition combination, affecting or influencing development or an organisim, its growth and its measureof survival.

Sustainable Development: this is the kind of growth that ensure the present needs are met and the needs to come it the future are not tampered with(Brundtland Commission, 1987).

Land Degradation: The cumulativereduction of the productive potential of the land in an area.

Land Use: Land-use denotes the purpose to which land is put to. Land-uses include agricultural, residential, transportation and other uses including industrial and commercial.

Land Cover: The type of elements (water, vegetation, structures) that canvas the surface of the earth at a particular area.

Land Use Conflicts: Those development activities, which are incompatible with each other.

CHAPTER TWO

RESEARCH METHODOLOGY

2.0 Introduction

This chapter will discuss the methodology that was employed during the study, describing the instruments and procedures to be followed in conducting the study. This research was carried out in stages; the first stage was to collect data both published and unpublished from library sources country wide. The purpose of such literature was to gather background information on the broad area of the topic and find out what others have done. The literature was be used to guide the process of preparing field research instruments. Primary and secondary data sources were then collected.

2.1 Research Design

A research style can be described as the structure of the research. It is a strategy that is used to developsolutions to research problems. A research design may be described as a system for collecting and analysing of the main data in such a waythat could be relevant with the main objective of the research. It involves the collection's blue print, measurement of data and its analysis (Kothari, 2004). The scheme or plan used in this study is descriptive survey. The major purpose being description of the state of affairs as they exist.

2.2 Research Population

The research population was the entire households of Gitothua ward. The real estate developers of the area will also form another population.

2.3 Sampling Plan

Sampling was used in this research; this was done in order to ensure representativeness of the sample. Every house had the same chance of selection.a random sampling that is systematic will be used to select the samples. The method involves numbering all the accessible subjects/population, and determining the interval of selecting the subjects.

Cadastral plans of the area were used as the sampling frame and parcel numbers will be picked at intervals for each land parcel. According to the 2009 census Gitothua ward had a population of 18083 persons with 4895 households. Using Slovin's formula of sampling:

$$n = \frac{N}{1 + N(e)^2}$$

Using 4895 Households with 5% margin of error it gives 370 samples.

2.4 Data Needs Matrix

Table 1: Matrix for Data Needs

Research Objectives		Information Required	Source	Technique of Analysis
1.	To determine the current land uses in Gitothua ward.	Main types of land uses in Gitothua	• Development plans • Satellite imagery • Cadastral maps • Reports and studies • Households	• Literature review on existing land uses. • Map reading • GIS analysis • Quantitative analysis
2.	To examine the drivers of conversion of land use in Gitothua ward.	Cause of land use change	• Key informants interview • Reports and studies	• Literature review • Qualitative analysis
3.	To establish the effects of conversion of land use conversions in Gitothua ward.	Effects of land use change	• Photography • Reports and studies • Agricultural reports • Key informants	• Literature review • Qualitative analysis
4.	To explore intervention measures can be taken to	Ways of reducing negative effects of change of land use.	• Community suggestions and recommendations	• Literature review • Qualitative

	minimise adverse effect of land use conversions.		• Policies and regulations • Studies and reports	analysis

2.5 Data Collection Methods

The study has designed methods of collecting secondary and primary data types.

2.5.1 Secondary data

The research used the existing information that is data that is published on the types of land use patterns, existing methods of geo-data acquisition and management. This kind of data was obtained from land registry and maps, development plans and existing institutions. Land use development and subdivision approvals records were obtained from records in the physical planning offices of Ruiru subcounty planning offices. Data on the trends in growth of population will be obtained from census report on population and housing of 1969 to 2009. Data from various books, journals, government documents and studies on the effect of land use changes was gathered and analyzed.

Information on the socio-economic elements of Gitothua ward such as population size and dynamics, employment and business types was obtained from the central bureau of statistics and census reports. Relevant satellite imagaries and topo-sheets covering the past and present land use patterns in the study were also acquired.

2.5.2 PrimaryData

Primary data collection was done in two stages: reconnaissance and the main field survey. A reconnaissance survey was undertaken in the study areas as a familiarization tour of Gitothua.

The survey allowed for the feasibility of the proposed instruments to be assessed and their suitability estimated.

The main survey consisted of asking questions to a sample of the target population that was to be representative. A total of 370 standard household questionnaires were administered to the population. Systematic random sampling was done using an interval of 13(K = 4895 / 370) households done in odre to get a representative sample. Various key informants were interviewed using a semi structured interview schedule they included key national and county government departments officials and real estate investors in the area wereadminisered. Photography, observations and existing maps and satellite imagery were used to complement the questionnaire.

2.6 Data Analysis Plan

The first step after data collection was to edit data and code it for ease of analysis. This is to ensure accuracy of the data. For qualitative data, the coding takes the form of say an abbreviation, which will enable the researcher to locate and retrieve the required information. For quantitative data, numerical codes are used to represent attributes.

Analysis of the quantitative data was mainly through simple descriptive statisics, by use of measure of central tendency such as mean and mode. Content analysis was also used in analyzing the content of the questionnaires. In analyzing qualitative data the researcher first organized the data derived from the field notes and interviews by reading through and cleaning data. Various categories were then derived which helped the researcher make deductions about the existent peri-urban problem in the study area.

The change in Land use analysis was used to detect changes in land use of the area. This involvedsupervised classification of different land uses on Landsat 7 satellite imagery at different

times (epochs) and comparison of the land use maps. GIS software (ESRI ArcGIS)was used in this analysis to perform maximum likelihood supervised classification. Satellite imagery was geo-referenced and mosaicked using proper coordinates that will have been collected from the field using a global positioning system (GPS) receiver. These points were used as ground control points. Topographic maps were scanned and digitized to create a base map over which the land use maps wasplaced.

2.7 Techniques of Data Analysis

The researcher employed both qualitative and quantitative data analysis techniques. Quantitative data was obtained from questionnaires that were administered to respondents which werelater encoded for ease of digital manipulation. A master questionnaire was prepared to match un-coded questionnaires issued to respondents. The whole data was collected compiled and editted to ensure there was accurecy of them to the research question. The data was then eddited for errelevance then data entry was complited by the software of SPSS. The procedure for data analysis and coding was by the help of Statistical Package for the Social Sciences (SPSS), computer software to be used for analyzing data. A number of data will be requred for Coding, the case of data requred will be that data that will enable the researcher to analyse it in quantitative manner (Denscombe, 2007).

Descriptive statistical techniques were then used to analyze data. Healey (2005) explains that enlightening insights enable specialists to condense substantial amounts of information utilizing measures that are effortlessly comprehended by an onlooker. This, comprise of graphical and numerical methods for summarizing data, in other words, reducing a large mass of data to simpler, more understandable terms. Denscombe (2007) considers this process a vital part of

making sense of the data. The descriptive statistical techniques which were used included mean and standard deviation as well as percentage frequencies.

CHAPTER THREE

LITERATURE REVIEW

3.0 Introduction

This chapter reviews relevant public literature as well as official documents to deepen the understanding of issues concerning land conversations of agricultural land at peri-urban areas. A conceptual model/framework is formulated to inform the study.

3.1 Urban Development Theories

Planning as a discipline is well endowed with theories which provide an essential basis for the understanding of planning procedures. Land use change theories are also present and they provide relationship between land owners, purchasers and developers. The classical economic theorist such as Alonso and Wingo, explain the spatial structure in terms of how the market allocates space to users, according to supply and demand; while human ecology theories explain urban development through market-driven economic competition for urban space, and the Marxist theories explain urban development as the result of exploitation of workers by capitalists (Kaiser*et al*, 1995). The study's main focus is the land use change as presented by the development of the peri-urban areas, the internal and external forces that determine this change and therefore the interest to utilize planning as a tool for managing these changes.

From the human ecology and political perspective theories put forward by Rudel (1989) puts forward that that as market changes, resulting from improved infrastructure produces demographic changes and changes in land regulations over time. As land use changes, repeated dozens of times on different parcels of land, it gradually alters the configuration of interest in a community and this change in interest causes a change in policy (Rudel, 1989).

The thesis of the systems theory, as applied to the cities is that, the city is a dynamic system that evolves in response to many influences, processes and policies. The theory can be applied to an analysis of the urban areas if one views urban areas as systems with persistent human activities, especially those that occur and recur at specific locations or within particular zones (McLaughlin, 1969). A system, in the physical sense, refers to adapted spaces (such as buildings, forests, parks) described by the conscious and regular use, rather than, the physical construction and development. The most important argument for the analysis of the systems theory as relates to this study is that many activities takes place in the adapted spaces that were not originally intended and equally activities may take place on the same space (mixed use). The systems approach also contends that a city is a dynamic entity which evolves through time in way which depend upon changes in land use.

3.2 Global Dynamics of Land Use Change

Global land use change can mostly be characterized by the expansion of urban and infrastructure areas at the expense of agricultural land and by the expansion of agricultural land at the expense of grasslands, savannahs and forests (Holmgren 2006).The global land area of the continents is around 14,900 million hectares. Depending on the definition and method of measurement, around the year 2005, built-up area covered by settlements and infrastructure took up a relatively small amount of land – 1 to 3% of the total. Without policy interventions, settlements and infrastructures are expected to expand by around 260 to 420 million hectares by 2050 (Kemp-Benedict et al. 2002, Electris et al. 2009), then covering about 4 to 5% of the global land area (Figure 2.1), while strong policy action may lead to only a 90 Mha increase (or 3%) (Electris et al. 2009). In both scenarios the expansion would occur on agricultural land. According to Seto et al. (2010), urban areas alone might expand altogether by between 40 and 143 million

hectaresfrom 2007 to 2050. Holmgren (2006) assumes that 80% of urban expansion occurs on agricultural land.

During the past 40 to 50 years agricultural land has expanded at the expense of forests in particular in tropical regions (Gibbs et al. 2010). A study on past trends and future development options based on various scenarios (Lambin and Geist 2006) indicates that the loss of forest will probably proceed in the tropics, whereas in temperate zones afforestation might prevail. Hurtt et al. (2011) developed land use scenarios by linking historic data with future projections for Earth System Models to predict future carbon-climate changes. Four integrated assessment models for 1500 to 2100 show declines of primary (previously undisturbed by human activities) forest as well as non-forest areas.

Cropland currently comprises about 10% (around 1,500 million hectares) of the world land area, whereas agricultural area in total makes up around 33% (around 4,900 million hectares). From 1961 to 2007 overall land use for crops increased by some 11%, or approximately 150 million hectares globally, with large regional differences. The EU-15 (in particular Italy and Spain), Eastern Europe (Poland, Bulgaria, Romania) and North-America (the US) showed a declining cropland use, whereas more cropland was used especially in South America (Brazil, Argentina, Paraguay), Africa (Nigeria, Sudan) and Asia (China, Indonesia).

An increasing share of irrigated land in total agricultural land is the major factor for the more multiple cropping. The overall cropping intensity in the world has risen steadily over the period 1961-63 to 2006-07. The highest growth is observed in Africa and Oceania (an increase by 25 percentage points and 16 percentage points, respectively), while there is a significant reduction in Europe (a decrease by 8 percentage points). Between 1961/63 and 2006/07, harvested area

grew by 229.5 million hectares (or 23.6%). About half of this growth is attributable to the expansion of arable land (135.6 million hectares), and half to the increase of MCI (OECDFAO 2009).

The shifts between countries and regions need to be interpreted against the background of global trends as well as of increased international trade. For instance, the decline of cropland in Europe is a consequence of largely replacing domestic feed production by import of soybean and soybean meal from Latin America (Dalgaard et al. 2008).Regarding future trends, the OECD (2008b) estimates global agricultural land - both cropland and permanent pastures - to extend by roughly 10% until 2030 (respectively by 14% until 2050 or around 690 million hectares). The United Nations (MEA 2005; UNEP 2007) outline the potential range of increase until 2050 between 7% and 31%, or roughly 350 to 1,500 million hectares, depending on various boundary conditions and assumptions. Forest losses go hand in hand with the expansion of pasture and cropland, which is also growing at the expense of natural grasslands and savannahs.

Global land use scenarios developed by the Netherlands Environmental Assessment Agency (Van Vuuren and Faber 2009) expect a net expansion of cropland fromaround 1,500 million hectares to more than 1,600 million hectares by 2050. The expansion would mainly occur in Africa, Latin America and Southeast Asia. During the same period, there would also be some decrease in agricultural areas in temperate zones. The FAO outlook trend (FAO 2006b) shows a very similar trend.

According to Unwin and Porter (1995), many regions in Asia have witnessed the emergence of functionally integrated structures where agricultural and non-agricultural activities are increasingly found in complex, spatial mixes. Evidence from other regions, particularly, in the

third world, may suggest that in physical terms the distinction between rural and urban landscapes is still relevant. Nevertheless in functional terms, the increasing and sustained integration is recognized (Potter and Unwin, 1995).

Aguilar and Ward (2003) discuss two forms of peri-urban development; firstly urban corridors (such as Thika road) which are lineal development that may concentrate a predominance of different activities along the way like corporate developments, industrial parks, residential areas, and the density varies from very compact areas to low- urban density with rural landscape in the middle. Second, urban sub-centres in the periphery that may be consolidating traditional towns once dominated by agricultural activities, or the result of new (low-income) residential developments in metropolitan municipalities of rapid growth incorporated into the wider metropolitan complex for the first time. According to Aguilar, the sub-centres play the role of small cities by providing cheap labour, concentrating a wide range of services, and serving as satellite or dormitory towns to the large city.

In Asia, as a result of the influence of the expanding city, the rural character of the fringe is gradually or sometimes very abruptly replaced by a more urban profile in terms of land use, employment and income, and culture. During this process of transformation, pressure on land is rising because of migration from the core city and rural areas and natural population growth. The pressure on land is characterized by building construction, garbage disposal and construction of highways. The result of this pressure on fringe villages is not only changing the land use character, but also the degradation of natural resources. Households adapt their socio-economic behavior by intensifying agriculture or leaving it, by seeking local non-agricultural employment and/or by out migration. In the their research work in the cities of Bangkok(Thailand), Jakarta(Indonesia) and Santaiago(Chile), Browder et al, selected study samples in

periurbanareas, working with a definition of the metropolitan fringe characterized by temporal and location features. They defined the outer boundary the urban fringe as the margin of the built-up area of the metropolitan centre. The fringe was defined from theboundary inwards, including all contiguous residential areas no older than 15 years (Browder, 1995).

3.2 Current Land Uses in Gitothua Ward

The spatial framework of Kenya's current urban system was laid during the colonial period, especially after completion of the Kenya- Uganda railway in the early 1900s (Obudho&Aduwo, 1990). As the country experienced large scale colonial European settlement and commercial cash crop farming in the in the fertile and temperate central highlands region, towns such as Eldoret, Kitale, Nakuru, and Nyahururu were established to serve as agricultural collection and distribution centers and as bases for European settlement and administration of the Kenya colony. The emerging urban centres grew at varying rates, depending on their location, accessibility, resource base, level of economic activity in their hinterlands, and the population of Europeans and Indians in the surrounding regions. (Obudho&Aduwo, 1990).

The colonial period is also significant in Kenya's urban development because it introduced British urban planning, architectural designs, and building standards, and continues to dominate their urban landscapes. These planning guidelines were applied during construction of the new colonial towns such as Nairobi superimposed on pre-existing indigenous cities including Mombasa. These instruments constrained the urban development of towns in the post-independence era because they were ill suited to the local socioeconomic conditions. (Ngayu, 2015)

After independence the government embarked on a programme to transfer land ownership from the white settlers to indigenous Africans. The programme involved settlement schemes as well as cooperative farms which would buy from the settler community. Cooperative farms and land buying companies would raise money from the members to buy the land.

Through a combination of factors, most of the white settler farms ended up in the hands of the new ruling and political class. Then the Company and Cooperative groups that emerged soon after independence began to bring together groups of landless people to buy some of the land from the departing settlers and from Gatuanyaga bordering Kitui, through Kiambaa and Limuru to Lari bordering Naivasha, one meets several big farms supporting flourishing plantations of pineapples, coffee, tea, horticulture or diary production.

In 1975 sessional paper No.4 on Cooperatives in Kenya was published and the government stated its continued recognition of cooperatives as vital institutions for mobilising resources. At the time there were 996 active cooperatives with the membership of 664,000 and a turnover of 691 million Kenyan shillings, most of which were large scale farming companies. (Muendo, 2004).

By 1974, Kenya had approximately 1540 large scale farms and estates, including cattle ranches, coffee, tea and sisal estates occupying about 500,000 hectares of land (Mbithi, 1975). Among this were the estates in Gitothua ward which include Tatu city. In 1986 there was a major change in policy framework in the country necessitated by the changing economic development. The Sessional Paper No. 1 of 1986 – Economic Management for Renewed Growth (EMRG) echoed the government long term strategy which included the liberalization of the economy.(Muendo2004) This allowed the cooperatives to run as profit making entities which

thus were able to change use of the land and get maximum profit from the more urbanized land uses.

This development made it possible for the cooperatives to subdivide their land into smaller agricultural land parcels ranging from 1 to 5 acres and allot the parcel to its members. Once the member had individual title deeds for the parcels they resulted to further land subdivisions in to smaller parcels meant for residential land use other than the original agricultural land use.

Ruiru faces another major land challenge defined by the rapid expansion of the Nairobi's peri-urban. Also, the urban centers have been rapidly expanding following heavy residential and commercial needs. Unfortunately, Ruiru is surrounded by rich agricultural land. Given the higher economic returns derived from the conversion of such agricultural land, many owners have sought change of user and large tracts of such land have been increasingly lost from Kiambuagricultural stock. Good examples are parts of the Githunguri Ranch and the Nyakinyua farms next to Ruiru which are all now under residential and commercial use. The new Tatu City next to Ruiru will claim more agricultural land. (Mwathane, 2012).

The uncoordinated development of the peri-urban areas around Nairobi can be blamed on lack of guided planning and management frameworks, prepared for the city and its environs. One of the most comprehensive planning efforts to date has been the Nairobi Metropolitan growth startegy focusing on coordinating the decentralization of the city, creation of other growth centres and integration of race and income groups. The Nairobi strategy, unlike the 1948 master plan, was a multi-sectoral development plan with clear strategies for integrated urban development to accommodate growth. The strategy assumed great administartive, political and financial support

by the central government; laying a framework for massive infrastucture investments. This support was not provided and thus the implementation of the strategy failed.

The Nairobi Metropolitan Development Plan 2008 focused on the boundaries of the city (Nairobi Metropolitan Area) which were to be expanded to include adjoining towns and municipalities. The Key objectives of the plan included the development and enforcement of planning and zoning regulations; and prpeatation of a spatial plan for the Metropolitan area. The plan covered 15 Municipalities adjascent to the city of Nairobi. The introduction of county governements may improve enforcement of planning regulations because of better funding and equipment to the devolved units.

3.3 Causes of Land Conversion

Land-use change is always caused by multiple interacting factors. The mix of driving forces of land-use change varies in time and space according to specific human-environment conditions. Biophysical drivers of land use change, such as droughts induced by climate change or loss of soil fertility by erosion may be as important as human drivers, which include economics and policy. As a result, biophysical factors, abiotic-climate, terrain and biotic-native and introduced species, primary productivity, etc., tend to define the natural capacity or predisposing conditions for land-use change among localities and regions. Trigger events, whether biophysical (a drought or hurricane) or socioeconomic (a war or economic crisis), also drive land-use changes. Therefore, land-use changes tend to be driven by a combination of factors that work gradually and factors that happen intermittently (Lambin, 2007).

According to Agevi, (1981), most of the land in the peri-urban areas is under private ownership. This system of land tenures hinders development control measures by the local authorities. Local

authorities lack resources to deploy the required manpower for enforce development regulations in these areas. They also lack spatial plans to guide growth in the peri-urban areas.

In his study of land constraints in Nyeri town Chege, (1977) observed that there was land shortage for urban development in urban centres. He noted that boundary extensions had been used to avail land for urban development without planning first. The boundary extensions were undertaken mainly due to political reasons other than economic. He concludes that by noting that mere boundary extension makes development control difficult due to the mixed land tenure system in these areas.

According to Kemoni, (2007) as quoted by Njoroge(2013), local authorities in developing countries are the land use plans implementers but have been traditionally organized along sectoral lines, with limited fiscal base, limited autonomy and no corporate policy making capacity. They have concentrated on service delivery 20and regulatory functions and have been unable to make effective decision capable of dealing with requirements of rapid urban growth.

3.3.1 Natural Variability

Natural environmental changes interact with the human decision making processes that cause land-use change. Highly variable ecosystem conditions driven by climatic variations amplify the pressures arising from high demands on land resources, especially under resource-limiting conditions, such as dry to sub-humid climatic conditions (Puigdef´abregas, 2010). Though natural and socioeconomic changes may operate independently, natural variability may also lead to socioeconomic unsustainability, for example when unusually wet conditions alter the perception of drought risks and generate overstocking on rangelands. When drier conditions

return, the livestock management practices are ill adapted and cause land degradation. Land-use change, such as cropland expansion in drylands, may also increase the vulnerability of human-environment systems to climatic fluctuations and thereby trigger land degradation (Puigdef´abregas, 2010)

3.3.2 Economic Factors

Economic factors and policies influence land use decision making by altering prices, taxes, and subsidies on land use inputs and products, changing the costs of production and transportation, and by altering capital flows and investments, credit access, trade, and technology. The unequal distribution between households, countries, and regions also determines who is able to develop, use, and profit from new technologies that increase profits from land management, such as the adoption of mechanized large scale agriculture (Lambin et. al. 2011).

3.3.3 Technological Factors

Economic changes are increasingly mediated by institutional factors, markets and policies, such as agricultural subsidies, that are influenced by global factors driving a trend toward intensive commercial agriculture and away from subsistence croplands. For example, giving farmers better access to credit and markets (by road building and other infrastructure changes), combined with improved agricultural technology and secure land tenure can encourage forest converstion to cropland, depending on how the new technologies affect labor markets and migration, whether the crops are sold locally or globally, how profitable farming is at the forest frontier, and the capital and labor intensity of the new technologies. (Lambin, 2007).

3.3.4 Demographic Factors

Both increases and decreases in local populations have large impacts on land use. Demographic changes include not only shifts in fertility and mortality but also changes in household structure and dynamics, including labor availability, migration, urbanization, and the breakdown of extended families into multiple nuclear families. Migration is the single most important demographic factor causing rapid land-use changes, and interacts with government policies, changes in consumption patterns, economic integration, and globalization (Barbier, 2011).

The growth of urban aspirations, urban-rural population distribution, and rapid urban expansion are increasingly important factors in regional land-use change, within major urban centers, in peri-urban areas, and even in remote hinterland areas. Many new urban dwellers in developing countries still own rural landholdings so that growth of urban areas not only creates new local and regional markets for livestock, timber, and agricultural products, it also increases urban remittances to the countryside (Angelsen and Kaimowitz, 2010).

3.3.4 Institutional Factors

Land-use changes are influenced directly by political, legal, economic, and traditional institutions and by their interactions with individual decision making. Access to land, labour, capital, technology, and information are structured by local and national policies and institutions, including: property; environmental policies; decision-making systems for resource management like decentralized, democratized, state-controlled, local communal, legal and social networks concerning distribution and access to resources. Land managers differ in their ability to participate in and to define these institutions (Poteete et. al. 2004).

Moreover, institutional controls on land use are increasingly shifting from local to regional and global levels as a result of the increasing interconnectedness of markets, the rise of international

environmental conventions, the consolidation of small landholdings, and the shift from communal, traditional systems to formal, state-sanctioned land ownership. Land degradation and other negative environmental consequences of land-use changes are often the result of ill-defined policies and weak institutional enforcement that undermine local adaptation strategies, such as subsidies for road construction, agricultural production, and forestry, and widespread illegal logging in Indonesia and other nations. On the other hand, the recovery or restoration of land is also possible with appropriate use policies. It is therefore critical that institutions that influence land management decisions are built around participation by local land managers and concern for the environment (Poteete et. al. 2004).

3.3.5 Cultural Factors

The motivations, collective memories, personal histories, attitudes, values, beliefs, and individual perceptions of land managers influence land-use decisions, sometimes profoundly. The intended and unintended ecological consequences of land-use decisions all depend on the knowledge, information, and management skills available to land managers and these in turn are often linked to political and economic conditions, e.g., the status of women or ethnic minorities. The cultural models of land managers and other agents of land use change thus help explain management of resources, adaptive strategies, compliance or resistance to policies, social learning, and social resilience in the face of land-use change (Briassoulis, 2008).

3.3.6 Globalization

Globalization processes can amplify or attenuate existing driving forces for land use change by removing regional barriers to change, weakening national connections, and increasing the interdependency among people and between nations. Globalization as such is not itself a driver of land-use change but acts as an underlying process for other driving forces(Barbier, 2010).

Although the environmental effects of macroeconomic policies and trade liberalization are particularly important in countries with fragile ecosystems (semiarid lands and mangrove forests), international trade and other forms of globalization can also improve environmental conditions through green certification and eco-labeling, wider and more rapid spread of technologies, better media coverage allowing international pressure on states that degrade their resources, and free circulation of people, which provides better educational and employment opportunities. International institutions (including organizations within the United Nations (UN) system and non-governmental organizations) can be instrumental in setting political agendas, building consensus, and promoting and funding policies aimed at sustainable land management(Briassoulis, 2008).

3.4 Impacts of Land Use Change

On one hand, sustainable land use conversions are likely to provide cheap land for residential development in the urban fringes thus making housing cost affordable to majority of people since real estate is expensive and cost of land accounts for a big percentage of the housing cost. The Kenya National Housing Policy (2004), for instance, observes that supply of serviced land at affordable prices in suitable locations is one of the critical inputs for housing development. Provision of affordable housing in the urban fringes, especially near the capital city of a nation, will have many positive economic and social benefits to the development of any nation. In addition, agricultural land use conversion is likely to increase land values, housing costs and rentals (due to increase in land values) thus earning land owners/real estate investors high returns from their land (Eric, et. al 2007).

On the other hand, unsustainable agricultural land use conversions reduce amount of agricultural land available for agricultural production. This may negate on policies of national food security

and nutrition since reduction in agricultural land may lead to reduction in agricultural production in countries that rely heavily on rain-fed agriculture like Kenya. Moreover, agricultural land use conversions may also lead to increase in land values, increase in housing costs and rentals (United States Department of Agriculture, 2008). Increase in land values, housing costs and rentals may displace poor locals from their agricultural land due to infiltration by upper income earners since poor locals cannot afford the resultant high living standards (Eric, et. al 2007).

Ruiru subcounty has been experiencing ribbon developments due to the presence of Thika super highway and the Northern Bypass. The land values at these areas are exorbitant and developers will always want to put up development that will give the maximum returns. This process has also resulted to uncontrolled subdivision of Agricultural land into very small plots that are uneconomically viable and with no reference to change of use(Mureti, 2012).

The result is uncontrolled and uncoordinated developments resulting into conflict of land uses. This calls for an urgent need to have strategic plans in place to contain and guide this type of urban sprawl. Land use and urban sprawl are major environmental concerns and there is need to adopt sustainable patterns of developments. New Highways and sprawled housing developments are reducing farmlands, causing loss of wildlife habitat and scenic qualifies that attract tourism, increased air pollution, increased energy consumption and loss of time as people are forced to spend more time commuting longer distances to reach their jobs , homes, schools, and shopping centers (Mureti, 2012).

For Instance, driving along Nairobi- Thika Superhighway, one can hardly realize the boundary of Kiambu and Nairobi Counties due to urban sprawl. Infill developments as a planning tool can

address the challenges of urban sprawl. Integrating new development into existing neighborhoods fabric can enhance the sustainable development (Mureti, 2012).

Kiambu county and especially Ruiru being a rich agricultural district, it is one of the leading potential industrial zone of the country. However there are isolated pockets of poverty in the district and mainly found in urban slums in Thika Municipality, Ruiru Town and Juja. Despite the 1978 strategy for Rural and Urban development placing Ruiru as one of the industrial hubs for Kenya development, not much has been achieved to date. The Industrial use has not been given much preference(Mureti, 2012).

This in fact a major contradiction to Government policy that Kenya should be industrialized by 2030.For any county to realize economical growth, industrial development ought to be prioritized. In order for the government to address the menace of people migrating to urban areas, incentives should be put in place to encourage the growth of off-farm activities through planning process. The proposed Tatu City, Thika Greens, Migaa Estates and Four ways Projects ought to have a very fine physical planning input to avert possible social-cultural impact on completion of developments(Mureti, 2012).

Environmental impacts concern mostly changes in: climate, atmosphere, and stratosphere like global warming and climate change, atmospheric pollution and stratospheric ozone depletion caused by the removal vegetative cover on Earth ; water resources like water depletion and pollution due to agricultural intensification, overgrazing, and industrial activities; soils like erosion, sedimentation, and desertification caused by removal of vegetation, water depletion, and climatic change; ecosystems like mainly biodiversity loss; and human health and safety

likeincreased incidence of infectious diseases, accidents, and other health hazards due to inadequate water, food, and other resources.

Demographic impacts include out-migration and weakening of population structures, while economic impacts refer to loss of land productivity, increased cost of land utilization, reduced income, and dependence of economically marginalized regions on external sources for subsistence and development. Social impacts, in addition to health and safety, concern loss of wealth, job, education, and life opportunities, poor social status, nutrition, and living conditions; aggregately, environmental security and human vulnerability are placed at risk. All impacts combined suggest that, in the late twentieth century, land-use and land-cover change does not promote the broad goal of sustainable development. Extant and proposed policies to promote the transition to sustainability aim at controlling land-use and land-cover change, directly or indirectly. However, the complexity and systemic nature of impacts deem imperative the adoption of the precautionary principle and international-level policy action (Briassoulis, 2008).

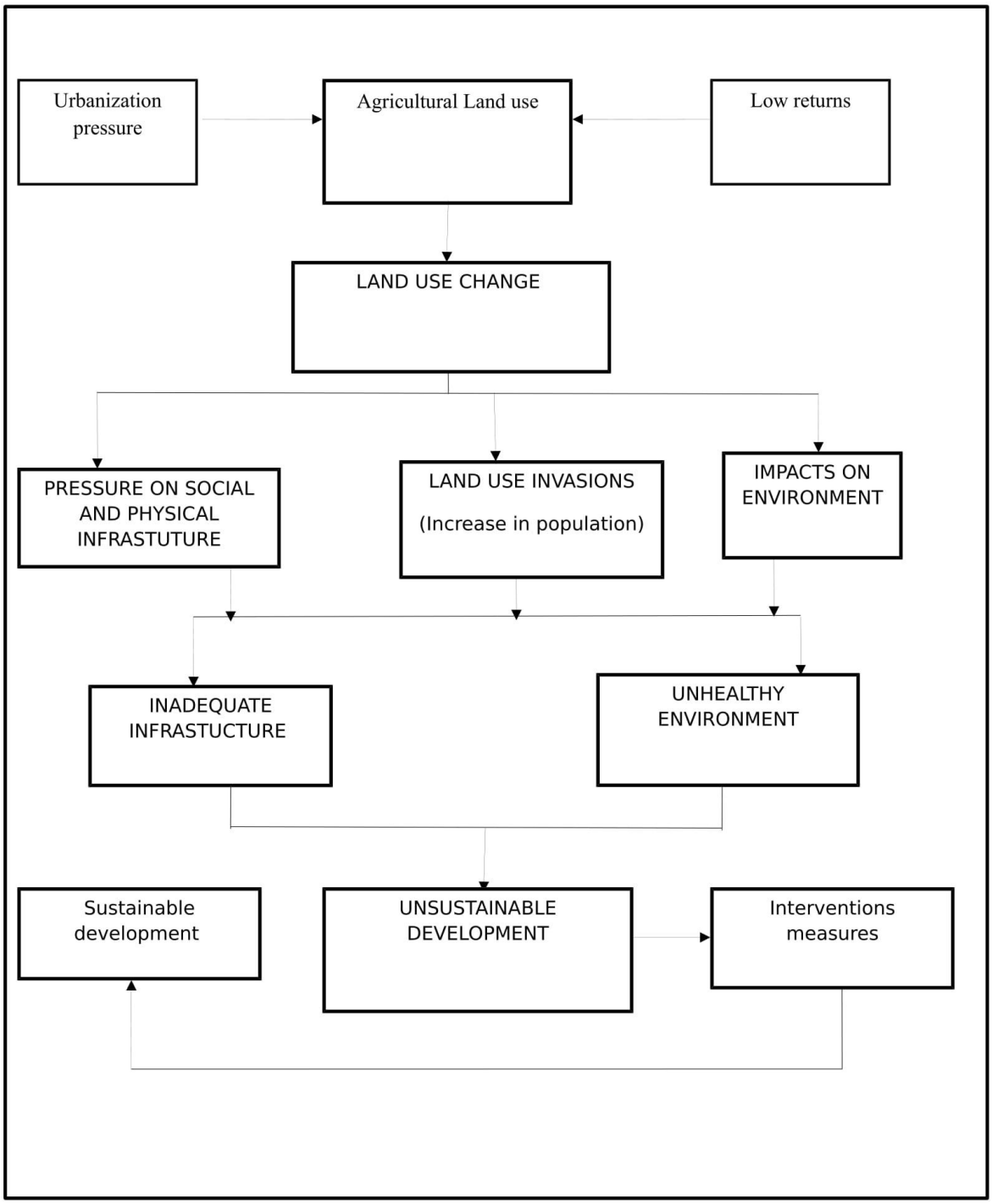
The sequence starts with land-cover modifications that alter the physical and chemical composition of environmental receptors (air, water, biota); these trigger a host of economic and social impacts that lead to further land-use and land-cover changes. Originally, most attention was paid to environmental impacts, but gradually the severity of socioeconomic impacts, including food security and environmental vulnerability, were recognized as well. Currently, the study of land-use change covers the whole web of intricately interlinked environmental and socioeconomic impacts in the broader context of the quest for sustainable development.

Land-use change occurs first at the level of individual land parcels and modifies land cover through proximate sources of change. These include forest clearing, fires, shifting or intensive cultivation, overgrazing or, more generally, over-harvesting of resources, construction of housing, tourist facilities, and infrastructure works, dredging and filling of wetlands, afforestation, national park designation, etc. Collective processes result from the aggregation of individual actions; these are known as deforestation, urbanization, suburbanization, urban sprawl, industrialization, nature conservation, and tourism development. Because of the connectedness of the environment, changes in one receptor reverberate on other receptors, generating large-scale effects. Examples of those include global warming and climate change, stratospheric ozone depletion, land degradation and desertification, soil salinization, river, lake and coastal pollution, acidification, or eutrophication (Briassoulis, 2008).

Environmental impacts cause socioeconomic hardships such as loss of land productivity and, consequently, increased cost of land development and income loss, unemployment, poor and unhealthy living conditions and the like. To overcome these hardships, people pursue particular courses of action. Migration and rural exodus are common "escape" solutions, improvements in land-management practices is another option, technological solutions still another, while a variety of institutional measures may try to address and/or redress some of these problems such as land reforms, environmental and regulations, instruments, and institutions, and administrative restructuring. Numerous hypotheses have been advanced to explain and predict the causes of land-use change and the resulting impacts. The complexity of real-world situations, in particular the pathways through which changes occur, as well as their global nature, defies theoretical

schematization and permits only approximations to both their identification and measurement. (Briassoulis, 2008).

3.5 Conceptual framework



CHAPTER FOUR

POLICY AND LEGAL BASIS OF LAND USE PLANNING AND DEVELOPMENT

4.0 Introduction

This chapter reviews relevant public literature as well as official documents to deepen the understanding of intervention measures for land use conversions of agricultural land at peri-urban areas in Gitothua ward.

4.1 Intervention Measures for Land Use Conversions

According to Agevi, (1981), most of the land in the peri-urban areas is under private ownership. This system of land tenures hinders development control measures by the local authorities. Local authorities lack resources to deploy the required manpower for enforce development regulations in these areas. They also lack spatial plans to guide growth in the peri-urban areas.

In her study of the effects of urbanization on the use and control of land within Ngong fringe area, Simiyu (2002) noted that the multiplicity of planning institutions coupled with their institutional inadequacies made it impossible to control expansion of urban settlements within peri-urban areas without strict development control enforcement (Simiyu, 2002).

According to Ngeti, (1997) in his study of An Assessment of the impact of land use Regulations and Policies on land utilization in Mombasa municipality he observed that land use regulations in developing countries, often fail to achieve greater efficiency and equity in the use of urban land and this was evident in many Kenyan towns. He attributed this to the use of Physical Planners by Local Authorities and the Central Government as rubber stamps to development proposals, lack of effective link between planning and implementing agencies, multiple land planning laws and deficiencies of skilled personnel in principal development control agencies such as Physical

Planning Department, the local authority and the land control boards resulting in misinterpretation and misapplication of the laws concerned with land use control issues. He concluded that there was need to amend the existing regulatory policies and planning legislation for effective land use control. (Ngeti, 1997)

Agevi, (1981) in his study of problems of urban boundary extension in Kitale municipality he observed that mere extension, which was not followed by proper policy machinery created a conducive environment for speculative developments that would outstrip the ill equipped development control machinery of municipal councils. He summarized by noting that planning institutions did not have adequate resources; finances, technical manpower and managerial ability to tackle effectively the colossal problems of development control in the satellite areas covered by the boundary extensions. (Agevi, 1981)

Past Kenya Government Initiatives on prudent land management In Kenya, several efforts towards sound land use have been undertaken by the government since independence, as stipulated by various documents:

Sessional Paper No. 10 of 1965 on "African Socialism and Its Application to Planning in Kenya" The first effort was the development of Sessional paper No. 10 of 1965 on African socialism and its application to planning in Kenya. The paper ensured that the country's wealth would remain in the productive areas, which include the former white highlands and those covered by early registration under the swynnerton plan. It asserted that to make the economy grow as fast as possible, development funds would be invested where it would yield the largest increase in net output. This approach clearly favoured the development of areas endowed with natural resources,

good land and rainfall, transport and power facilities while areas without such facilities continued to lag behind(Kenya, 1965).

The second government effort was the development of the Sessional paper No. 1 of 1986 on Economic management for renewed growth, which re-emphasized that agriculture remains the leading sector in stimulating growth and job creation. In terms of land tenure, the policy paper observed that there had been no major policy review since independence. The government was therefore to appoint a commission in early 1986 to review the land tenure laws and practices in the country and to recommend legislation that would bring the law into conformity with Kenya's independence needs (Kenya, 1986).

4.2 Policy Framework

This section reviews the legal guild lines that have been enacted in the country to control land use changes. The policy framework therefore provides broad principles and guidelines on land use management issues.

4.2.1 The National Land Use Policy

Land use policy means primarily the intentions, the programs and operations of public authority to control land use in desirable direction. It stems from the desire to order and regulate the use of land in an efficient and ethical way, thus preventing land use conflicts. Currently, Kenya does not have a comprehensive and codified national land use policy but instead there have been inconsistent laws on land utilization including The Land Planning Act, chapter 303 and The Town Planning Act, Chapter 134 which have been repealed. All sectors affected by land use policy such as agriculture, housing, Nairobi Metropolitan, among others lament the inexistence of a National Land Use Policy. Currently, land use management is guided by many land laws

such as The Land Control Act, chapter 302 and The Physical Planning Act, chapter 286, not by policy. However, Kenya is in the process of formulating a National Land Use Policy. Consequently, land use policy and planning under the current status cannot be said to promote sustainable development, meaning there is poor land use management

4.2.2 TheNational Land Policy

Kenya has not had a clearly defined or codified National Land Policy since independence until 2009 when a National Land Policy was formulated (Kenya, 2009). This delay and existence of many incompatible land laws led to a complex land management and administration system. Since colonialism, Kenya has been grappling with the land question. Subsequent government regimes failed toor are not willing to resolve. This has resulted in environmental, social, economic and political problems and deterioration of quality of land, squatter settlement and landlessness, land disinheritance of some groups and individuals, urban squalor, under-utilization and abandonment of agricultural land, tenure insecurity; all these have fanned conflicts (Muendo, 2004). The National Land Policy aims of guiding the country towards sustainable and equitable use of land to resolve the land question once and for all.

Further, the policy recognises that use of land in urban and rural areas has been a major concern to all Kenyans. Some of the key problems noted by the policy that need to be resolved at land use policy level include emergence of land use conflicts as a result of competing land uses, uncontrolled subdivision of agricultural land particularly in the high potential areas of the small farm sector, low land productivity, deterioration in land quality as a result of poor land use practices, indiscriminate sale and purchase of land, lack of alternative land uses and planning for diversification of the rural economy and unmitigated urban sprawl. Other problems include unproductive and speculative land holding especially, by the elite; and uncontrolled development

and a general disregard for planning regulations, among others. In addition, problems of unsustainable production, inadequate land use planning; poor environmental management, inappropriate ecosystem protection and management are commonplace and require appropriate policy response. Moreover, urban agriculture has not benefited from proper regulation and facilitation. This is a testimony to the fact that Kenya does not have effective land use management and planning, thus it is experiencing unsustainable development and environmental deterioration (Muendo, 2004).

4.2.3 The Agricultural Sector Development Strategy (ASDS) 2010–2020

The Agricultural Sector Development Strategy (ASDS) is the overall national policy document for the sector ministries and all stakeholders in Kenya. It is a revision of the Strategy for Revitalizing Agriculture (SRA) (Kenya, 2010). Agriculture is noted to be inevitably the key to food security and poverty reduction and overall development and growth of the sector is anchored in two strategic thrusts: increasing productivity and developing and managing key factors of production. ASDS acknowledges that land is the most important resource in agricultural production. And that limited availability of productive land is a major constraint to increased agricultural production (Kenya, 2010: 9 and59). The strategy has further highlighted lack of coherent land use policy which has led to uneconomic land subdivisions and poor land-use practices, thus these practices have accelerated land degradation and declining land productivity. It is evident that agricultural land use conversion is a real challenge that must be tackled by proper land use management framework before the situation gets out of hand. There is no denying that Kenya relies heavily on rain-fed agriculture and that our fertile rain-fed agricultural land is limited. For Kenya to achieve her vision of a food-secure and prosperous nation as envisaged by ASDS there is need to protect her limited high and medium potential land

4.2.4 The Kenya Vision 2030

Kenya Vision 2030 is the new country's development blueprint covering the period 2008 to 2030 (Kenya, 2008). It aims at making Kenya a globally competitive and prosperous country with a high quality of life by 2030, that is a newly industrializing, "middle income country providing high quality life for all its citizens by the year 2030" by improving economic, social and political pillars. Vision 2030 has identified agriculture as one of the key sectors to deliver the 10 per cent annual economic growth rate envisaged under the economic pillar. In Agriculture, Kenya aims at increasing productivity of crops and livestock; introducing new land use policies through better utilization of high and medium potential lands and developing an Agriculture Land Use Master Plan. Consequently, sustainable agricultural land use conversion will be important in achieving this goal so as to protect our limited high and medium potential agricultural lands. Similarly, under social pillar, importance of housing is acknowledged. Kenya's journey towards prosperity also involves the building of a just and cohesive society, enjoying equitable social development in a clean and secure environment. The 2030 vision for housing and urbanization is an adequately and decently housed nation in sustainable all inclusive environment. Availability and access to cheap and serviced land for housing development is cited as a major challenge to provision of adequate and affordable housing.

Therefore, for Kenya to achieve the twin goals of improved agricultural performance and provision of adequate and affordable housing there is need for sustainable agricultural land conversions. For instance, demand for cheap and serviced land for housing development may force property developers and households to seek land in the urban fringes thus putting more pressure on agricultural land. To achieve sustainable agricultural land use management, especially in the urban fringes, the two competing goals need to be checked and balanced. This

can only be achieved by putting in place effective and responsive land use management framework.

4.2.5 National Urban Development Policy

Urban development in Kenya has largely been taking place without a comprehensive national urban policy framework. Past sector policies did not adequately address urbanization as an evolving system that could foster development and economic growth and one that would integrate urban and rural development in a mutually beneficial relationship.

The draft National Urban Development Policy(NUDP) seeks to create a framework for sustainable urban development in the country and addresses the following thematic areas: urban economy; urban finance; urban governance and management; national and county urban planning; land, environment and climate change; social infrastructure and services; physical infrastructure and services; urban housing; urban safety and disaster risk management; and marginalized and vulnerable groups.

National Urban Development Policy is guided by the Constitution of Kenya 2010, clauses 184 and 176 (2) that provide for regulation of urban areas and cities, clause 200(2), which outlines the governance of the capital city, other cities and urban areas and Vision 2030, which calls for a nationwide urban planning and development campaign. (KARA, 2016)

4.3 Legal Framework

Many laws and policies have been developed to guide physical developmental processes and they impact on the peri-urban areas and other human settlement zones. Each of them influences land use differently since they regulate different facets of land use.

4.3.1 The Constitution of Kenya (Kenya, 2010)

The constitution of Kenya was promulgated on 27th August 2010 and forms the foundation of all other laws in Kenya as the supreme law of the land. Chapter six section 60(1) spells out the principles under which the provision on land use and management are made. They include equitable, efficient, sustainable and productive management of land resources, access and use of land; and further states that these principles will be implemented through a national land policy. Under the same section, the constitution provides for the formation of a National Land Commission which is to "monitorand have oversight responsibilities over land use planning throughout the country" and "conduct research related to land and the use of natural resources, and make recommendations to the appropriate authorities"

Article 60, Section 1, cover matters on land and states that land; "shall be held, used and managed in a manner that is equitable access to land; security of land rights; sustainable and productive management of land resources; transparent and cost effective administration of land; and sound conservation and protection of ecologically sensitive areas."

On the other hand article 66, section 1, provides for the role of the state to regulate the use of any land, or any interest in or right over any land, in the interest of defense, public safety, public order, public morality, public health or land use planning. There is established the National Land Commission whose function among others is to monitor and have oversight responsibilities over land use planning throughout the country.

Article 69 Section 1, make provisions for the state to ensure sustainable exploitation, utilization, management and conservation of the environment and natural resources, and ensure the equitable sharing of the accruing benefits; and the fact that all persons are expected to cooperate with state

organs and other persons to protect and conserve the environment and ensure ecologically sustainable development and use of natural resources. Section 70, subsection 1, provides for redress, in the case where a person alleges that the upon right to clean and healthy environment, is likely to be denied, violated, infringed or threatened (Kenya, 2010).

4.3.2 The Urban Areas and Cities Act No.13 of 2011, Laws of Kenya

The act sets out the functions of the City and Municipal Boards. Among these include, a) to formulate and implement integrated development plans and, b), to control land use, land subdivision, land development and zoning by public and private sectors for any purpose. The land uses include but are not limited to industry, commerce, markets, shopping and other employment centres, residential areas, recreational areas, parks, entertainment, passenger transport, agriculture and freight and transit stations within the framework of the spatial and master plans for the city or municipality as may be delegated by the county government.

The act articulates the objects of the integrated urban areas and city development planning as preparation of environmental management plans and valuation rolls for property taxation. Most importantly, the act provides for integrated urban and city development plans that bind, guide and inform all planning development and decisions and ensures the comprehensive inclusion of all functions and the fact that a county government shall initiate an urban planning process for every settlement with a population of at least two thousand residents.

In a key departure from previous practice, the act sets out the rule that plan preparation, adoption and therefore implementation of spatial plans is a priority for county governments. The provision that, a board or town committee within the first year of its election must adopt a single, inclusive strategic plan for the development of the city or urban area, the board's development

priorirtiesand objectives, a spatial development framework and basic guidelines for land use management systems for the city or municipality(Ngayu, 2015).

4.3.3 The County Government Act 2012, Laws of Kenya

The act provides for the functions of county government and specifically part X1 elaborates on 'county planning'. According to the act, the objectives of planning at the county level are many varied and include; i) facilitating the development of a well-balanced system of settlements, productive use of scarce land, water and other resources for economic, social, ecological, social, ecological and functions across a county; (ii) developing urban and ruaral areas as integrated areas, sub counties and wards for planning purposes.

In previous planning laws, the engagement of citizens in the planning process was implied, albeit, with limitations on the format of engagement. Section 4(1) clearly states that public participation in the county planning processes is mandatory and is facilitated through mechanisms provided for in part VIII of the act. Sec 2 of the act also provides for the types of plans that should be developed to facilitate development within each county, naming them as, county integrated development plans; county sectoral plans; and cities and urban areas plan as provided for under the Urban Areas and Cities Act. Specifically, the act states that the spatial plan should have a life span of ten years to provide for accommodation of the dynamics of development, an aspect that planning authorities have been grappling with for many years.

Planning within the peri urban areas is catered for by sec.108 (2) f, where it states that a county "may delineate the urban edges of the municipalities within its jurisdiction and mechanisms of dealing with the rural urban interfaces." This study makes an attempt to provide mechanisms on how best the fringes can be planned. Information generated hereto is expected to lay the

foundation generated hereto is expected to lay the foundation of this provision as it articulates the planning challenges and opportunities evident in the evident in peri-urban areas (Ngayu, 2015).

The poor implementation of the plans can be blamed on the inability of planning authorities to link financial budgeting and spatial plans. This aspect has been addressed by the act in sec 110 (1) which provides that the country's integrated development plan shall "inform the county's budget which shall be based on the annual development priorities and objectives referred to in section 101 of this act and the performance targets set by the county". The on-going reforms in the country therefore promise not only changes in the political arena but also the planning profession and practice which may experience fundamental transformation.

4.3.4 The Physical Planning Act, Chapter 286, Laws of Kenya

In terms of preparation of plans, the Physical Planning Act provides for preparation of plans at different spatial levels including the steps and contents of such plans. Sec 16 (1) provides for the preparation of a regional physical development plan; '…. in reference to any Government land, trust land or private land within the area of authority of a county council for the purpose of improving the land and providing for the proper physical development of such land.

Sec 16 (2) states that; '… a regional physical development plan may provide for planning, replanning, or reconstructing the whole or part of the area comprised in the plan, and for controlling the order, nature and direction of development in such an area.'

Sec 23, (1) gives the DPP powers to; '…. Declare an area with unique development potential or problems as a special planning area for the purpose of preparation of a physical development

plan irrespective of whether such an area lies within or outside the area of a local authority.' This implies the plan may be prepared irrespective of the administrative boundary (Ngayu, 2015).

This implies that the law is explicit on circumstances under which a broad planning framework such as a regional physical plan to guide development may be prepared. Due to the expansiveness of peri-urban areas and the fact that such areas lie astride multiple jurisdiction, then such a plan would be most appropriate. The contested nature of the space and conflicting land uses, particularly where they are watershed or ecologically fragile areas, make the peri-urban areas good candidates for "special planning areas". The law allows for planning for an area irrespaective of land tenure system. Sec 24(1) provides for the Director to prepare with reference; '…to any Government land, trust land or private land.'

It is implied that a plan may be prepared to guide the development for public benefit in provisions such as subsection (3) which gives the purposes for which the local physical plan is prepared as,

'…. Guiding and coordinating the development of infrastructural faciliteies and services for an area referred to in subsection (1), and for the specific control of the use and development of land or for the provision of any land – in such area for public purposes.' In respect to developments that may have negative environment impacts, such as excavation and alterations to an area and which result to change of land use and Sec 36 provides such recourse if: '…… any development activity will have injurious impact on the environment…' (Ngayu, 2015).

4.3.5 The Land Act 2012, Laws of Kenya

The essence of this act was to consolidate and rationalize the numerous laws previously governing management and administration of land in Kenya. In regard to land use planning and

management, part II of the act specifically provides for management of public land. The body charged with responsibility of making planning regulations and plan approval is the National land Commission. Section 17 provides for preparation of development plans (by a management authority); the key considerations for plan making are provided for under subsection 2a-d; and finally section 19 provides for making rules and regulations for sustainable conservation of land based resources,(Ngayu, 2015).

4.3.6 The National Land Commission Act 2012, Laws of Kenya

The object and purpose of the act is to manage and administer land in accordance with the principles of land policy and Article 10 of the constitution. Secondly it is to link the NLC with county government and other institutions dealing with land and land related resources. Further, in section 5 (h) the Act provides for the commission to have monitoring and oversight responsibility over land use planning throughout the country.

4.3.7 The Land Control Act, Chapter 302, Laws of Kenya

In the actthe land control boards are given powers to grant or refuse permission for dealings in agricultural land such as sale, transfer, lease, mortgage, exchange, partition or other disposal. The land control boards are supposed to consider the following before granting the permission for dealings in agricultural land: they should have regard to the effect which the grant or refusal of consent is likely to have on the economic development of the land concerned or on the maintenance or improvement of standards of good husbandry within the area; act on the principle that consent ought generally to be refused where the person to whom the land is to be disposed of is unlikely to farm the land well or to develop it adequately or is unlikely to be able to use the land profitably for the intended purpose owing to its nature or already has sufficient agricultural land. In the case of the division of land into two or more parcels, the land control boards should

refuse permission where the division would be likely to reduce the productivity of the land or where the parties who want to buy the land are not Kenyans.

CHAPTER FIVE

GITOTHUA WARD

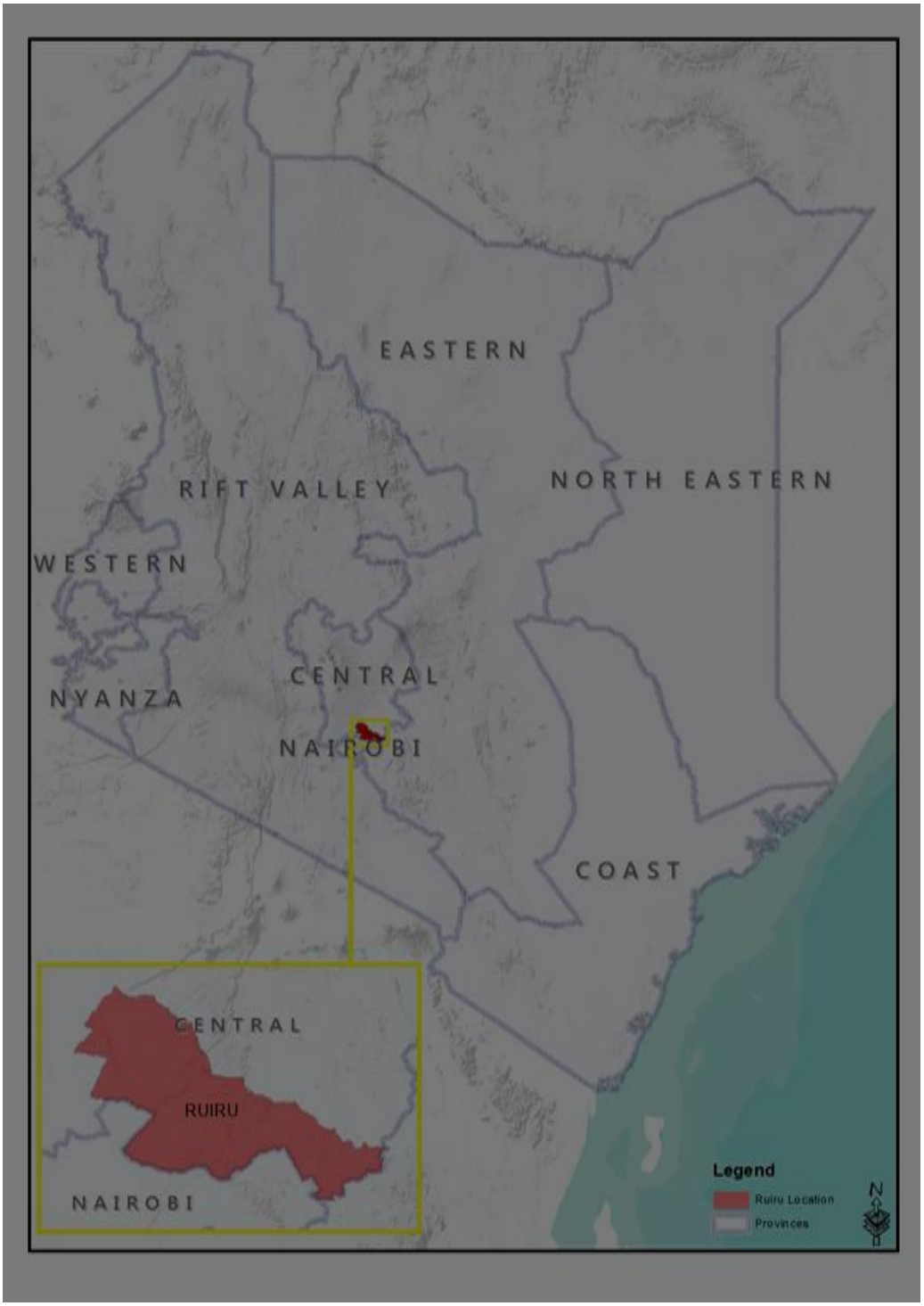
5.0 Introduction

This part presents the background of the study area. It highlights location and size, geographical characteristics including, administrative sub locations and wards, physical environment and natural resources, population size, growth and closes with the historical developments of Ruiru subcounty.

5.1 Geographical Location

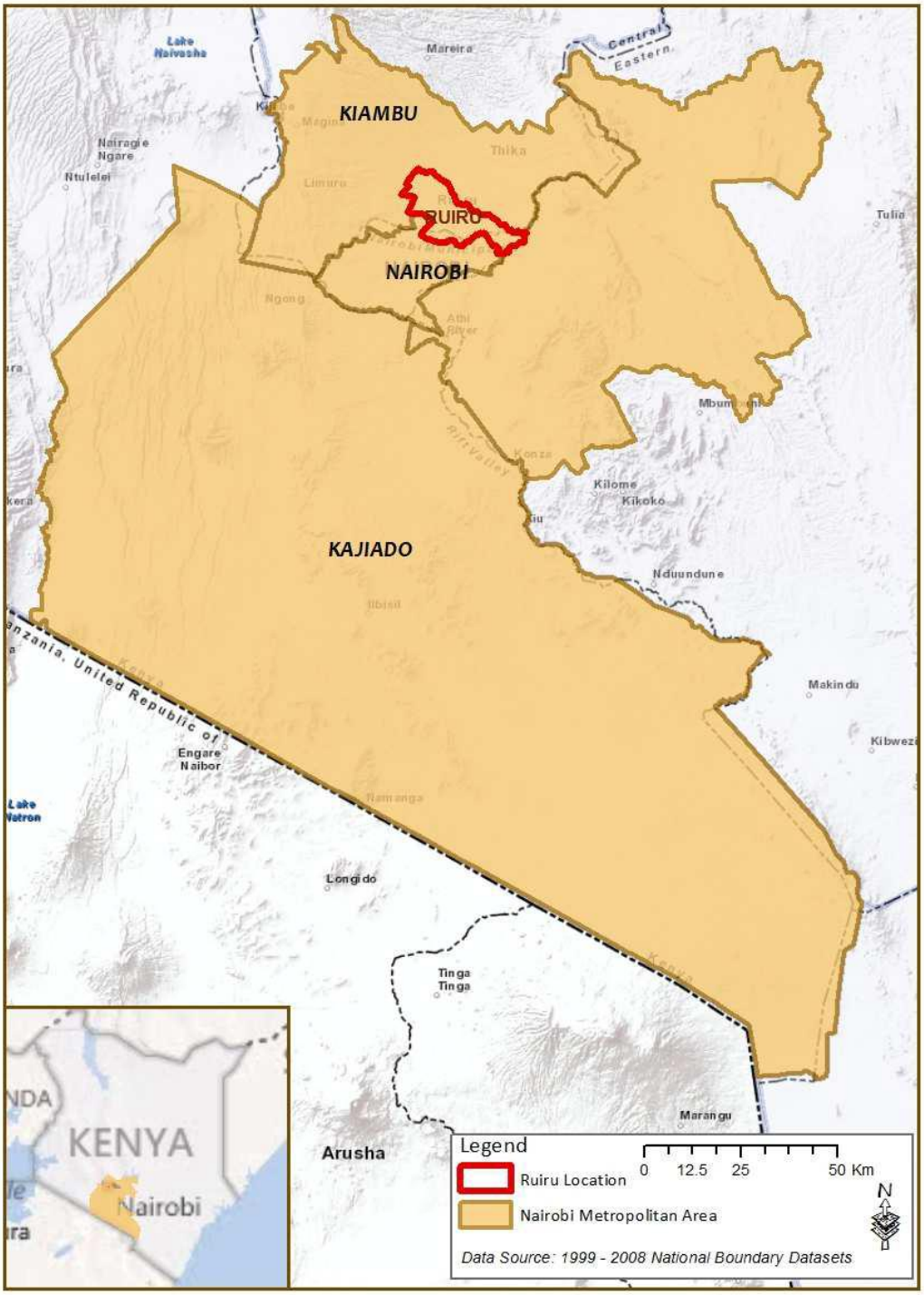
Ruiru Sub County is located on the 0.5^{o} c latitude and 37^{o}E longitude lines.It is located about 200 km south of the Equator. It is in the former Central Province ofKenya. The town stands on the Nairobi – Thika highway. It is situated 16 kmNorth East of Nairobi city and is hardly 3km from the city boundary. It lies 18 km from Thika town. It is accessible by both railway and national trunk road and has a fertile hinterland. Locally it borders Juja sub location to the North, MachakosDistrict to the East, Nairobi city to the south and Kiambu to the west.

Figure 2: Ruiru in the national context.



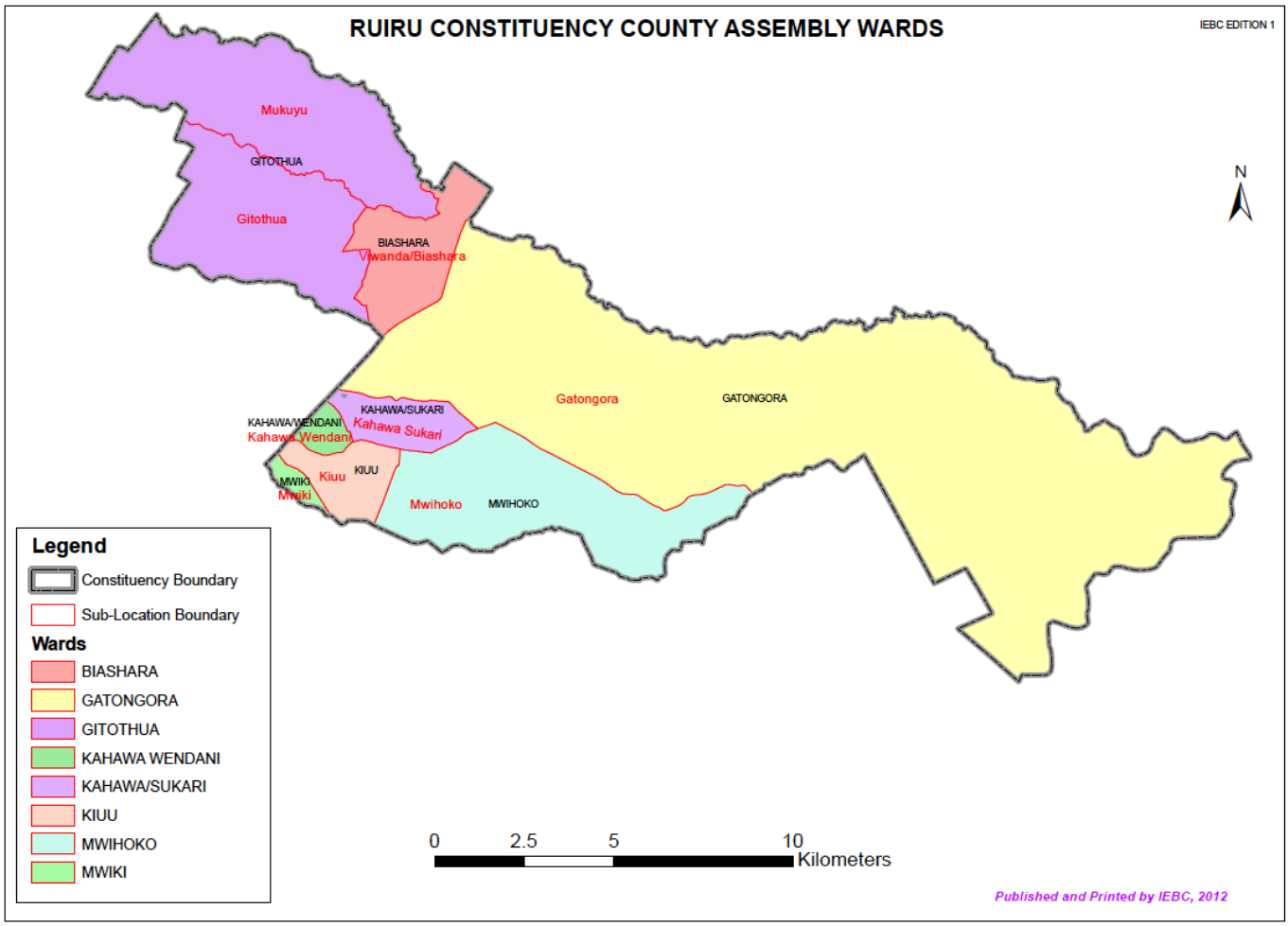
Source – National Boundary Data sets (2008).

Figure 3B: Ruiru in the Nairobi Metropolis context.



Source – National Boundary Data sets (2008).

Figure 4: Ruiru sub-county



Source – National Boundary Data sets (2008).

Figure 5B: Ruiru sub-county& Gitothua ward SateliteImages

5.2 Topography and Slope analysis

Ruiru subcounty is located on the transitional Zone of the upperAthi basin and the Kikuyu dissected plateau. The land is generally undulating with a general drainage pattern towards the Athi River basin. Ruiru River divides the town in two parts. The town lies about 1550 meters above sea level. The area generally slopes from the northwest to southeast.To the North- West the town's topography is generally steep and dissected by Makuyu and Ruiru River. The areas south of Nairobi- Thika road are generally flat(Kenya, 2003).

5.3 Geology

According to the National Atlas, the geology of Ruiru comprises of tertiary volcanic rocks. These make up the soils on the hilly areas. Soils resulting from these rocks are dark reddish brown and well drained. The industries and coffee farms in Ruiru are located on the hilly areas of the town, which have the dark reddish soils(Njoroge, 2013).

5.4 Soils

The soils in the study area are derived from volcanic rocks that gradually occur between 1200 to 2000 meters above sea level. The general nature of the soil ranges from shallow yellow/brown to red clays. In geological term they are youthful soils formed after removal of black clays by erosion process. However there are patches of black cotton soils. In addition, there areas which have soils that can support foundations even at shallow depths (Njoroge, 2013).

5.5 Hydrology

The major sources of water accessed for domestic activities in the sub-county are tap water from the National Water Connection (NWC) mains, supply from the Community Based Organizations (CBOs) mains, boreholes/wells and rivers.Thepeople in the subcounty access water sources for use domestically, animals and crop irrigation duties(Ruiru land use, 2016).

5.6 Drainage System

Ruiru forms part of the broader eastern slopes of the Aberdares. It lies approximately 1500 meters above sea level. The area rises from the northwestern end of the municipality to the southwestern end. The slopes of the Aberdares are characterized by long elongated parallel ridges and valleys which have extended to Ruiru. Though the area is generally undulating, these characteristics are seen in the main drainage channels in the municipality, that is Ruiru, Theta, Gatharaini and kamiti Rivers which drain into the Athi basin. These channels have been used to delineate administrative boundaries for example, Theta and Ruiru River form the boundaries of Murera Ward, Ruiru and kamitiform the boundary of Kahawasukari and Gatharaini and Kamiti (Magondu, 2006).

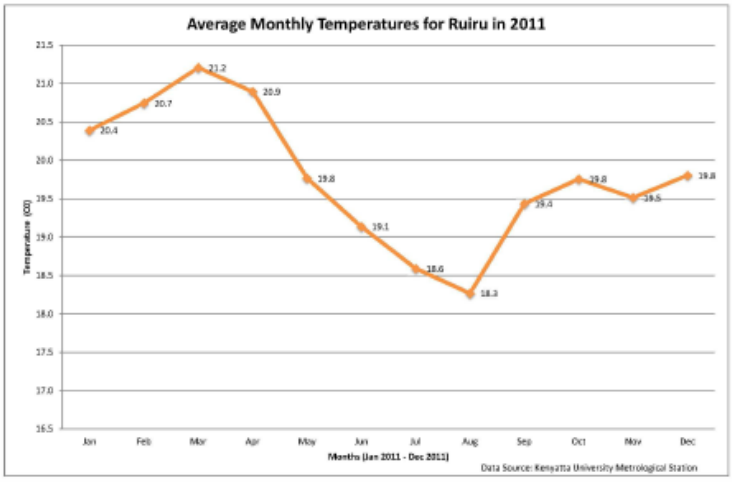
5.7 Climatic Characteristics

At micro level, the wind blows from North towards the Southern direction. Their strength and speed differ at different times of the day with afternoon experiencing the strongest winds with whirls blowing out dust especially in dry seasons and in bare ground. The sun path is the normal east west movement with minimal variations(Magondu, 2006).

5.7.1 Temperature

The temperature is generally high, the mean maximum temperature being 26 degrees Celsius while the mean minimum temperature being around 14ºC. The average annual temperature is about 21ºC(Ruiru land use, 2016).

Figure 6: Average monthly Temperatures Ruiru



Source – Kenya 2012 Nairobi: Kenyatta University Metrological Station

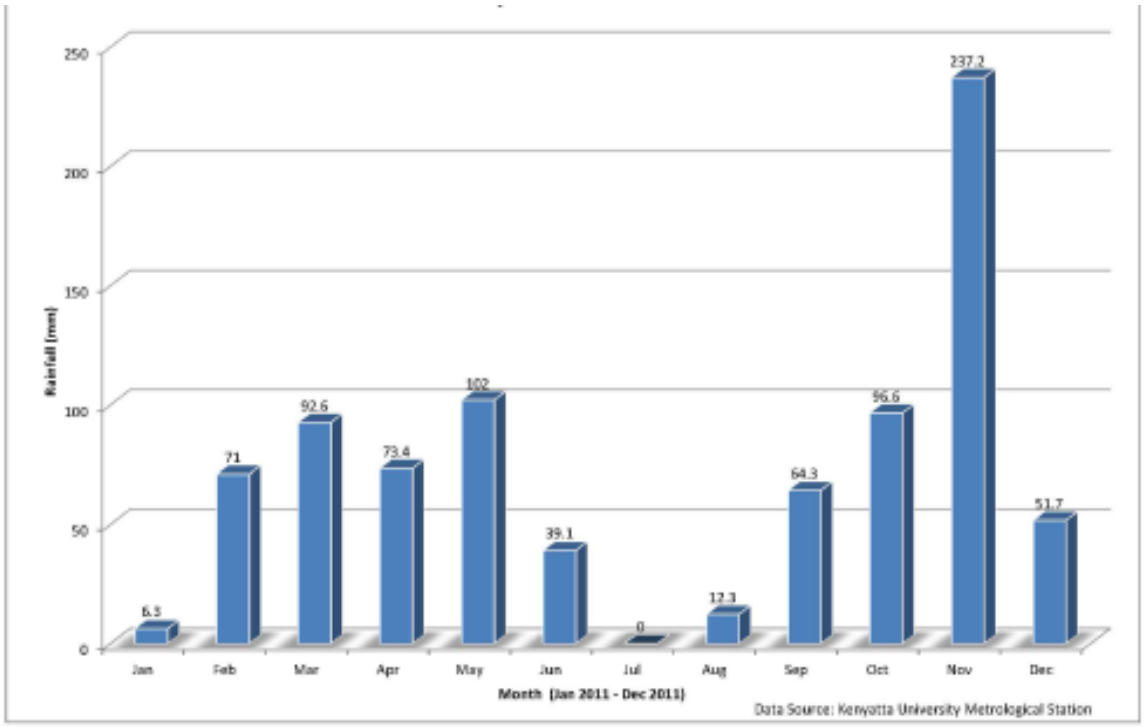
5.7.2 Humidity

The annual relative humidity for the area is about 51 according to the meteorological department. May, June, July are the most humid months while February and March are the least humid (Kenya Metrological, 2015).

5.7.3 Rainfall

The type of rainfall found in Ruiru town is generally characteristic of the climate of Nairobi – Thika region Rainfall mainly occurs in the afternoons. Rainfall averages between 850mm – 1000mm per annum and falls in two months i.e. short rains from October to December and long rains form March to May(Kenya Metrological, 2015).

Figure 7: Total Monthly Rainfall Ruiru



Source – Kenya 2012 Nairobi: Kenyatta University Metrological Station+

5.8 Population and Demographic Characteristics

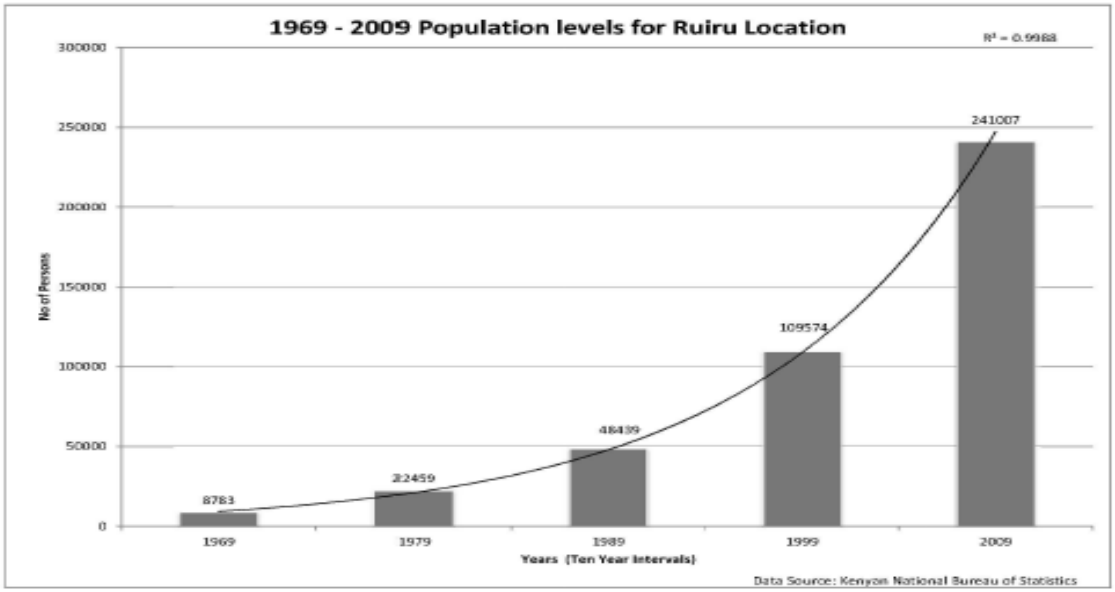
Gitothua ward was from by merging two sub-locations which have the following characteristics.

Table 2: Population and Demographic characteristics

Sublocation	Male	Female	Total	Households	Area(Km²)	Population density
Mukuyu	1004	893	1897	611	21.42	88.55
Gitothua	8935	7251	16186	4284	20.71	781.6

Source: Kenya National Bureau of Statistics, (2009)

Figure 8: Population increase in Ruiru



Source: Kenya National Bureau of Statistics, (2009)

5.9 Socio-economic Characterist'6ics

Ruiru subcounty and in particular is an agricultural area with big farming estates but recently there has been an increase in residential land use that has brought with it commercial services which include retail shops , supermarkets and so on. A lot of business activities have arisen in the risen past due to an influx of population which demands goods and services. Commerce is now rivalingagriculture as the main economic activity in Gitothua ward (Ruiru land use, 2016).

5.10 Social Services and Facilities

Gitothua area has a relatively good service infrastructure, the area boast of numerous private schools and two public primary schools. Gitothua does not have any public secondary schools. Gitothua has several health centres but are all public. The district hospital that is nearest can be found in the neighboringBiashara ward. There exists also some private clinics and dispensaries. The recreational facilities around is a private area known as courtesy beach which is spacious and conserve the environmentally fragile area (Ruiru land use, 2016).

5.11 Infrastructure

Gitothua area has numerous roads and the access is quite good. The conditions of some access roads is however wanting. It is surrounded by three arterial roads the A102 Thika highway and the eastern bypass as well as the northern bypass. A railway line passes through the ward as it heads towards Nanyuki. The water reticulation is done by the Ruiru juja water and sewerage company. There is no sewerage services by sewer lagoon are being constructed in the neighboringGatongora ward. Solid waste disposal is done by private companies and taken to Thika sub county for disposal (Ruiru land use, 2016).

5.12 Human Settlements

Informal settlements mostly slums and illegal structures mushrooming in the Gitothua ward. Commonly in these squatter settlements, residents buy water from peddlers or fetch it. Gitothua ward is highly inhabited by Peri-urban settlements (Ruiru land use, 2016).

5.13 Economy

The main economic sectors in the ward are agriculture, industry and small retail businesses. The three account for more than 80% of economic activities in the ward. Despite this environmental degradation brought about massive felling of trees in farms, bringing risks of erosion and death of trees has slowly changed the economic landscape to real estate. The industries are also being affected since raw materials that were sourced from the agricultural activities have greatly reduced industrial activities (Ruiru land use, 2016).

5.14 Agriculture

Agriculture is steadily declining from the once robust coffee farms to a more subsistence production of maize and beans. All the coffee estates have been wound up except Tatu which is

in the processes of conversion into a modern city. Agriculture generally is very low in the area.(Ministry of Agriculture Livestock & Fisheries, 2016).

5.14.1 Food Production

Among the food crop grown in Gitothua include maize, beans, irish potatoes and cabbages. These are grown basically for domestic use.(Ministry of Agriculture Livestock & Fisheries, 2016).

5.14.2 Cash Crop Production

Coffee was the principle trade in Gitothua ward. This was until its decline in the last decade (Ministry of Agriculture Livestock & Fisheries, 2016).

5.14.3 Livestock

The main livestock kept in Gitothua ward include cattle, Sheep, and goats albeit few and kept for subsistence use only. Livestock growth in the area is not well developed. (Ministry of Agriculture Livestock & Fisheries, 2016).

5.15 Land Use Change and Conversion

Many developers have put a lot of massive development projects in Gitothua ward due to its location and economic viability. This includes Tatu city that has provoked many land owners to change their land from agricultural land into residential cam commercial land use. However in order to prevent market failure and conserve agricultural land, the Sub-county and the entire County Government has put in place development measures to control the extend of land sue change (Ministry of Lands & Physical Planning, 2016)

5.16 Conclusion

Gitothua is preferred by many for its location, proximity to the city centre and its attractive climate and landscape. There is need, however, for land-use planning because the agricultural productivity of the land is being wasted. The real estate boom has benefited the area, with the major banks likes of Equity bank, Cooperative Bank, Family Bank, Barclays, Standard Chartered and the Kenya Commercial Bank having their presence there. The presence of shopping malls, infrastructural development and employment opportunities are key indicators that even the commercial developments have gained ground in this area.

CHAPTER SIX

DATA ANALYSIS AND RESULTS

6.0 Introduction

This research was an endeavour to investigate implications of conversion of agricultural land use in peri urban areas of Gitothua ward, Ruiru subcounty. Gitothua ward was chosen as a case study to represent other peri urban areas. The findings form the basis of the analysis and presentation to follow and serve as a basis on which conclusions and recommendations were made. Simple descriptive statistics such as tables, graphs and photographs have been used to display, describe and present the research findings through classification of the raw data into some purposeful and usable categories. Qualitative data have been presented as narratives. Tables were preferred since they present data in an orderly manner and conserve space while reducing the explanatory statements to the minimum. Photographs were used since images help present data in a manner that as much as possible reflect the existing state on the ground at the time of research and can be understood without a lot of explanation.

The respondents were asked questions or interviewed on the level of knowledge of the study topic, specifically on prevalence of agricultural land use conversions, causes and effects of the conversions. The respondents were also asked questions regarding the state of the current management frameworks to regulate agricultural land use conversions and their opinions on what should be done to ensure sustainable agricultural land use conversions. The responses on the key objectives were analysed and presented as follows.

6.1 Response Rate

The research was conducted on a sample of 370 respondents from Gitothua ward households to whom questionnaires were administered. The statistics analysed were used to show the relationships between variables. Out of the 370 questionnaires, 329 questionnaires were duly filled and this represents a response rate of 88.8%. This response rate is considered satisfactory to make conclusions for the study.

Table 3: Response Rate

	Frequency	**Percent**
Questionnaires filled and returned	329	89%
Questionnaires unreturned	41	11%
Questionnaires administered	**370**	**100%**

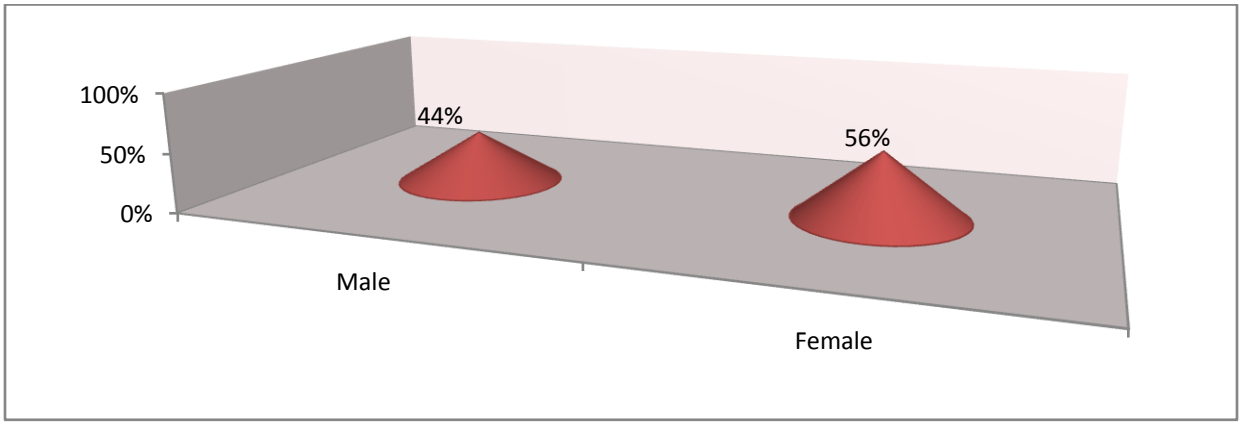
6.2 Demographic Results

Demographic results put forward information of research respondents.

6.2.1 Distribution of Respondents by Gender

The gender of the respondents of the study findings are as shown in (Figure 9)

Figure 9: Distribution of Respondents by Gender

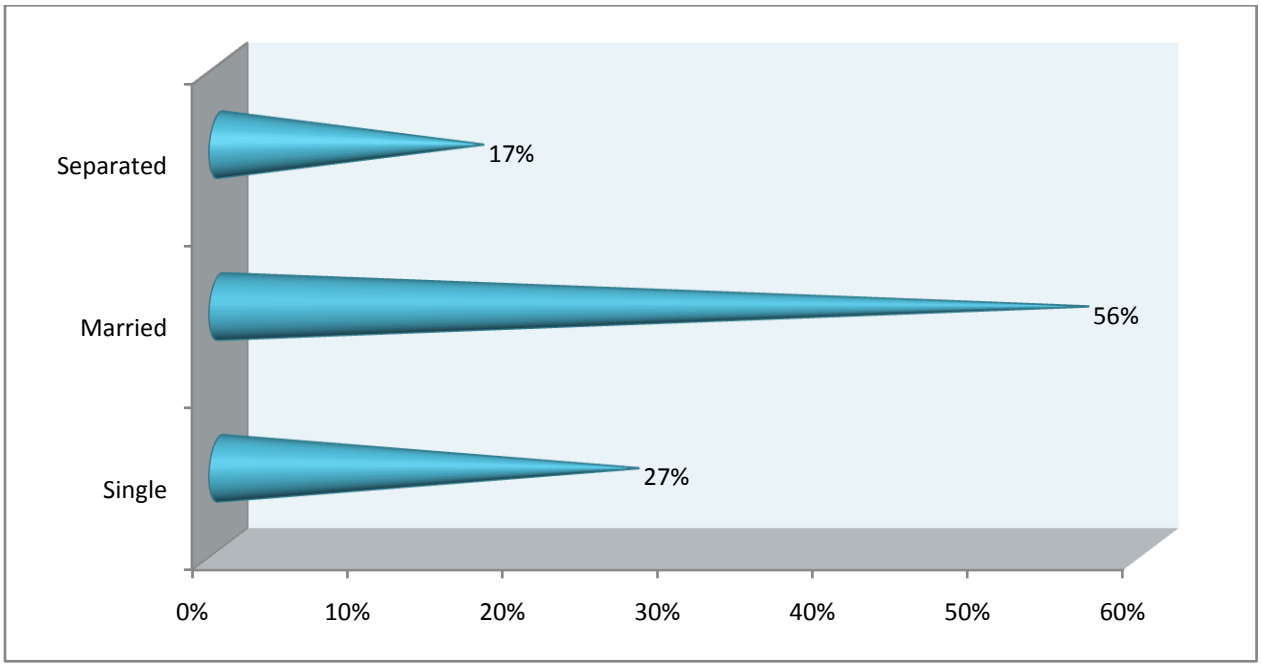


The findings above indicate that majority of the respondents (56%) were females while the remaining 44% were males. This implies that women were slightly more than men but they were the keener in the study offering detailed answers and more explanations than their female counterparts. They made perfect candidates for focused group discussions a strategy that is advisable for future researchers who wish to study a similar topic.

6.2.2 Distribution of Respondents by Marital Status

Figure 10 shows the findings with regard to the distribution of respondents by marital status.

Figure 10: Distribution of Respondents by Marital Status

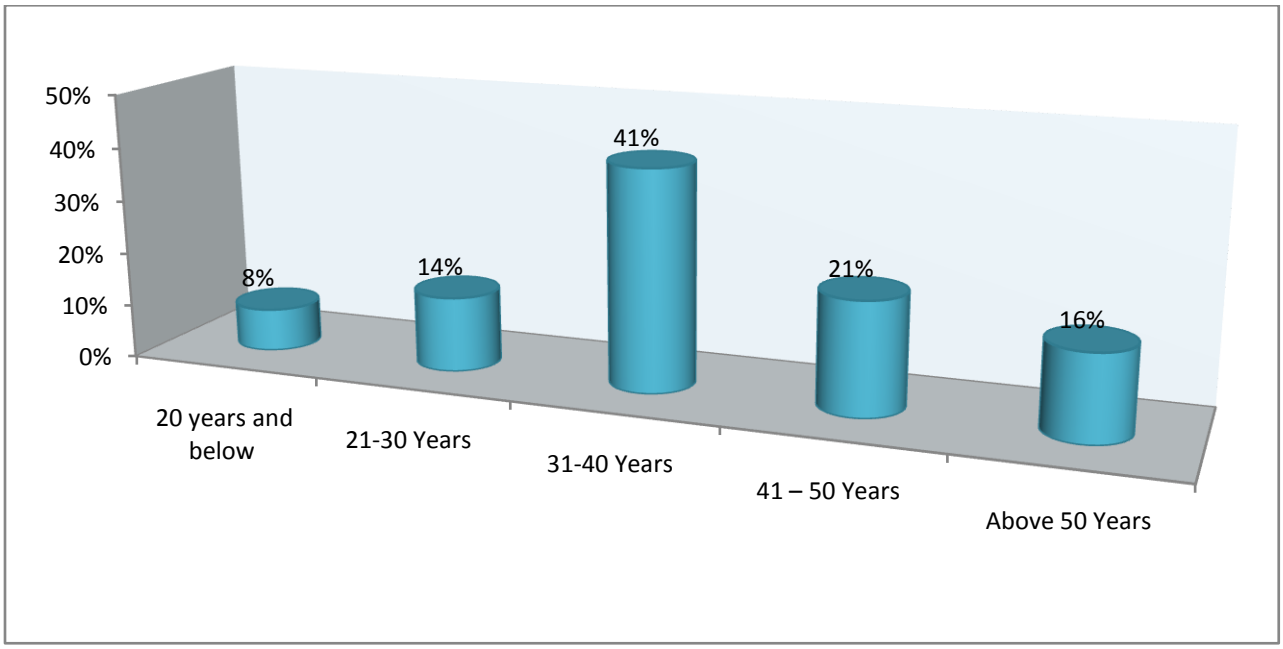


According to the findings above, most (56%) of the respondents were married, 27% were Single, while the remaining 17% were separated. Thus shows that Majority of the respondents were married. This is explained by the local culture that frowns upon bachelors. The people of Gitothua ward hold the institution of marriage in high esteem. Many of the respondents were young and this explains the high number of the unmarried. A significant number of respondents were reluctant to reveal their marital status.

6.2.3 Analysis of Respondents by Age

The study sought to find out the respondent's age distribution and the questionnaire required the respondents to fill in their age category. Figure 11 indicates the distribution of the respondents by age.

Figure 11: Analysis of Respondents by Age



From the figure above, the majority of the respondents 41% were between the age category of 31-40. 21% of the respondents are aged between 41and 50 while 16% are aged 50 and above. 14% of the respondents were aged between 21-30 years and 8% were aged between 20 years and below. The above findings indicate that the majority of the respondents were between the age categories of 31-40 years

6.2.4 Distribution of Respondents by Level of Education

Further the respondents were asked their level of education and the respondents filled in their highest level of education. (Table 4)

Table 4: Distribution of Respondents by Level of Education

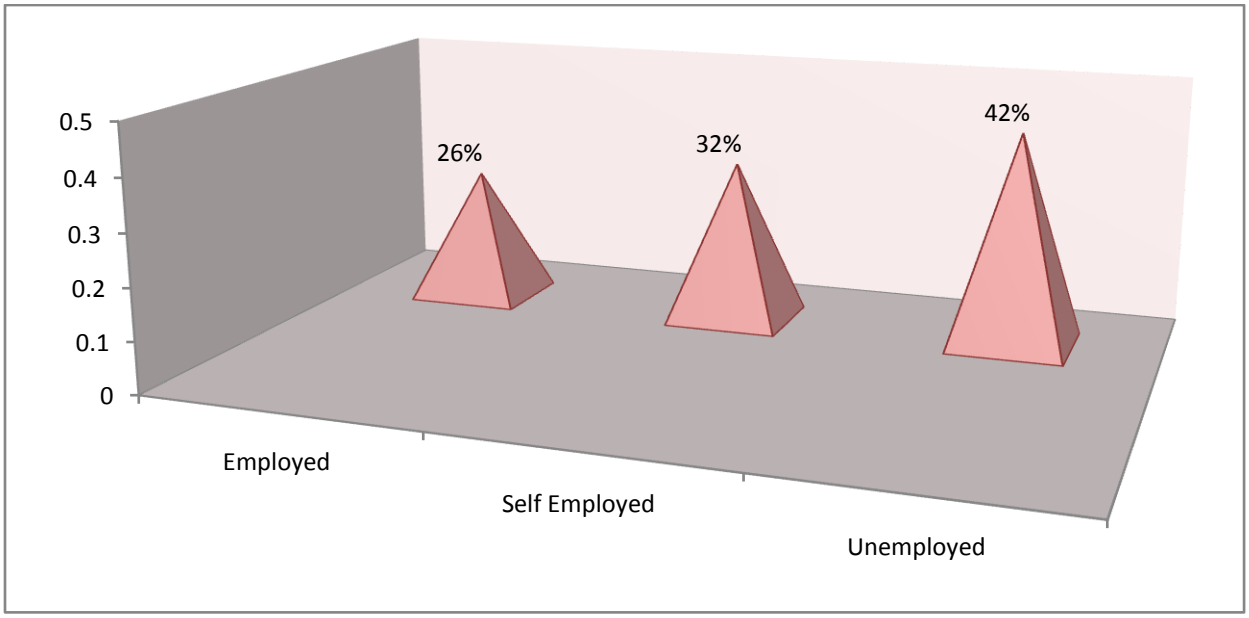
Respondents	**Frequency**	**Percent**
No Education	68	21%
Primary incomplete	32	10%
Primary complete	53	16%
Secondary incomplete	42	13%
Secondary complete	58	18%
Post-Secondary Certificate	43	13%
Undergraduate degree	20	6%
Postgraduate degree	13	4%
Total	**329**	**100%**

Table 4 above indicates that majority of the respondents (21%) had noeducation, 18% had only completed secondary level, 16% had completed primary level, 13% did not complete their secondary education, 10% did not complete their primary education, 6%had undergraduate degree, while only 4% had postgraduate degree.It's apparent from the distribution of respondents by level of education that the literacy levels of respondents are generally high. More than half of them were of secondary level of education and less with quite a number of them having no education. It was noted during the study that the illiterate citizens were generally wary of the questionnaire perhaps because they found it embarrassing that they were unable to fill them in person.

6.2.5 Distribution of Respondents by Occupation

In order to understand the respondents' occupation, the respondents were asked to indicate their current employment status. (Figure 12)

Figure 12: Distribution of Respondents by Occupation



From the findings above, 42% of the respondents indicated that they were unemployed, 32% indicated they were self-employed, while only 26% indicated they were employed. A majority of the respondents were unemployed with quite a good number of the remaining being lf self-employed. A few of them were employed. This may be explained by their youthful ages as it appears many have opted for self-employment rather than idle job seeking.

6.3 Existing Land Uses in Gitothua Ward

The study sought to establish the existing land uses in Gitothua ward. The study findings are as shown in subsequent subheadings.

6.3.1 Land Use / Land Cover

In mapping the impacts of land use conversions on natural land and the land cover, this study focused on the changes that have occurred over land e.g. built up area within Gitothua Ward and its surroundings. Aerial maps showing extend of spatial land use and land cover change were generated to qualify the fact that there is sprawl and to what extent. Ruiru Sub County originally had its entire land except in Biashara ward being agricultural land characterised by farming and undeveloped land. Water bodies in the region include Galana and Ruiru rivers, man-made dams and Wetlands. The growth of Ruiru town and the neighbouring towns has seen expansion of Built-up areas, taking up a huge chunk of the land in the area that was initially agricultural are undeveloped. This can be seen in the sequence of satellite images showing how these changes have occurred in different years since 2003 to 2013. There is pronounced growth mainly along the roads. This is the common trend of urbanization in Kenya where many people tend to move to settle along the transportation channels.

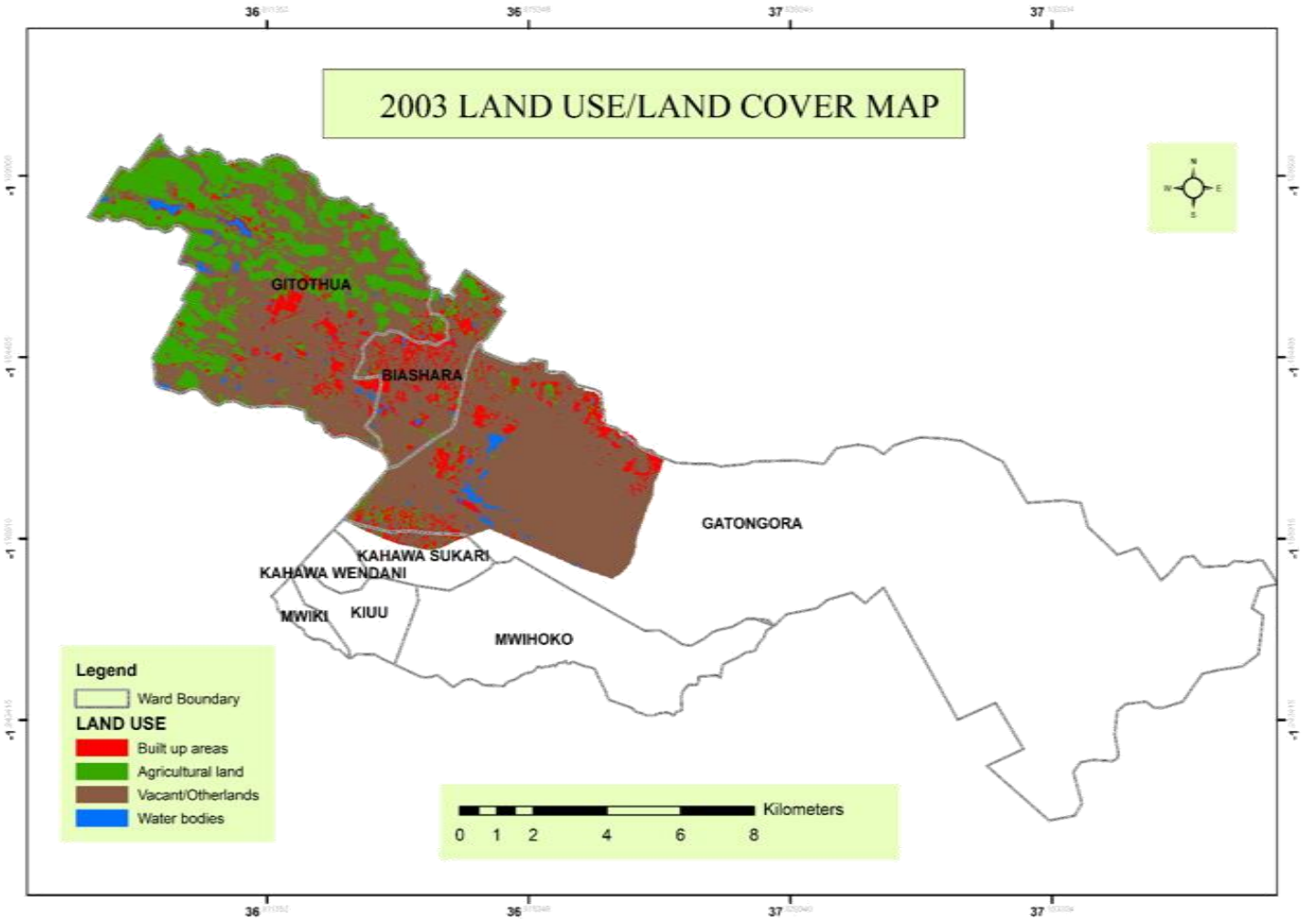


Figure 13: Land Use/Land Cover Map (2003)

A map showing spatial coverage of the four land use parameters namely Built up area, Agriculture and Vacantland and water bodies as it was in 2003. The main area of this study being Gitothua ward.

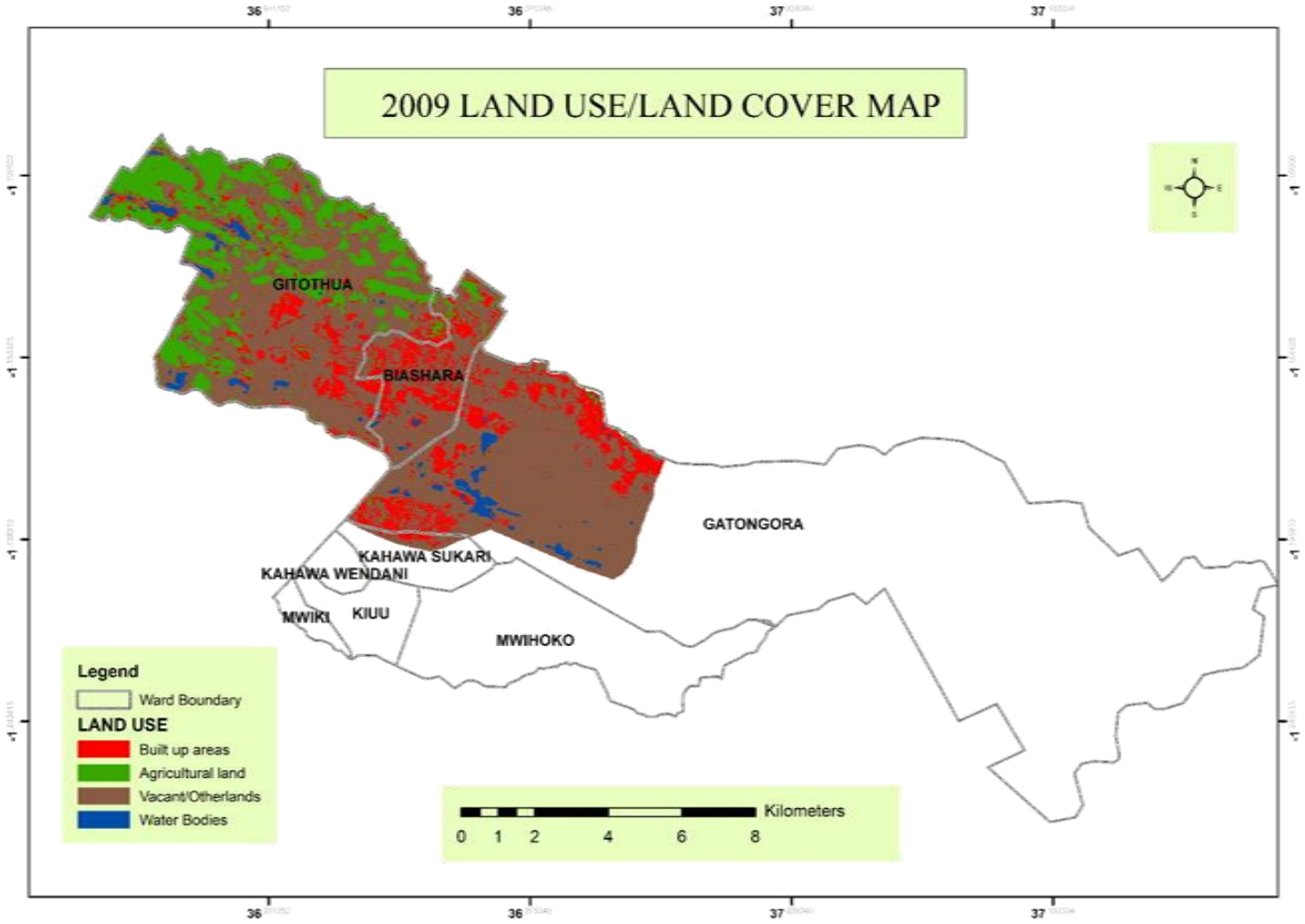


Figure 14: Land Use/Land Cover Map (2009)

A map showing the extent of the four land use parameters as at 2009. The main area of this study being Gitothua ward.

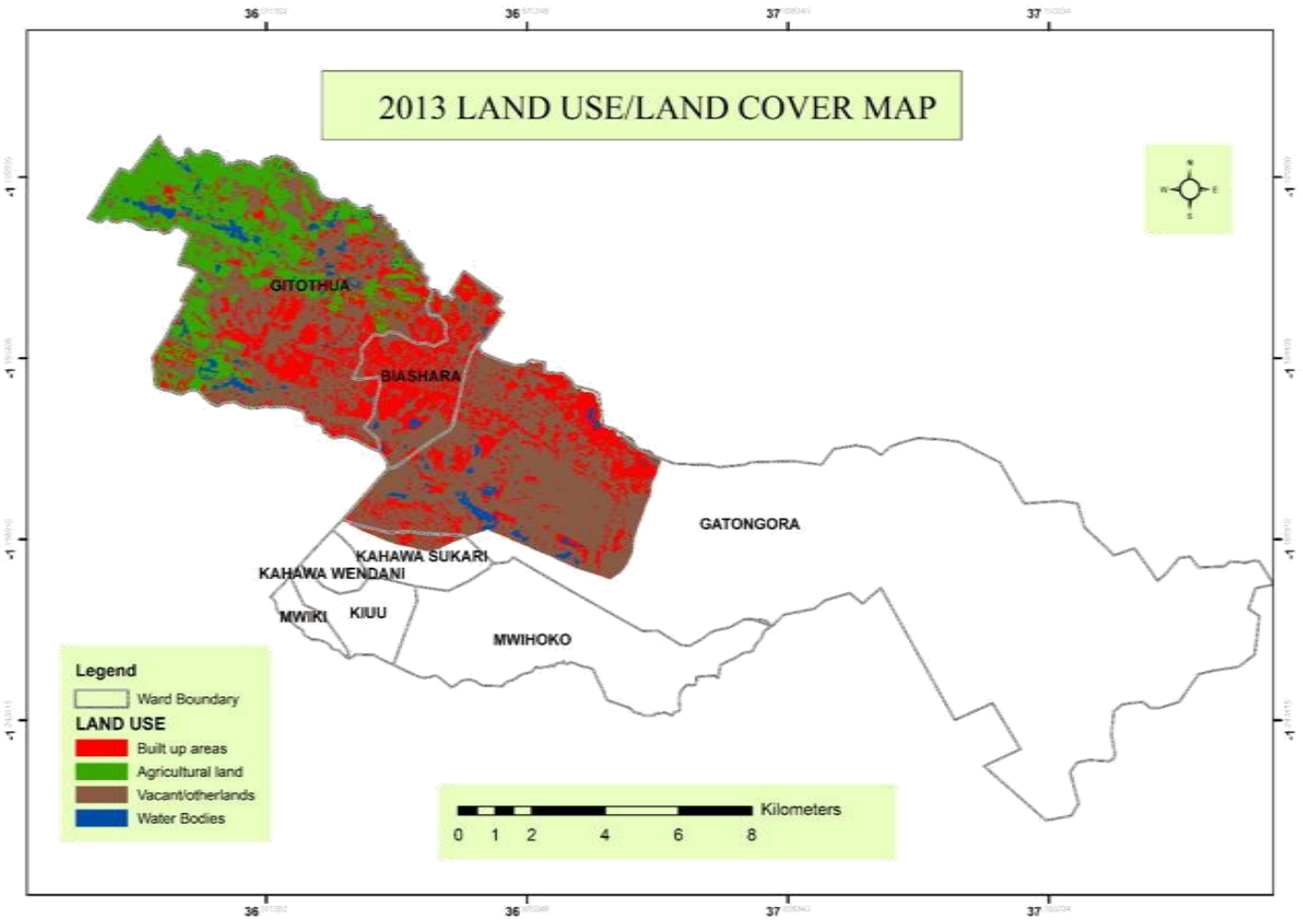


Figure 15: Land Use/Land Cover Map (2013)

Map shows the urban sprawl extent as at 2013. Urban growth has occurred so significantly that many of the clustered settlements are almost joining. The main area of this study being Gitothua ward.

Table 4B:1 Change Trend

Year Of Study Area	**2003(Area in Km2)**	**% of Total**	**2009(Area in Km2)**	**% of Total**	**2013(Area in Km2)**	**% of Total**
Built up area	7.10	8.5	12.39	14.9	21.20	25.5
Water bodies	1.44	1.7	2.18	2.6	2.89	3.8
Agricultural land	18.40	22.1	15.59	18.7	16.41	19.7
Vacant/other lands	56.31	67.7	53.09	63.8	42.75	51.0
Total Area	**83.25**	**100**	**83.25**	**100**	**83.25**	**100**

Table 4C:2 Rate and Magnitude of Change

Year Of Study / Area	Change Between 2003 And 2009	Change Between 2009 And 2013	Change Between 2003 and 2013
Built up area	5.29	8.81	14.1
Water bodies	0.74	0.71	1.45
Agricultural land	-2.81	0.82	-1.99
Vacant/other lands	-3.22	-10.34	-13.56

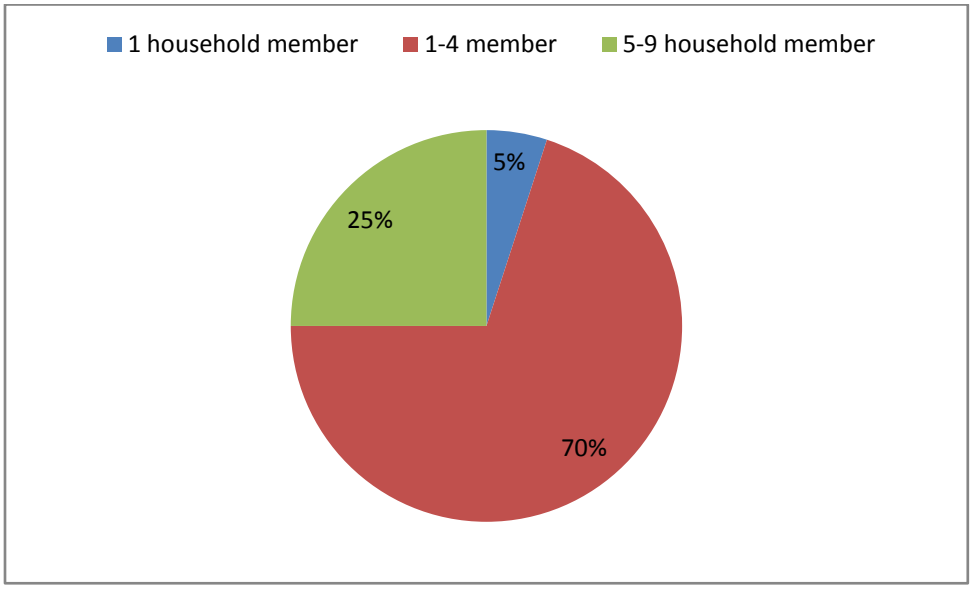
Table 4D:3 Trend Percentage Change

Year Of Study / Area	Built Up
Change between 2003 and 2009	5.29
Observed change/ Sum of change × 100	5.29/14.1 * 100 = 37.5%
Change between 2009 and 2013	8.81
Observed change/ Sum of change × 100	8.81/14.1 * 100 = 62.5%

6.3.2 Household Size

Gitothua ward; being an area that has grown from the result of in-migration by urban population has the typical nature of urban populations in that; the urban population lives with their families that consist of the nuclear family only. Also, having maintained some semi-rural characteristics from the rural population, it also has a pre-dominance of family households that could be attributed to the 25% population with between 5-9 household members. There are usually no single person homes in semi-rural areas explaining only the 5% that have 1 household member.

Figure 16: Household Size



6.3.3 Prevalence of Agricultural Land Conversions in Gitothua Ward

Respondents were kindly requested to indicate whether they are prevalence of agricultural land conversions in Gitothua ward (Table 5).

Table 5: Prevalence of Agricultural Land Conversions in Gitothua Ward

Level of Prevalence	**Frequency**	**Percent**
Very Prevalent	246	75%
Moderate	83	25%
Not Prevalent	0	0%
Total	**329**	**100%**

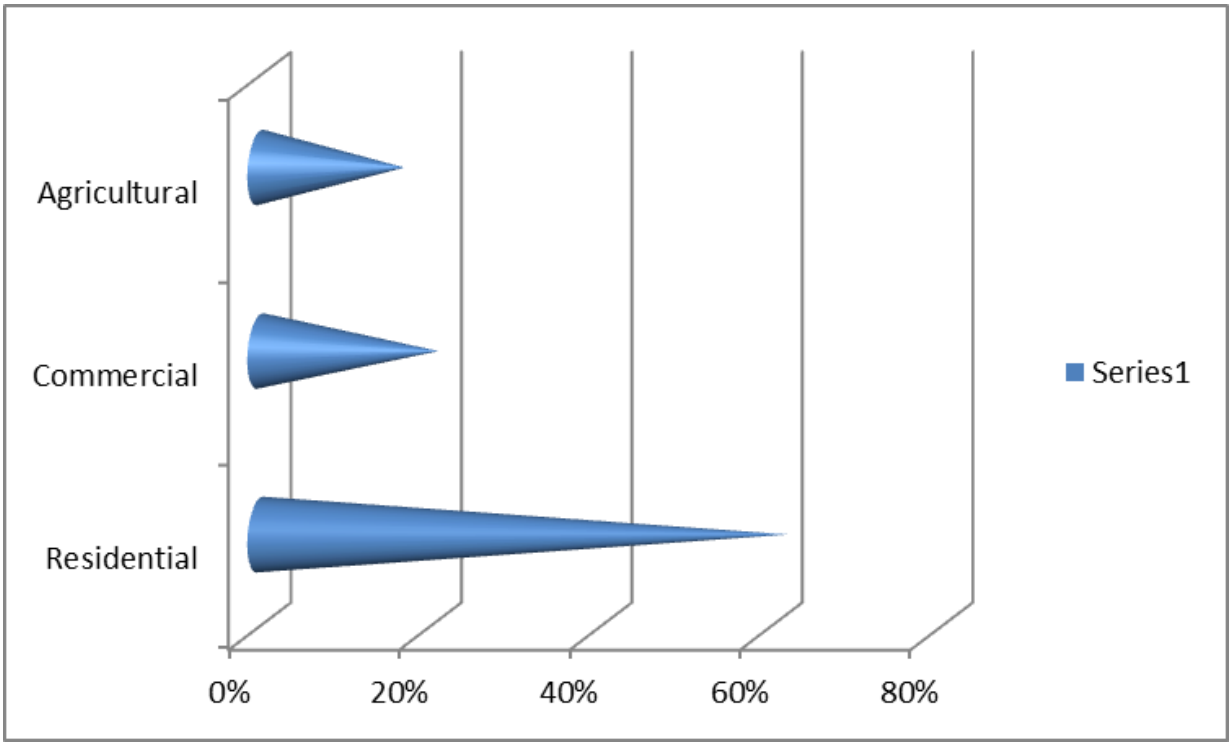
The research revealed that agricultural land use conversions in the study area are very prevalent (75%). Only 25% of the respondents indicated that the conversions are moderate, none indicated that the conversions are not prevalent, this confirms that all the respondents are aware of the

conversions. In addition, 95% of the respondents were concerned about the negative effects of the agricultural land use conversions. The 5% who are not concerned about the conversions cited the positive effects the conversions have on the economy such as provision of cheap land for real estate development, creation of job opportunities in construction industry, increase in land values and rentals, among others. Therefore, the agricultural land use conversions are very prevalent and of great concern due to their inherent negative effects on the sustainable development of Kenya.

6.3.4 Existing Land Uses in Gitothua Ward

Respondents were kindly requested to indicate the existing land Uses in the Gitothua ward. (Figure 17).

Figure 17: Existing Land Uses in Gitothua Ward



The study revealed that most of the people livin in Gitothua ward use their land for Commercial purposes as indicated by 21% of the respondents, 62% indicated for Residential purposes, while 17% indicated for Agricultural purposes.

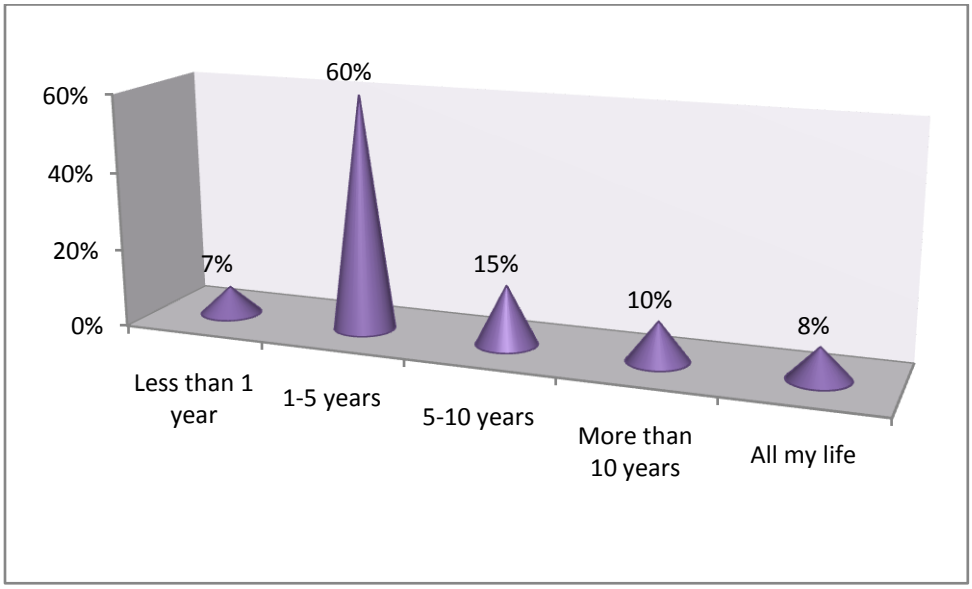
Plate1: High Density Buildings in Gitothua Ward

Plate2: Converted Coffee Farm in Gitothua Ward

6.3.5 Time Lived In Gitothua ward

The population of Gitothua ward is mostly composed of immigrants and the people who have stayed in Gitothua ward all their life. This is because of the sprawl from Nairobi that attracted people from different places to Gitothua ward. Rapid urbanization took place in Gitothua ward only recently as indicated by the population that has resided in Gitothua ward in the last 10 years (70%). 7% of residents have stayed in Gitothua ward for less than 1 year, 8% all their life and 10% for more than 10 years. 15% have stayed for between 5-10 years and the largest group, 60% have stayed for between 1-5 years in the centre.

Figure 18: Time Lived In Gitothua ward



6.3.6 Immigration

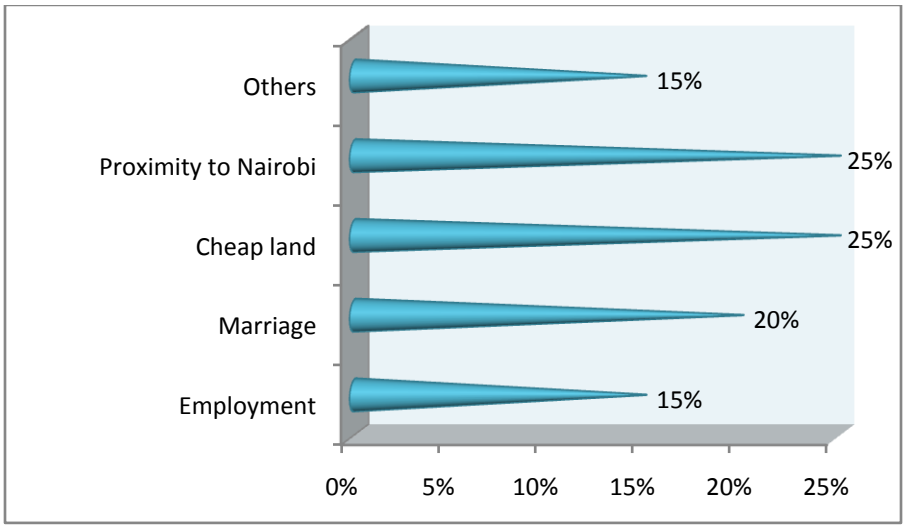
As indicated earlier, urbanization and urban growth has been taking place in Gitothua ward and has been attributed to in-migration from the main city and from the hinterlands of Gitothua ward. This is attributed to factors such as people looking for better services and standards associated with migration from the hinterlands and increased employment opportunities that are closer to Nairobi. The people from the main city are pushed out of there by higher costs of land and rent (push factors) and cheaper land values and lower of rents on accommodation in Gitothua ward (pull factors).

About 70% of the respondents do not consider Gitothua ward their ancestral home hence bringing to attention that most residents of the centre are immigrants into Gitothua ward. Only 30% are actually ancestral residents of Gitothua ward

6.3.7 Reasons Attracting Move to Gitothua ward

In view of the above 70% of immigrants into Gitothua ward, the study established the reasons that attracted the move to Gitothua ward

Figure 19: Reasons Attracting Move to Gitothua ward

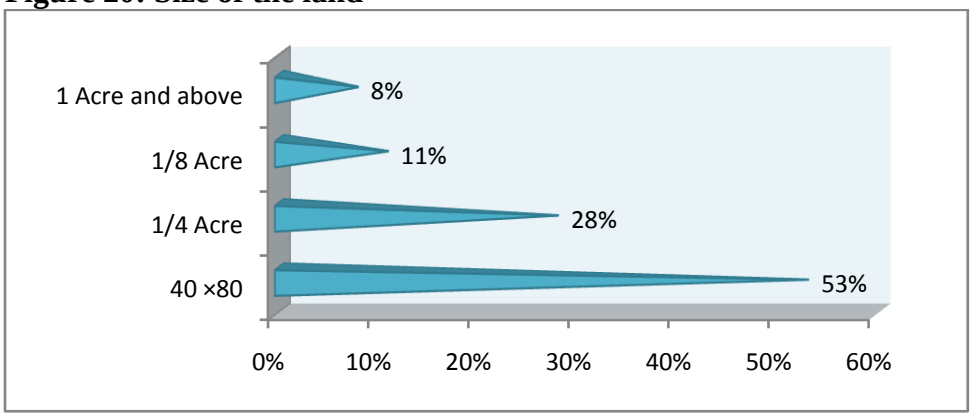


The attraction of people to Gitothua ward based on employment 15% may relate to the people moving from rural areas so that they can be located in the vicinity of the city. 20% of the migrants came to Gitothua ward because of marriage reasons implying that there is quite a large number of married families and couples settling in Gitothua ward. Those that have been attracted by cheap land 25% constitute city workers looking for cheap land on the outskirts of the city for building residence or setting up business buildings. Those attracted by proximity to the city involve rural people wishing to enjoy opportunities near the city

6.3.8 Size of the land

Respondents were kindly requested to indicate the size of their land in Gitothua ward.

Figure 20: Size of the land



Majority of the respondents (53%) indicated that they owned 40 ×80 of the acre, 28% indicated 1/4 of an Acre, 11% indicated 1/8 of an Acre, while 8% indicated 1 Acre and above

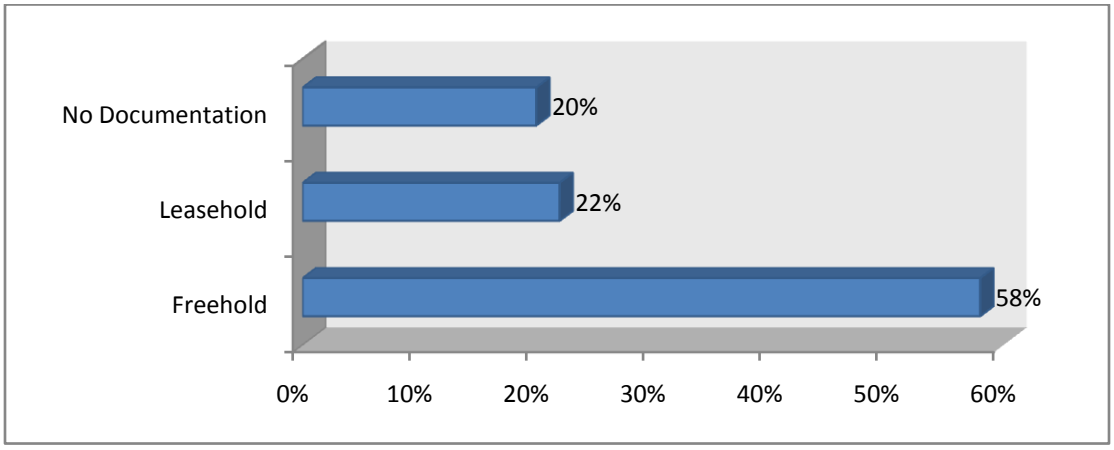
6.3.9 Land Use in Gitothua Ward

Many developers have put a lot of massive development projects in Gitothua ward due to its location and economic viability. This includes potential Tatu city that has provoked many land owners to change their land from agricultural land into residential cam commercial land use. However in order to prevent market failure and conserve agricultural land, the Sub County and the entire County Government has put in place development measures to control the extend of land use change.

6.3.10 Nature of the land ownership in Gitothua Ward

Respondents were kindly requested to indicate the Nature of the land ownership in Gitothua Ward.

Figure 21: Nature of the land ownership in Gitothua Ward



Majority of the respondents (58%) indicated the Nature of the land ownership in Gitothua Ward to be freehold, 22% indicated to be leasehold while 20% indicated that there was no documentation.

6.4 Causes of Agricultural Land Conversions in Gitothua Ward

The study sought to establish the causes of agricultural land conversions in Gitothua Ward. The study findings are as shown in subsequent subheadings.

6.4.1. Causes of land change in Gitothua Ward

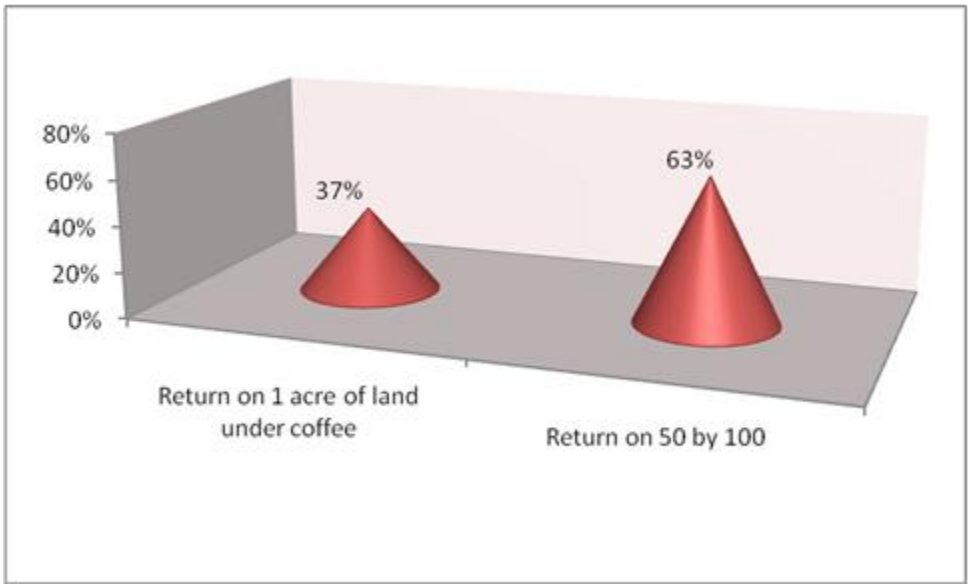
Respondents were kindly asked to indicate the causes of land change in Gitothua Ward. Respondents cited the causes of land change in Gitothua Ward to be lack of profits in agriculture and more profit in land selling. According to some developers engaged in Gitothua ward, there is currently huge conflict of land use in the area due to increased demand for land. It emerged during this study that, land has appreciated significantly in the region and many people are willing to dispose their huge tracts of land for other uses other than agricultural. Subsequently, there is increased encroachment of reserved riparian areas along the rivers and even wetlands.

Some constructions have extended even beyond the required reserve perimeter posing a great danger to environmental degradation and loss of biodiversity.

6.4.2 Low Agricultural Returns and Land Conversions

The study sought to establish the extent to which low agricultural returns have led to land conversions in the Gitothua ward (Figure 22).

Figure 22: Low Agricultural Returns and Land Conversions



From the study, it was established that most of the respondents were on the view that the returns on 1 Acre of land under coffee in Gitothua ward is relatively lower (as indicated by 37% of the respondents) as compared to 50×100 plot of land in the same area as indicated by majority of the respondents (63%) to have highest returns. This implies that the productivity and profitability of many farms (especially small scale) is too low, guaranteeing peasant farmers remain poor. This is due to the fact that returns from agricultural activities are lower compared to other users such as residential development.

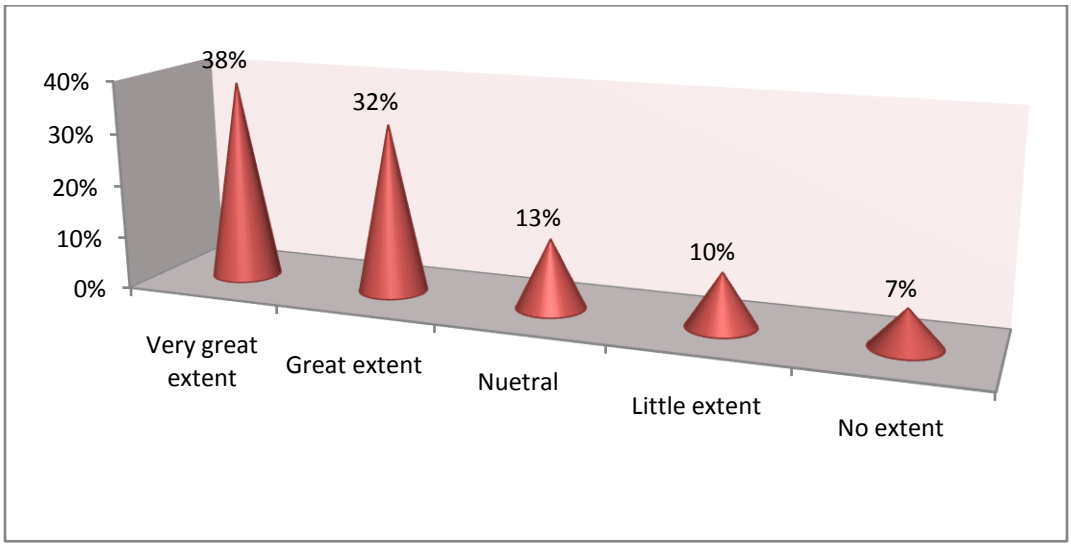
Consequently, agricultural land use is considered inferior to other land uses; hence farmers are motivated to convert their farms to obtain higher returns. As a result, coffee farms and other agricultural lands are being converted into residential use at an alarming rate. Many developers are paying off the farmers a lot of money to acquire agricultural land for residential estate development, an amount that would take years or even decades for the agricultural activities to bring.

Plate3: Coffee farm converted to a residential development in Gitothua Ward

6.4.3 Influence of Demand for Housing on Land Conversions in the Gitothua Ward

The study sought to establish the extent to which demand for housing affect land conversions in the Gitothua ward. (Figure 19).

Figure 23: Influence of Demand for Housing on Land Conversions



According to the findings, majority of the respondents (38%) were on the opinion that demand for housing affect land conversions in the Gitothua ward to a very great extent, 32% indicated to a great extent, 13% were neutral, 10% to a little extent, while 7% indicated no extent. This implies thatdemand for housing affect land conversions in the Gitothua ward to a very great extent. According to the literature reviewed, this could be explained by the fact that demand for housing in Kenya is currently at over 165,000 units per annum (Kenya, 2008).

The minister incharge of Housing confirmed this and stated that "the land in Nairobi is fully occupied and even the Government doesn't have any more to build housing for civil servants...leaving land on environs of Nairobi urban fringes as only source of land for housing purposes (Standard Newspaper, 2011 pg. 111). Further, the location theories state that households want to maximise utility while reducing transportation costs to the urban centres, especially Nairobi City and ThikaTown.The households also prefer large houses with large land parcels, which can only be found in the urban fringes since land in Nairobi City has become

scarce and extremely expensive. People want serenity, exclusivity and security, hence the dash away from the city centres since areas around the city have been identified as congested and full of pollution. To most people, living away yet close to the city centre is a status symbol due to inner city decay. The current improvement in infrastructure was also cited to facilitate residence in the peri-urban areas.

6.4.4. Influence of Increase in Urban Population on Land Conversions

The study sought to establish the extent to which increase in urban population affect land conversions in the Gitothua ward.(Table 6).

Table 6: Influence of Increase in Urban Population on Land Conversions in the Gitothua Ward

	Frequency	**Percent**
Very Great extent	151	46%
Great extent	125	38%
Neutral	29	9%
Little extent	16	5%
No extent	8	2%
	329	**100%**

According to the findings, majority of the respondents (46%) indicated that increase in urban population affect land conversions in the Gitothua ward to a very great extent, 38%indicated to a great extent, 9%were neutral, 5% to a little extent, while 2% indicated no extent. This implies thatincrease in urban population affect land conversions in the Gitothuawardto a very great

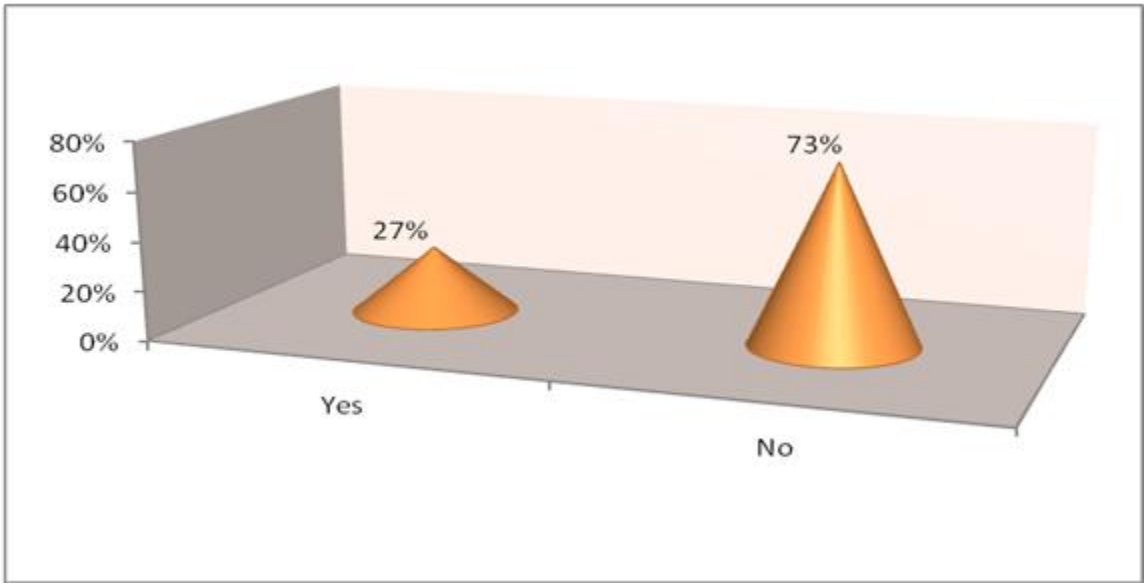
extent.The population of Nairobi City has increased from 2,143,254 persons (Kenya, 1999) to 3,138,369 persons (Kenya, 2009), this translates to an average of 5% annual increase.

In addition, the literature reviewed showed that total urban population has increased over the years up to 32.3% of the total Kenyan population and it is expected to rise to 61.5% in year 2030 (KNBS, 2009) and (Kenya, 2008). The concept paper on National Spatial Plan (Kenya 2010), notes that Kenya's population is quickly urbanizing and it is estimated that more than 50 per cent of the total population will live in urban areas by the year 2050. It is inevitable that increase in urban population willlead to increased demand for housing thus putting pressure on agricultural land in the peri urban for conversion into residential development.

6.4.5 Public Participation Land Policies in Study areas

The study sought to establish whether public in the Gitothua ward participate in land policies. (Figure 24).

Figure 24: Public Participation Land Policies in Study areas



According to the findings, majority of the respondents (73%) indicated that they are not involved on land policies in Gitothua ward while 27% of them indicated that they participate on land policies in Gitothua ward. This implies that there is low public participation on land policies in Gitothua Ward resulting to weak and ineffective land institutions which have led to increased land conversions in the in Gitothua ward to a very great extent. The reasons given by the respondents were that the Kiambu county land management boards, which is mandated by Land Control Act Chapter 302 to protect agricultural land from conversions, is incompetent due to inadequate staff, funds and technical capacity.

6.5 Outcome of Conversion of Agricultural Land in the Study Area

The study sought to establish the outcome of conversion of agricultural land in Gitothua Ward. The study findings are as shown in subsequent subheadings.

6.5.1 Distance of facilities from Homestead

Respondents were asked to tndicate the distance of various facilities from their homestead. The study indicated that most of the facilities offered in Gitothua area are four and more kilometres from the respondents' homesteads.

Table 7: Distance of facilities from Homestead

Services	**0-1KM**	**1-2KM**	**2-4KM**	**4 +KM**
Primary School	9%	12%	32%	47%
Hospital	11%	23%	15%	51%
Religious facilities (church, mosque, temple)	26%	20%	11%	43%

Administrative/civic offices	6%	14%	47%	33%
Security/Police post	7%	33%	12%	48%

Plate4: School in Gitothua Ward

6.5.2 Waste Disposal Methods

Gitothua ward does not have an organized solid waste disposal system owing to its rapid expansion and no proper plan put in place. Waste from the informal commercial activities ends up accumulating in the drainage channels causing blockage and health hazards as well as unsightly environment. Another area of concern in urban infrastructure is usually the provision of sanitary facilities, especially refuse collection and sewage disposal. As the population increases, so does the amount of waste that is generated and needs to be managed. Despite

paying rates to Kiambu County, solid waste disposal is a perpetual problem in Gitothua ward. Septic Tanks (on-site sanitation) are what are used in almost the entire location of Gitothua ward location. Drainage in Gitothua ward settlements or households is very basic. It mainly consists of earth drains along roads most of which are inadequately maintained.

Table 8: Waste Disposal Methods

Waste disposal methods	**Frequency**	**Percent**
Private Garbage Collector	247	75
Burn the waste	66	20
Bury	16	5
Total	**329**	**100**

The research established that 75% dispose their waste through private garbage collectors, 20% burn the waste and 5% bury their waste.

6.5.3 Liquid waste disposal

Most of the liquid waste in Gitothua ward is disposed in septic tanks as there is no main sewer system that serves the centre. Residents have had to improvise and construct their own septic tanks which they use to dispose of their liquid waste. 70% of residents dispose their liquid waste in septic tanks that are emptied upon fill and 30% dispose their liquid waste in pit latrines.

Figure 25: Liquid waste disposal

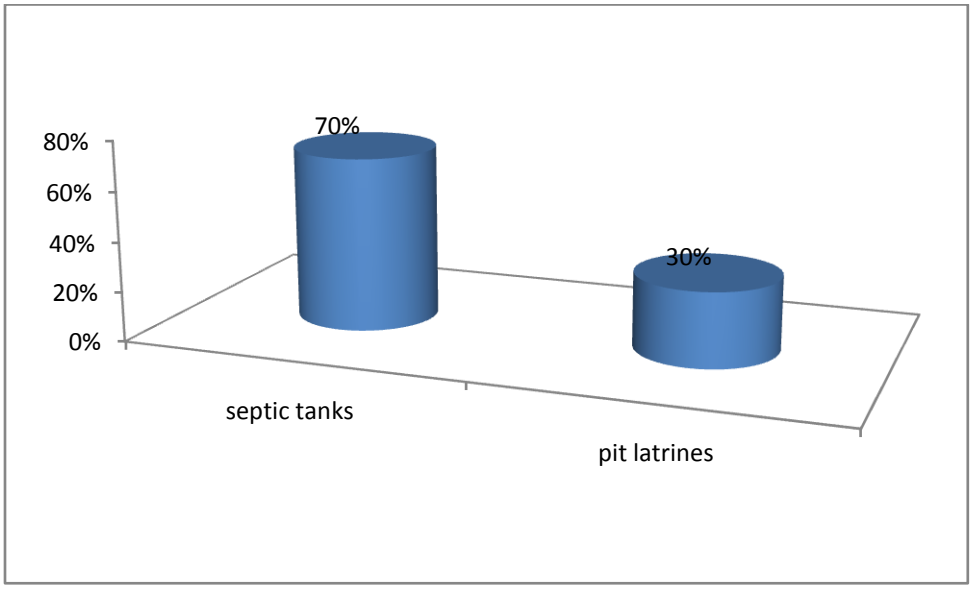


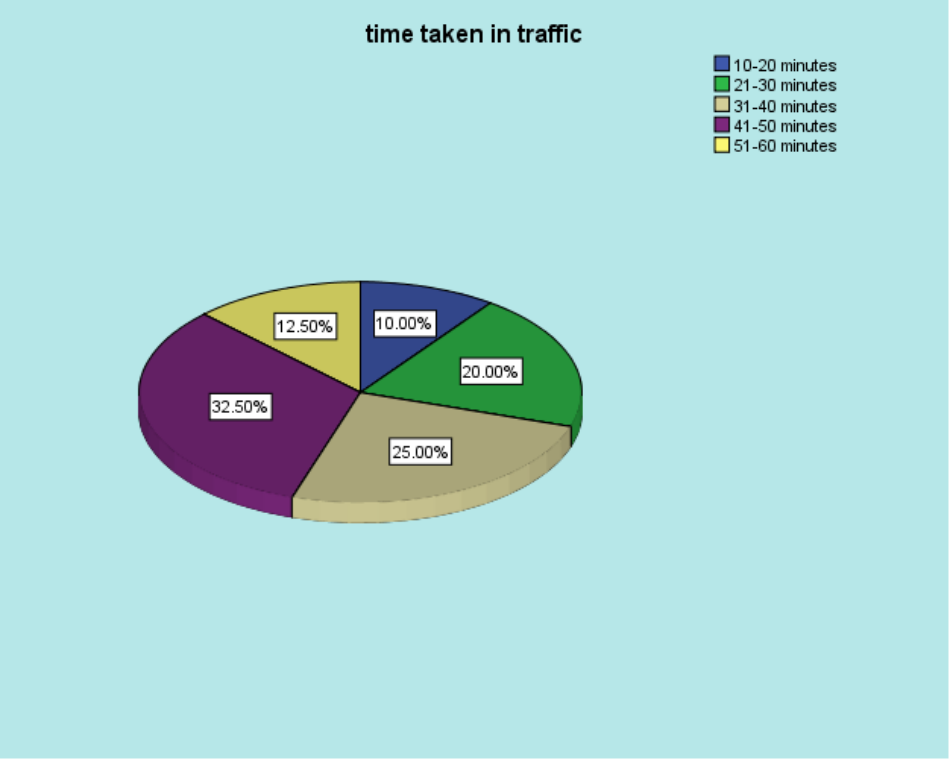
Plate4: Poor Sanitation in Gitothua Ward

6.5.4 Effects of Urban Sprawl on Traffic

30% of the population interviewed named traffic congestion as the major problem they face as a result of urban sprawl in the area. This is also evident on the time taken on traffic traveling to

and from work, shopping, entertainment or school which majority claimed increased travelling time due to traffic congestion caused by urban sprawl. Majority takes between 41 minutes to 50 minutes travelling from the study area to Nairobi town. This shows longer time since the distance of only 16 km should only take a maximum of 30 minutes considering the main road is a class A road (Thika super highway).

Figure 26: Time Taken in Traffic



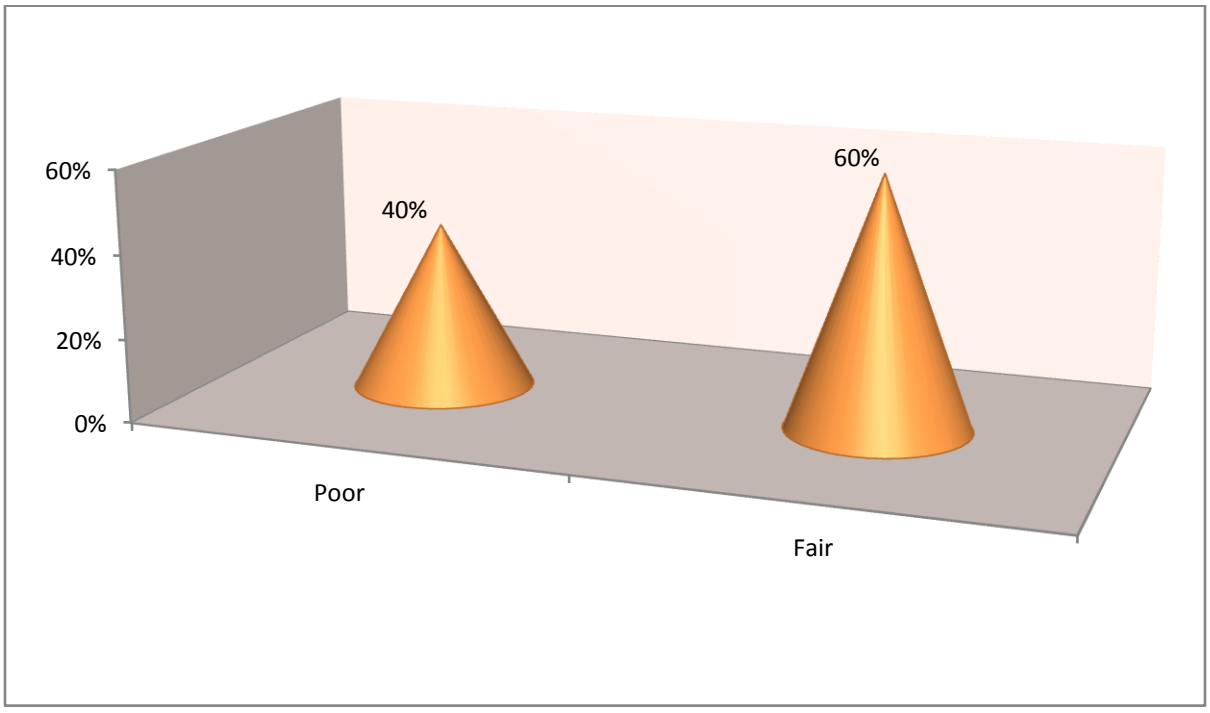
Also, another 7.5% named increased accidents occurrence as the main effect of urban sprawl.This clearly shows that indeed urban sprawl has negatively affected the traffic sector in the areaand hence lowering the standard of living.Urban sprawl also results to overdependence of vehicles for transport, this is due to the increaseddistance to work, school, shopping and entertainment places. According to the field studyconducted, the majority of the population uses public service vehicles for their dailytransportation. In analyzing the main mode of transport for the people of Ruiru constituency,37.5% of the population use 12 sitter matatus, 30% uses buses (above 12 sitter), 20% usespersonal cars,10% uses Bodaboda and only 2.5% walks.

6.5.5 Road conditions

Gitothua ward is served by several roads which do not have the recommended standards to make it suitable for operation; therefore this gives the need for the upgrading in order to properly accommodate the motorized and the non-motorized transportation forms. The role of transportation networks in Gitothua ward has majorly supported commercial development in the area as well as bringing people and their goods in the community within close proximity and providing the means by which people can move freely from one activity to another. The study sought to establish the road conditions in Gitothua ward and the following were the results; 40% of the respondents said the roads are in poor state and 60% said they were fair.

Plate 5: Poor Roads in Gitothua Ward

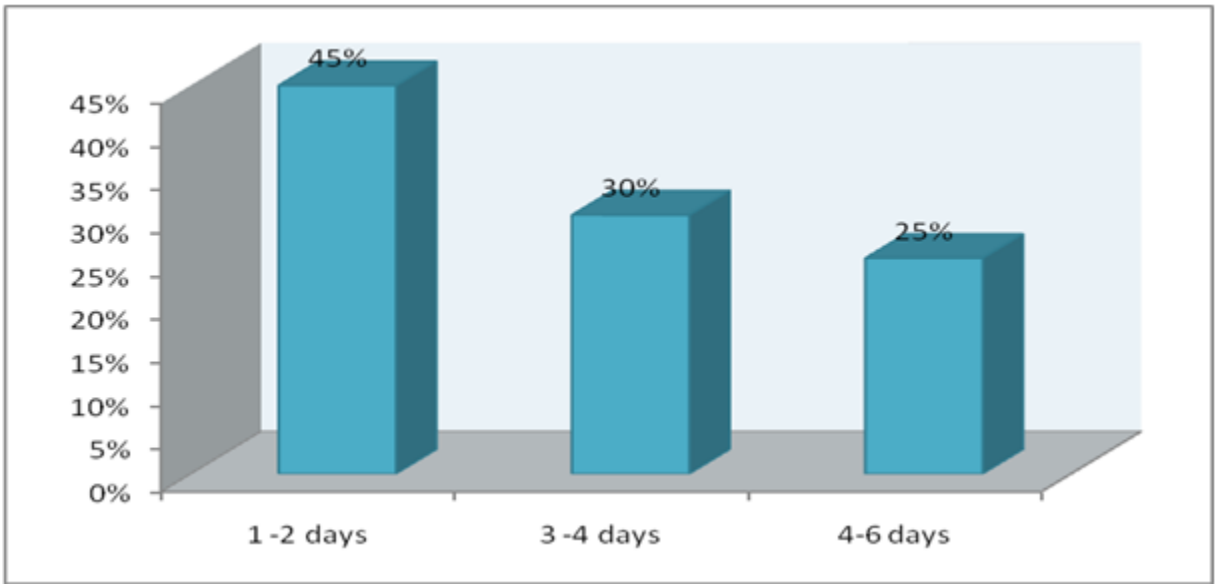
Figure 27: Road condition in Gitothua ward



6.5.6 Extent of Getting piped Water

Water and sanitation facilities in Gitothua ward include water supply, water distribution, sewer system and methods of solid and liquid waste disposal as well as the environmental conservation and appealing environment to live in. The situation as observed is fair in that there are provisions for these facilities only that the growing capacity is putting pressure on these facilities. The study sought to know how often they get piped water in a week and the results are as below

Figure 28: Extent of Getting piped Water



Majority of the respondents as indicated by 45% receives piped water for 1-2 days in a week, 30% indicated 3-4 days while 25% indicated 4-6 days

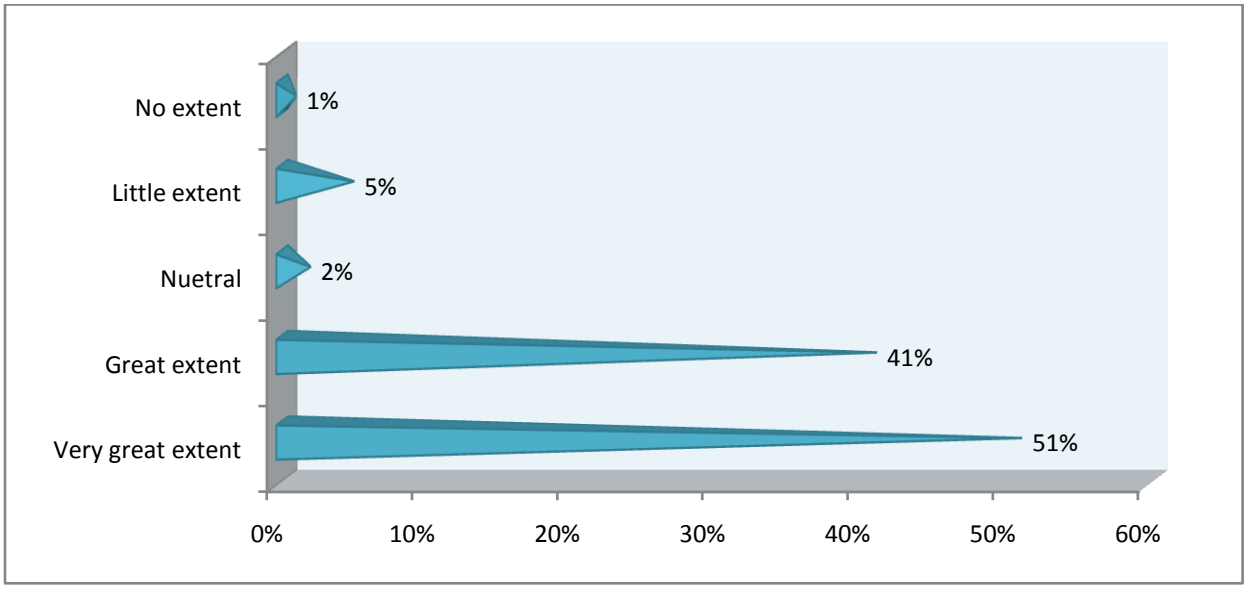
On the issue of maintenance, 85% of residents responded that the county government is responsible and 10% that the community based organizations are responsible. 50% further suggested organized waste disposal as a way to improve the water and sanitation condition and 40% suggested that the county government should explore options to provide alternative water sources.

On Community and recreational facilities, 50% of the residents feel they are fair in condition and attribute their maintenance to the county government and individual owners of these facilities particularly recreational facilities.

6.5.7 Diminishing Agricultural Land

Respondents were kindly requested to indicate the extent to which land conversion in Gitothua ward has led to diminishing agricultural land. (Figure 29).

Figure 29: Diminishing Agricultural Land



According to the findings, majority of the respondents (51%) indicated that land conversion in Gitothua ward has led to diminishing agricultural land to a very great extent, 41% indicated to a great extent,5% indicated to a little extent,2% were neutral, while only 1% were on the opinion that land conversion in Gitothua ward has no effect on diminishing agricultural land.This indicates that land conversion in Gitothua ward has led to diminishing agricultural land to a very great extent.

According to minutes of the Ruiru Local Land Control Board, over 200 acres of agricultural land are being converted every year. Reduction in agricultural land has many inherent and associated further negative effects which include food shortage; reduced agricultural exports hence reduced foreign exchange; lost job opportunities in agricultural sector, among others (Kenya, 2010).

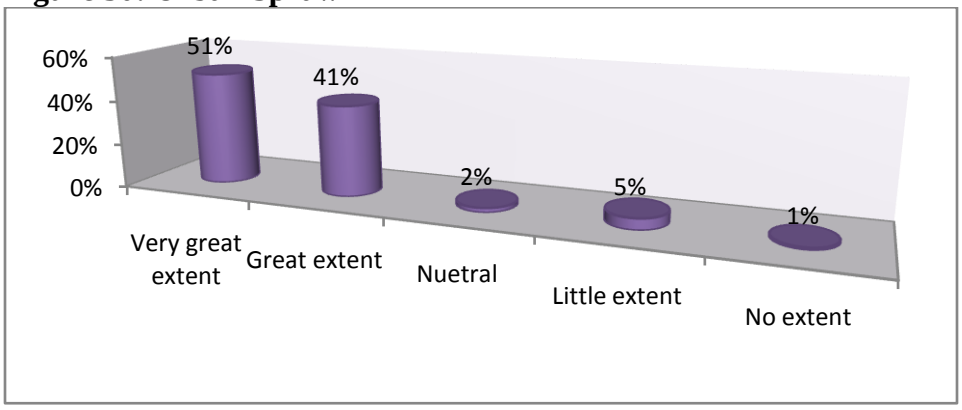
Gachimbi et al (2003) carried out a study on the agricultural production and its constraints in Kiambu District and found out that one of the constraints to maize and beans production is diminishing agricultural land due to population increase. Similarly, the study found out that agricultural land conversion is the leading cause of reduced coffee and tea production in the district.

This negates achievement of nourishment secure and prosperous country as imagined in the Kenya Vision 2030, the Agricultural Sector Development Strategy (ASDS) 2010-2020, the National Food Security and Nutrition Policy (NFSNP), the Kenya Food Security and Nutrition Strategy (KFSNS), and achievement of the Millennium Development Goals (MDGs)(Kenya, 2010). Diminishing fertile agricultural land in Kenya has far reaching negative effects, especially due to the fact that Kenya depends on rain-fed agriculture. From the literature reviewed, it is also evident that quantity and quality of cultivatable land has declined over the years and agricultural productivity has dwindled as well. Kenya, specifically, continues to experience devastating persistent and unpredictable droughts and famines. Therefore, for Kenya to achieve the twin goals of food security and sustainable development; there is need to regulate agricultural land use conversions sustainably.

6.5.8 Urban sprawl

The study sought to establish the extent to which land conversion in Gitothua ward has led to urban sprawl (Figure 30).

Figure 30: Urban Sprawl



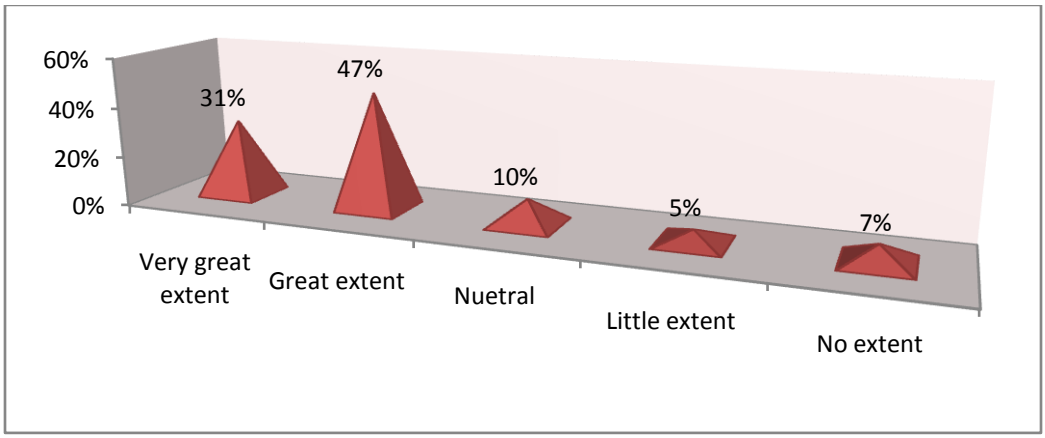
The findings reveals that majority of the respondents (51%) indicated that land conversion in Gitothua ward has led to urban sprawl to a very great extent, 41% indicated to a great extent, 5% indicated to a little extent,7% were Neutral, while only 1% were on the opinion that land conversion in Gitothua ward has no effect on urban sprawl.This shows thatland conversion in Gitothua ward has led to urban sprawl to a very great extent. Due to the conversions, the rural area is losing its character and becoming part of the Nairobi City, with its inherent negative features such as environmental negative impacts like air and noise pollution.

Development of large scale residential estates which have led to clearing of the vegetation cover and trees has fuelled environmental pollution. This was noted during field survey that air and noise pollution are increasing due to increased use of motor vehicles. Uncontrolled development was also noted whereby high-rise residential flats were noted to be developed on coffee estates, with inadequate infrastructural services

6.5.9 Increase in Land Values and Housing Cost/Rentals

The researcher aimed in establishing the extent to which land conversion in Gitothua ward has led to increase in land values and housing cost/rentals. (Figure 31).

Figure 31: Increase in Land Values



The findings shows that majority of the respondents (47%) indicated thatland conversion in Gitothua ward has led to increase in increase in land values and housing cost/rentals to a great extent, 31% indicated to a very great extent, 10% were Neutral, 5% indicated to a little extent,while only 7% were on the opinion that land conversion in Gitothua ward has no effect on increase in land values and housing cost/rentals.This shows thatland conversion in Gitothua ward has led to increase in land values to a great extent. On one hand, increase in land values and housing cost/rentals brings higher returns to the real estate investors/ land owners. For instance, once a farm has changed user into residential user, the value would go up and the investor would earn more from his investment.

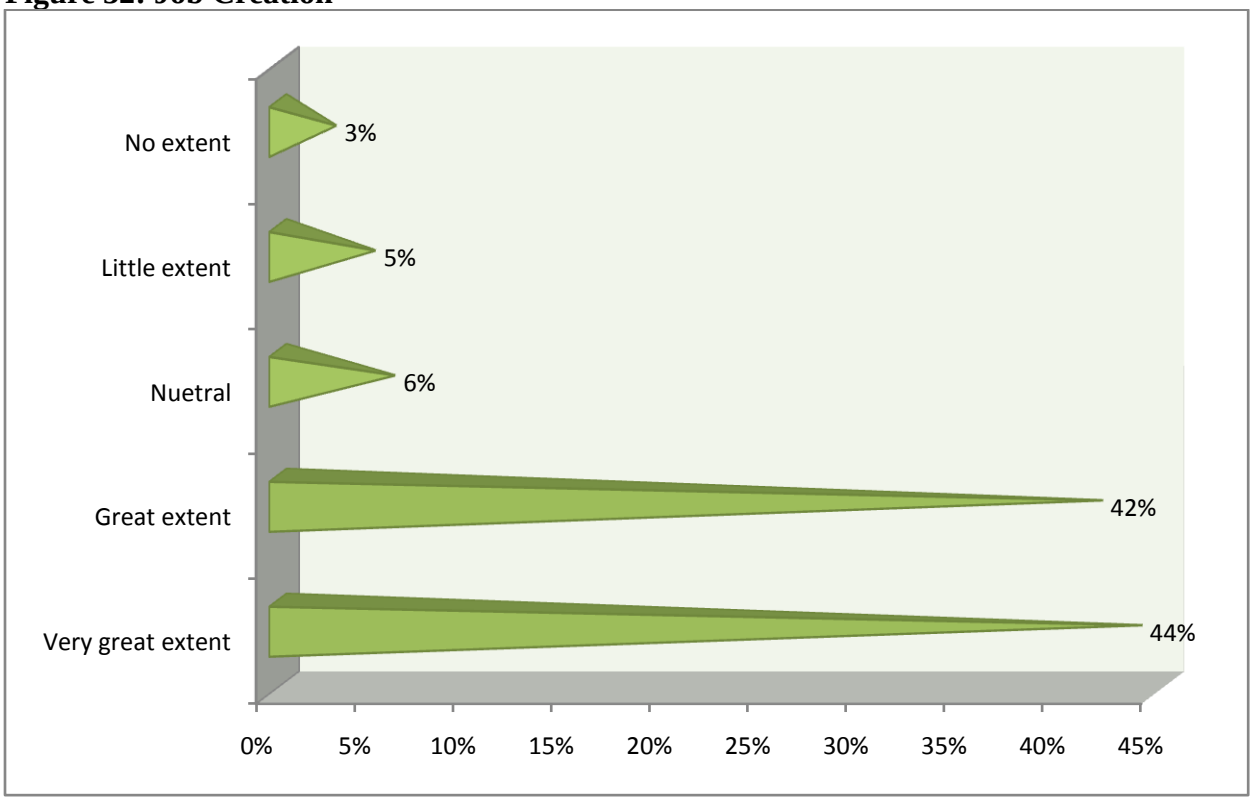
Similarly, if the farm is developed, the resultant housing cost/rentals would be higher to enable the investor cover the higher cost/value of the land and make some profit margin. This is desirable (positive) on the part of the real estate investor/land owner. On the other hand, once the

land values and housingcost/rentals go up, the local residents/farmers who cannot afford the high land values and housing cost/rentals are likely to be displaced from their lands due to infiltration by the upper and middle income earners as living standards become unaffordable.

6.5.10 Job creation

The study sought to establish the extent to which land conversion in Gitothua ward has led to job creation.(Figure 32).

Figure 32: Job Creation



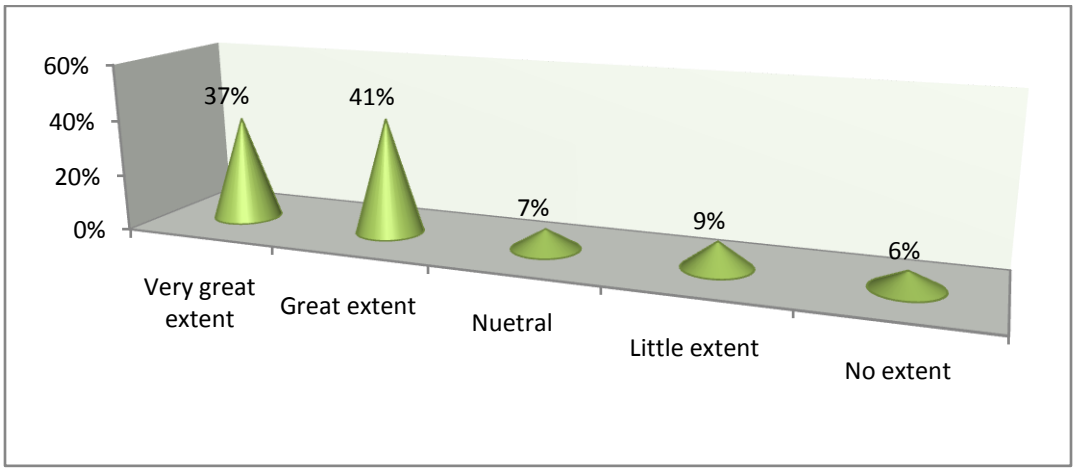
The findings shows that majority of the respondents (44%) indicated thatland conversion in Gitothua ward has led to job creation to a very great extent, 42% indicated to a great extent, 6% were Neutral, 5% indicated to a little extent,while only 3% were on the opinion that land conversion in Gitothua ward has no effect on job creation.This shows thatland conversion in Gitothua ward has led to job creation to a very great extent.

The development of the residential estates provide job opportunities to various local residents in various activities such as in land clearance, construction of the estates, transport of construction materials, among others. However, the jobs are temporary as they are limited to the life span of the construction project thus cannot be relied upon to sustain livelihoods of the local residents. This was actually noted during the field survey whereby people were seen working in construction sites. After interviewing some of them, it was noted that most of them are employed on casual basis usually on daily basis.

6.5.11 Pressure on the existing infrastructure

The study sought to establish the extent to which land conversion in Gitothua ward has led to pressure on the existing infrastructure.(Figure 33) below

Figure 33: Pressure on the existing infrastructure



The findings shows that majority of the respondents (41%) indicated thatland conversion in Gitothua ward has led to pressure on the existing infrastructure to a great extent, 37% indicated to a very great extent,9% indicated to a little extent,7% were Neutral, while only 6% were on the opinion that land conversion in Gitothua ward has no pressure on the existing infrastructure.This shows that land conversion in Gitothua ward has led to has led to pressure on the existing

infrastructure to a great extent.The road networks, supply of water and electricity are becoming inadequate and experiencing more pressure due to increased demand from the new residential estates since these were not envisioned during initial installation. In an ideal situation, infrastructure and services should be provided before development takes place, however, in the study area provision of services and infrastructure is done in retrospect without improving capacity of the old infrastructure. For instance, residents in the new high-rise residential flats in the coffee estates complained of intermittent water supply and narrow access roads that are challenging to motorists. Others complained of persistent power outages.

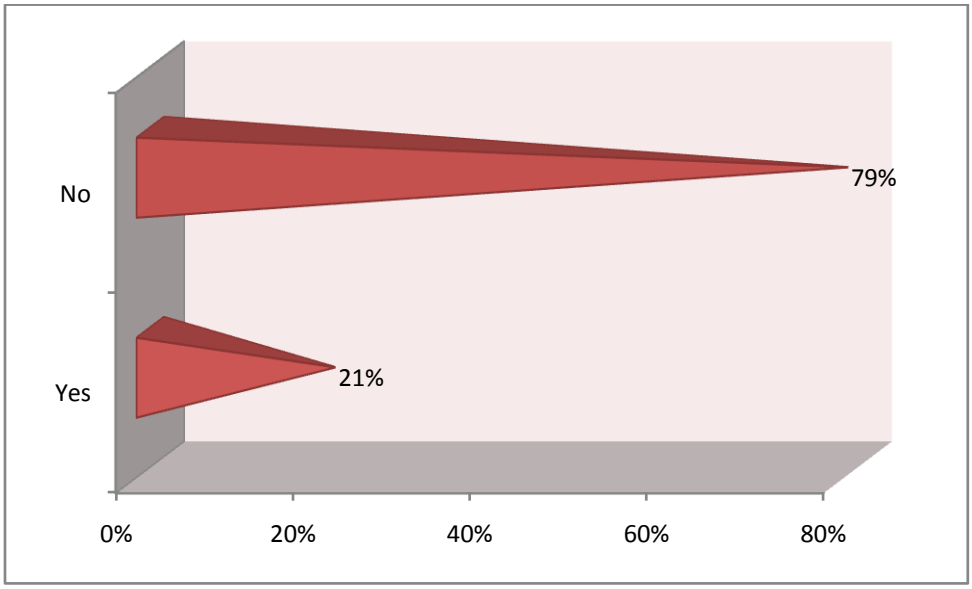
6.6 The State of Management Framework to Regulate Agricultural Land Conversions

The study sought to establish the state of management framework to regulate agricultural land conversations in Gitothua Ward. The study findings are as shown in subsequent subheadings.

6.6.1 Awareness of planning and resource allocation provisions in the new constitution

The deteriorating state of physical development and infrastructural facilities and services of the in Gitothua ward calls for an alarm to improve their conditions. The pattern of physical development is becoming unsustainable and a health hazard. The state of the infrastructure-roads, drainage channels as well as the sewer lines also requires some intervention. After assessing the causes and effects of planning for Gitothua ward, it is evident that, the major problem affecting the centre is the continuous ribbon development pattern. Thus, there is need to find a way to distribute the pattern of development. The study sought to establish from the respondents, whether they are aware of planning and resource allocation provisions in the new constitution

Figure 34: Awareness of planning and resource allocation provisions in the new constitution



The study revealed that most of the residents of Gitothua ward are not aware of planning and resource allocation provisions in the new constitution as indicated by 79% of the respondents, while only 21% of the respondents who indicated that they are aware of planning and resource allocation provisions in the new constitution

Among those who indicated that they are aware of planning and resource allocation provisions in the new constitution indicated that Article 60, Section 1 of the constitution, covers matters on land and states that land; „shall be held, used and managed in a manner that is equitable, efficient, productive and sustainable, and in accordance with the principles of equitable access to land; security of land rights; sustainable and productive management of land resources; transparent and cost effective administration of land; and sound conservation and protection of ecologically sensitive areas"

On the other hand Article 66, Section 1, provides for the role of the State to regulate the use of any land, or any interest in or right over any land, in the interest of defence, public safety, public

order, public morality, public health, or land use planning. There is established the National Land Commission whose functions among others is to monitor and have oversight responsibilities over land use planning throughout the country

In terms of preparation of plans, the Physical Planning Act provides for preparation of plans at different spatial levels including the steps and contents of such plans. Sec 16 (1) provides for the preparation of a regional physical development plan;….in reference to any Government land, trust land or private land within the area of authority of a county council for the purpose of improving the land and providing for the proper physical development of such land.‟

Sec 16 (2) states that;...a regional physical development plan may provide for planning, replanning, or reconstructing the whole or part of the area comprised in the plan, and for controlling the order, nature and direction of development in such an area.‟

ec 23, (1) gives the DPP powers to;….declare an area with unique development potential or problems as a special planning area for the purpose of preparation of a physical development plan irrespective of whether such an area lies within or outside the area of a local authority.‟ This implies that a plan may be prepared irrespective of the administrative boundary.

This implies that the law is explicit on circumstances under which a broad planning framework such as a regional physical plan to guide development may be prepared. Due to the expansiveness of fringe areas and the fact that such areas lie astride multiple jurisdictions, then such a plan would be most appropriate. The contested nature of space and conflicting land uses, particularly where they are watersheds or ecologically fragile areas, make the fringes good candidates for “special planning areas”. The law allows for planning for an area irrespective of

land tenure system. Sec 24 (1) provides for the Director to prepare with reference;…to any Government land, trust land or private land."

6.6.2 Policy Framework

The study sought to establish from the respondents the extent to which policy frameworkto regulate agricultural land use conversions in Gitothua ward is adequate and effective. (Table 9).

Table 9: Policy Framework

	Frequency	**Percent**
Very Great extent	20	6%
Great extent	30	9%
Neutral	43	13%
Little extent	145	44%
No extent	91	28%
Total	**329**	**100%**

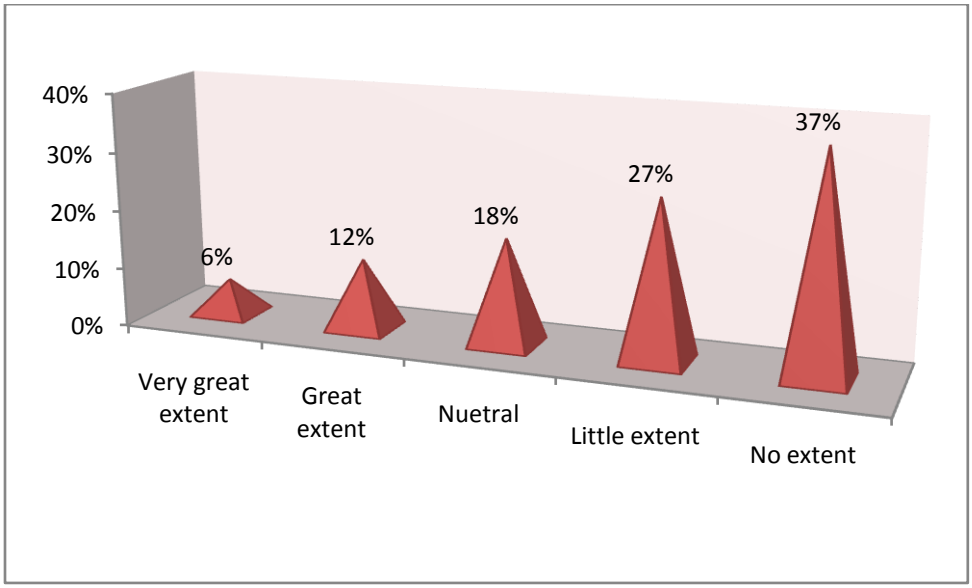
According to the findings, majority of the respondents (44%) indicated that policy frameworkto regulate agricultural land use conversions in Gitothua ward is adequate and effective at a little extent, 28% indicated no extent, 13%, were neutral, 9% indicated great extent, while only 6% indicated that policy frameworkto regulate agricultural land use conversions in Gitothua ward is adequate and effective at a very Great extent. This implies that policy frameworkto regulate agricultural land use conversions in Gitothua ward is inadequate and ineffective. The respondents cited lack of a national land use policy, urban sprawl and wanton destruction of

agricultural land as evidence of inadequate policy. The respondents indicated that there must be deliberate efforts (national policy) to regulate agricultural land use conversions.

6.6.3 Regulatory Framework

The study sought to establish from the respondents the extent to which regulatory framework to regulate agricultural land use conversions in Gitothua ward is adequate and effective. (Figure 35).

Figure 35: Regulatory Framework



According to the findings, majority of the respondents (33%) indicated that regulatory framework to regulate agricultural land use conversions in Gitothua ward is inadequate and ineffective, 27% indicated that regulatory framework to regulate agricultural land use conversions in Gitothua ward is adequate and effective at a little extent, 18%, were neutral, 12% indicated great extent, while only 6% indicated at a very Great extent. This shows that regulatory framework to regulate agricultural land use conversions in Gitothua ward is inadequate and

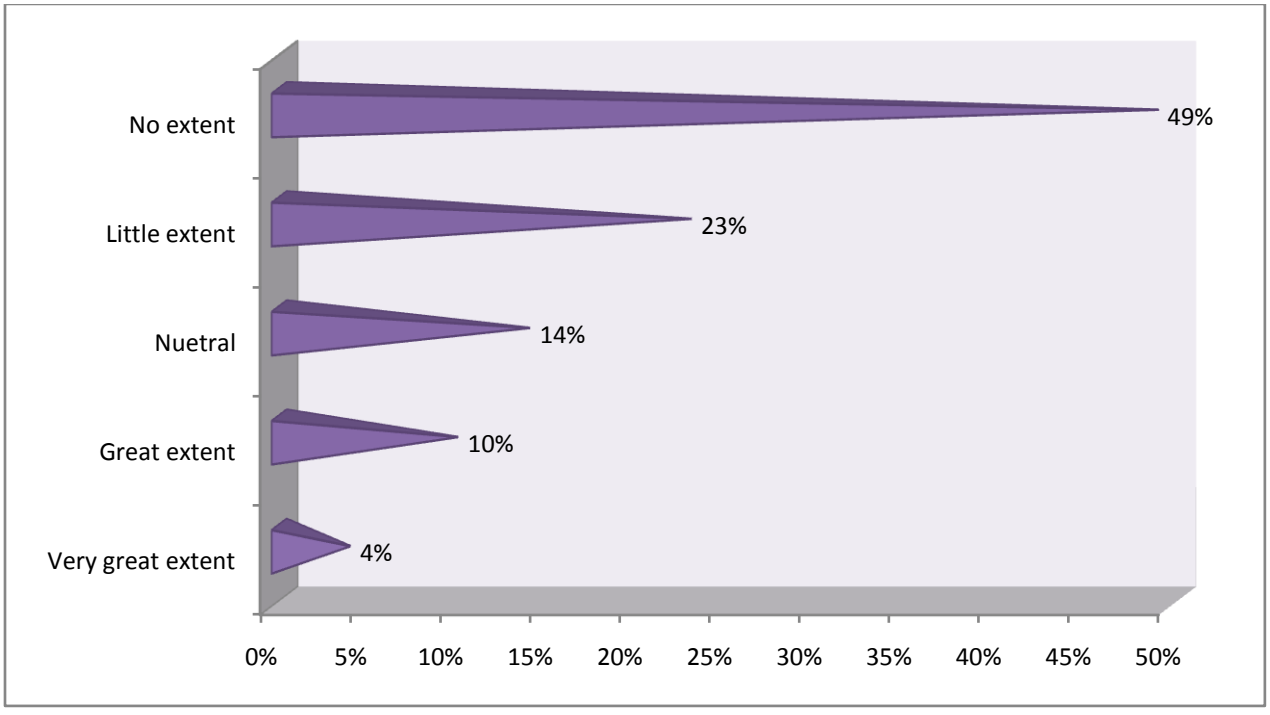
ineffective. Some of the laws, for instance the Agriculture Act chapter 318 (57 years old) are too old and ineffective.

The Agriculture Act, for example, does not give the Agricultural Officers, at district level, power to regulate agricultural land use conversions. Another reason given for legal framework being inadequate and ineffective is lack of Constitutional changes throughout the history of Kenya until late 2010. The old Kenyan Constitution did not provide principles of land use and management as the current Constitution does, thus there has been inadequate land use management for a long time.

6.6.4 Institutional Framework

Respondents were kindly requested to indicate the extent to which institutional framework to regulate agricultural land use conversions in Gitothua ward is adequate and effective.

Figure 36: Institutional Framework



According to the findings, majority of the respondents (49%) indicated that institutional frameworkto regulate agricultural land use conversions in Gitothua ward is inadequate and ineffective, 23% indicated that institutional frameworkto regulate agricultural land use conversions in Gitothua ward is adequate and effective at a little extent, 14%, were neutral, 10% indicated great extent, while only 4% indicated at a very Great extent. This shows that institutional frameworkto regulate agricultural land use conversions in Gitothua ward is inadequate and ineffective. This is because the Ruiru Local Land Control Board, which is mandated by Land Control Act Chapter 302 to protect agricultural land from conversions, is incompetent due to lack of technical staff and funds (Kenya 2014).

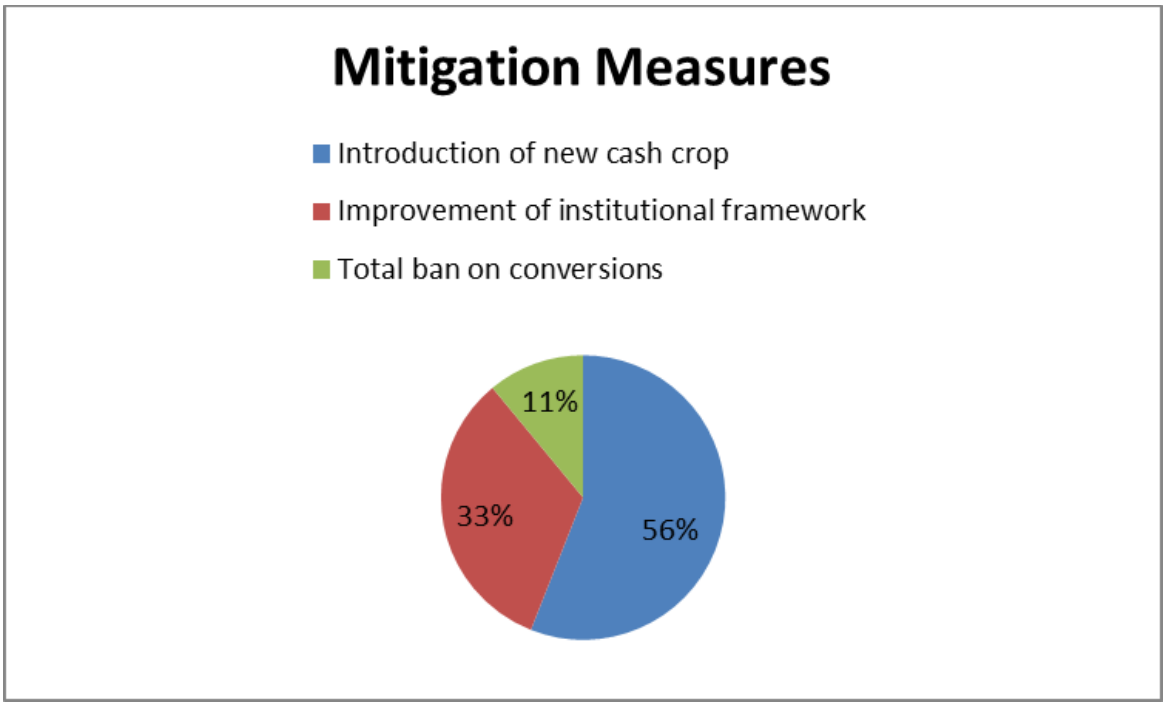
Also, the Kiambu County Government does not have adequate staff and technical knowledge on agricultural land use conversions hence the two institutions rely on district departments such as lands, physical planning and survey. These inform Board's and County government,s decision to grant or refuse change of user on agricultural land. The fact that over the last five years no application for change of user has been rejected and the Board and Council do not know how many acres of agricultural land have been converted over the years strengthens this viewpoint. Cases of corrupt land officials were also reported.

Weak and ineffective land institutions were revealed to be a setback to sustainable agricultural land use conversions; this was indeed identified as one of the causes of agricultural land use conversion. Some of the challenges facing institutions include lack of or inadequate technical personnel, lack of national land use policy, many archaic and conflicting land laws and agricultural land fragmentation into uneconomical sizes. The study also revealed that the county council has a lot of power that makes other authorities ineffective (yet the council relies on their advice to grant development permissions). Other challenges include political interference, lack of

coordination among all relevant authorities in land use conversions and ignorance among the land officials regarding relevant policies and regulations, especially the new National Land Policy (Kenya, 2010) and new land laws (Kenya, 2012).

6.7 Intervention Measures

Respondents were kindly requested to indicate the best way they thought the adverse effects of agricultural land use conversions in Gitothua ward can be mitigated.



CHAPTER SEVEN

CONCLUSIONS AND RECOMMENDATIONS

7.1 Introduction

This chapter gives a summary of the salient points of the study; lessons learned as well suggestions on the way forward regarding each of the three aspects this study which are: causes of agricultural land conversions in Gitothua ward, effects of agricultural land conversions and model for planning (policy, programme and management) that should be adopted in GitothuaWardcentral in form of summary of the findings, conclusion and recommendations.

7.2 Summary of the Findings

This section presents the summary of the findings with regard to the implications of conversion of agricultural land use in peri urban areas of Gitothua ward, Ruiru subcounty

7.2.1 Findings on Existing Land Uses in Gitothua Ward

The research revealed that the agricultural land use conversions are very prevalent and of great concern due to their inherent negative effects on the sustainable development of Kenya. In addition, the study established that there is existence of agricultural land use conversionsinGitothua ward whereby existing land in Gitothua ward is mainly used for commercial and residential land uses.

7.2.2 Findings on Causes of Agricultural Land Conversions in Gitothua Ward

The study established thatthe productivity and profitability of many farms (especially small scale) is too low, guaranteeing peasant farmers remain poor. In addition, it was revealed thatdemand for housing affect land conversions in the Gitothua to a very great extent. Also, the study established that increase in urban population affect land conversions in the Gitothua and

that weak and ineffective land institutions havelead to increased land conversions in the in Gitothua to a very great extent.

7.2.3 Findings onOutcome of Conversion of Agricultural Land in Gitothua Ward

Further the study revealed thatland conversion in Gitothua has led to diminishing agricultural land to a very great extent and thatland conversion in Gitothua has led to urban sprawl to a very great extent. Also, it was noted thatland conversion in Gitothua has led to increase in land values to a great extent. In addition, land conversion in Gitothua has led to job creation to a very great extent and thatland conversion in Gitothua has led to has led to pressure on the existing infrastructure to a great extent.

7.2.4 Findings ontheintervention measures can be taken to minimise adverse effect of land use conversions?

Moreover, the study revealed thatmost people preferred the introduction of alternative crops to coffee which could be used to mitigate adverse effects of land use conversions at 56%. The strengthening of institutional frameworks was also considered by 33% of the respondents and the total ban on land use change was the least preferred intervention measure at 11%. From key informants interviews it was discovered that Kiambu County has a County Spatial Plan that is yet to be approved by the county assembly thus the planners lack a tool in entrenched law that would assist them in proper regulation of land use.

7.3 Conclusions

This section presents the conclusions with regard to the implications of conversion of agricultural land use in peri urban areas of Gitothua ward, Ruiru subcounty.

7.3.1 Conclusions on Existing Land Uses in Gitothua Ward

The study concludes that the agricultural land use conversions are very prevalent and of great concern due to their inherent negative effects on the sustainable development of Kenya. In addition, the study concludes that there is existence of agricultural land use conversionsinGitothua ward whereby existing land in Gitothua ward is mainly used for commercial and residential land uses.

7.3.2 Conclusions on Causes of Agricultural Land Conversions

The study has established that the agricultural land use conversions are as a result of many factors; low returns in agricultural activities, demand for housing, increase in urban population, weak and ineffective land institutions and proximity of the case study (fertile agricultural lands) to Nairobi City Centre. Other causes include expansion of urban centres, sub-division of agricultural land into agriculturally unviable sizes, improvement in infrastructure and lack of public participation in land use conversions. These have been noted to be interrelated.

7.3.3 Conclusions on Outcome of Conversion of Agricultural Land

The main objective of this research was to investigate implications of conversion of agricultural land use in peri urban areas of Gitothua ward, Ruiru subcounty, with view of recommending appropriate management framework to regulate agricultural land use conversions. The research revealed that the current agricultural land use conversions are very prevalent and of major concern for attainment of twin goals of improved agricultural (food) production and sustainable development in the country. The agricultural land use conversions have both positive and negative effects. However, the negative effects far outweigh positive effects, with diminishing agricultural land being the greatest negative effect. There is need, therefore, to regulate

agricultural land use conversions so as to optimise positive effects while minimising the negative effects.

7.3.4 Conclusions on the intervention measures to be adopted in Gitothua Ward

Further the research has established that the best way to mitigate the adverse effects of conversions is through improvement in the profitability of the agriculture sector. This is best achieved by introduction of alternative crops in the area that are more profitable than coffee.Also there has been the Kiambu Spatial Plan that has been developed but is yet to be approved by the County assembly. This would greatly benefit the planning sector and avoid haphazard land use change.

7.4 Recommendations

This section presents the recommendations with regard to the implications of conversion of agricultural land use in peri urban areas of Gitothua ward, Ruiru subcounty

7.4.1 Recommendations on the Existing Land Uses in Gitothua Ward

Purchase and/or transfer of development rights (PDRs/TDRs), critical agricultural area protection measures as well as urban revitalization strategies could also be used, as policy instruments, to protect fertile agricultural land found in the urban fringes.

7.4.2 Recommendations on the Causes of Agricultural Land Conversions

The Government should put in place policies (incentives) to encourage farmers to retain their agricultural land and avoid conversion into other uses. This could be done by establishing good markets for agricultural produce (for example coffee), provision of farm implements and agricultural extension services, in order to make agricultural land use more profitable and competitive. In addititon new more profitable cash crops like macadamia can be introduced. This

will counteract the greatest influence of agricultural land use conversions in the urban fringes, which was noted to be low returns from agricultural activities.

In addition land based experts like planners, surveyors and architects should operate in a more professional way, making ethical decisions that are not based on profit alone but the general well-bieng of society. Professional bodies should regulate conduct and discipline any member that does not athere to the set rules. This will aid in proper enforcement of land use planning and development controls to curtail encroachment of land uses.

Allow for densification in urban areas so as to reduce the need for housing in agricultural areas. This should be done through revision of the building code which is outdated. Plot ratios and Plot coverage should be adjusted according to the prevailing current needs.

7.4.3 Recommendations on the Outcome of Conversion of Agricultural Land

There is need for public institutions to conduct their affairs and manage public resources in a transparent and rational manner in order to guarantee sustainable use of land resources. The process of decision-making and the process by which decisions are implemented should be well informed and for the national's current and future interests. Good governance will ensure that relevant policies, laws, effective institutions and meaningful public participation are put in place to guide sustainable land use conversions. Good governance will also curb corruption, reduce government instability and ensure meaningful public education, all of which may contribute to poor land use management.

There is urgent need for regularization of existing unplanned developments in order to take adequate intervention measures and improve the livelihood of the residents of Gitothua Ward.

This will help Gitothua in the improvement of the spatial arrangement of its development thereby making the ward improve its liveability.

7.4.4 Recommendations on the intervention measures to be adopted in Gitothua Ward

Based on the above findings, it is hereby deemed necessary to outline a number of recommendations that are pertinent to appropriate management framework to regulate agricultural land use conversions in the urban fringes.There is urgent need to approve and operationalize the Kiambu County Spatial Plan to influence the future distribution of activities in space and regulate conversions of land from one category to another. This is important so as to upscale land use planning at county level from which subcounty and ward development plans can be formulated and implemented.

There is need to introduce alternative cash crops like macadamia in order to get improve the profit magins of the farmers thus encouraging them more to retain their farmlands.

There is need to create and/or strengthen relevant land institutions with powers and capacity to regulate land use conversions. Consequently, the Kiambu Local Land Control Board should be either equipped with adequate technical personnel and funds to handle land use conversions or disbanded and replaced with an effective institution that is responsive and proactive to the ever changing economic, political and social realities. The same should apply to the Kiambu County Council

7.5 Areas for Further Research

This study concentrated on theconversion of agricultural land use in peri urban areas of Gitothua ward, Ruiru sub-county. This study therefore recommends that in the future a study be conducted across all counties. This will enable the generalization of the findings across the country.

The research recommends further studies on the effects of protecting agricultural land in the peri urban areas versus affordable housing

References

Agevi, A.H.G (1981), Problems of Urban Boundary Extension in Kenya: ACase Study of Kitale Municipality. M.A Thesis, Department of Urban andRegional Planning, University of Nairobi, Kenya

Bernstein, J. D. (1994). Land use considerations in urban environmental management. In *Urban Management ProgramUrban Management and the Environment* (No. 12). World Bank.

Briassoulis, H. (2008). *Land-use, Land-cover Changes and Global Aggregate Impacts.* Athens, Greece: Encyclopedia of Life Support Systems.

Njoroge, E. G. (2013). *An investigation of causes of land management Challenges in satellite towns. A case study of Ruiru municipality.* M.A Thesis, Department of Geography and Environmental Studies, University of Nairobi, Kenya.

CARDENAS, D. C. (2005, August 26). *fao.org.* Retrieved March 03, 2014, from www.fao.org: ftp://ftp.fao.org/es/esa/beijing/cardenas_landuse.pdf

Chege O. (1978), Land Constraints to Urban Development: The Case of NyeriTown, M.A Thesis, Department of Urban and Regional Planning, University ofNairobi, Kenya.

Development, W. C. (1987). *Our Common Future.* New York: Oxford University Press. United Nations.

Eric Lambin, H. J. (2007). Causes of land-use and land-cover change. The Encyclopedia of Earth: Content, Credibility, Community.

Kemoni, J. O. E. (2008). *Institutional Problems and Constraints in Land Utilization in ThePeri-Urban Areas of Mavoko Municipality: A Case of Namanga Road–Stony Athi Corridor*. M.A Thesis, Department of Urban andRegional Planning, University of Nairobi, Kenya

Kenya, Republic of (1970), The Land Control Act, Cap 302. GovernmentPrinter, Nairobi.

Kenya, Republic of (1986), Sessional paper No. 1 of 1986 on Economicmanagement for renewed growth. Government Printer, Nairobi.

Kenya, Republic of (1996), The Physical Planning Act cap 286.Government Printer, Nairobi

Kenya, Republic of (2003), Economic recovery strategy for wealth andEmployment Creation for the period 2003-2007. Government Printer, Nairobi.

Kenya, Republic of (2007), Sessional paper No. 3 of 2009 on National LandPolicy. Government Printer, Nairobi.

Kenya, Republic of (2010), The Constitution of Kenya. GovernmentPrinter, Nairobi.

Kenya, Republic of (2012), The Land Act No. 3. Government Printer,Nairobi.

Kihagi, J. K. (2000). *Land use Changes in lake Nakuru Catchment: Implications on environmental planning and management.* Nairobi.

Kiptoo, V. K. (1995). *The effects of unplanned settlements on land use planning: A case study of Eldama Ravine town.* Nairobi.

Kothari, C. R. (2004). *Research methodology: Methods and techniques*. New Age International.

Lambin, E.F., Turner, B. L., Geist, H., Agbola, S. And Angelsen, A. (2011) The Causes of Land-Use and Land-Cover Change: Moving Beyond the Myths, Department of Geography, University of Louvain, Place Louis Pasteur

Mbithi, B. (1975). *Spontaneous settlement problem in Kenya.* Nairobi: East African Literature Bureau.

Muendo, M. N. (2004). *Land use planning in the arid and semi arid areas: A case study of Nguu settlement scheme in Makueni District* .M.A Thesis, Department of Urban andRegional Planning, University of Nairobi, Kenya

Mugenda O. M. &Mugenda A. G. (2003), Research Methods: Quantitativeand qualitative approaches. ACTS press, Nairobi.

Mwathane, I. (2012, August 05). *Mwathane Blogs*. Retrieved 03 25, 2015, from Mwathane Blogs: http://ibrahimmwathane.com/

Ngeti, R. (I997), An Assessment of the Impact of Land Use Regulations andPolicies on Land Utilization in Mombasa Municipality.M.A Thesis, Departmentof Urban and Regional Planning, University of Nairobi, Kenya.

Ruben N. Lubowski, S. B. (2006). *Environmental effects of agricultural land-use change. Washington, DC, USA: US Department of Agriculture, Economic Research Service.*

Simiyu, L.B (2002), Effects of Urbanization on the Use and Control of Land: ACase of Ngong Fringe. M.A Thesis, Department of Urban and RegionalPlanning, University of Nairobi, Kenya.

Magondu, G. J. M. (2006). *Planning for domestic water supply in Mugutha sub-location of Ruiru municipality in Kenya*. M.A Thesis, Department of Urban andRegional Planning, University of Nairobi, Kenya

Weeks, J. R. (2010). Remote sensing of urban and surburban areas. *Springer Science*, 33 - 45.

Wu, J. (2008). Land use changes: Economic, social, and environmental impacts.

Ngayu, M.M. (2016). *What are the Drivers of Growth in on the rural-urban fringes; case studyof the Kiambu – Nairobi Corridor*. Doctoral Thesis, Department of Urban andRegional Planning, University of Nairobi, Kenya

APPENDICES

Appendix 1: Questionnaire

Part A: Background Information.
(Tick One)

1. Gender
    1. Male ( )
    2. Female ( )
2. Marital Status
    1. Single ( )
    2. Married ( )
    2. Separated ( )
3. Age
    1. 20 years and below ( )
    2. 21-30 Years ( )
    3. 31-40 Years ( )
    4. 41 – 50 Years ( )
    5. Above 50 Years ( )
4. What is the highest level of education you have attained?
    1. No Education ( )
    2. Primary incomplete ( )
    3. Primary complete ( )
    4. Secondary incomplete ( )
    5. Secondary complete ( )
    6. Post-Secondary Certificate ( )
    7. Undergraduate degree ( )
    8. Postgraduate degree ( )
5. Employment Status
    1. Employed ( )
    2. Self Employed ( )
    3. Unemployed ( )

Part B: Current land Uses

6. What is the size of your house hold?

1 household member	
1-4 member	
5-9 household member	

7. How prevalent would you say are the current agricultural land conversions in Gitothua ward?

    Very prevalent( )

Moderate ( )

Not prevalent ( )

8. Rate the extent of the following land Uses in the Gitothua ward?

Residential buildings ( )

Commercial buildings ( )

Agricultural activities ( )

9. Have you lived in Gitothua Ward since birth?

Yes ( )

No ( )

(If yes, how long have you been a resident of Gitothua ward? ----------

10. If No, state the reasons for coming to Gitothua ward (Tick where necessary)

Employment	
Marriage	
Cheap land	
Proximity to Nairobi	
Other (Specify)	

11. What is the size of the land you reside on?

40 ×80 ( )

1/4 Acre ( )

1/8 Acre ( )

1 Acre and above ( )

12. What is your Land Use?

For Residential ( )

For Commercial ( )

For Agricultural ( )

13. What is the nature of the land ownership?

Freehold ( )

Leasehold ( )

No Documentation ( )

Part C: Causes of Land Conversion

14. In your own opinion what are the causes of land change in Gitothua Ward?

……
..

15. Rate the extent to which low agricultural returns have led to land conversions in the Gitothua ward?

Very great extent ( )

Great extent ( )

Nuetral ( )

Little extent ( )

No extent ( )

16. Rate the extent to which demand for housing has led to land conversions in the in Gitothua ward?

Very great extent ( )

Great extent ( )

Nuetral ( )

Little extent ( )

No extent ( )

17. Rate the extent to which increase in urban population has led to land conversions in the in Gitothua ward?

Very great extent ( )

Great extent ( )

Nuetral( )

Little extent ( )

No extent ( )

18. Rate the extent to which weak and ineffective land institutions have led to land conversions in the in Gitothua ward?

Very great extent ( )

Great extent ( )

Nuetral ( )

Little extent ( )

No extent ( )

Part D: Impacts of Land Use Change

19. What are the solid waste disposal methods used in your area?

Private Garbage Collector ( )

Burn the waste ( )

Bury ( )

20. How do dispose yourliquid waste?

In septic tanks ( )

In pit latrines ( )

21. How do you rate the status of Roads conditions in your area?

Poor ( )

Fair ( )

Good ( )

Very Good ( )

Excellent ( )

22. How do you rate the status of Water and Sanitation in your area?

Poor ( )

Fair ( )

Good ( )

Very Good ( )

Excellent ( )

23. Rate the extent to which land conversion in Gitothua ward has led to diminishing agricultural land?

Very great extent ( )

Great extent ( )

Nuetral( )

Little extent ( )

No extent ( )

24. Rate the extent to which land conversion in Gitothua ward has led to urban sprawl?

Very great extent ( )

Great extent ( )

Nuetral( )

Little extent ( )

No extent ( )

25. Rate the extent to which land conversion in Gitothua ward has led to Increase in land values?

Very great extent ( )

Great extent ( )

Nuetral( )

Little extent ( )

No extent ( )

26. Rate the extent to which land conversion in Gitothua ward has led to job creation?

Very great extent ( )

Great extent ( )

Nuetral( )

Little extent ( )

No extent ( )

27. Rate the extent to which land conversion in Gitothua ward has led to pressure on the existing infrastructure?

Very great extent ( )

Great extent ( )

Nuetral( )

Little extent ( )

No extent ( )

28. From your experience, what are the effects of agricultural land use conversions in this area?

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

Part E: Intervention Measures to Minimise Adverse Effect of Land Use Conversions

29. Are you aware of planning and resource allocation provisions in the new constitution?

Yes ☐

No ☐

. If yes, what do you know?

30. Rate the extent to whichPolicyframeworkto regulate agricultural land use conversions is adequate and effective

Very great extent ( )

Great extent ( )

Nuetral( )

Little extent ( )

No extent ( )

31. Rate the extent to which legal frameworkto regulate agricultural land use conversions is adequate and effective

Very great extent ( )

Great extent ( )

Nuetral( )

Little extent ( )

No extent ( )

32. Rate the extent to which institutional frameworkto regulate agricultural land use conversions is adequate and effective

Very great extent ( )

Great extent ( )

Nuetral( )

Little extent ( )

No extent ( )