AN INVESTIGATION INTO CAUSES AND EFFECTS OF AGRICULTURAL LAND USE CONVERSIONS IN THE URBAN FRINGES: A Case Study of Nairobi-Kiambu Interface

BY

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REG. NUMBER: B92/64952/2010

A PROJECT PAPER SUBMITTED IN PARTIAL FULFILMENT FOR THE AWARD OF MASTERS IN ARTS (VALUATION AND PROPERTY MANAGEMENT) DEGREE IN THE DEPARTMENT OF REAL ESTATE AND CONSTRUCTION MANAGEMENT, UNIVERSITY OF NAIROBI

JULY, 2013

DECLARATION

I, Museleku Erastus Kiita, hereby declare that this project is my own original work and has not been presented for a degree in any other university.

Signature..... **Date…….**

MUSELEKU ERASTUS KIITA

This project paper has been submitted for examination with my approval as a university supervisor.

Signature.....

PROF. PAUL M. SYAGGA, PhD

Date.....

ACKNOWLEDGEMENTS

I attribute the success of this research to the efforts of many people who assisted at different stages and in different capacities.

First and foremost, I express my utmost gratitude to my supervisor Professor Paul Syagga for his steadfast and invaluable guidance, assistance, constructive criticism and patience throughout execution of this research towards successful end. God bless you Prof!

I would like to thank all the lecturers and chairperson in the Department of Real Estate and Construction Management (RECM) for their collective guidance. I extend my appreciation to the non-teaching staff in the department of RECM for their input in this work.

Sincere thanks to my friends Wilfred Mutuku, Xavier Masila, Alex Gicheru and Christopher Mwangi, among others, for their support and encouragement throughout the research work. Special thanks to the management and staff of Lloyd Masika limited, especially the department of valuation, for their support and encouragement.

Heartfelt thanks to the Kiambu local land control board, district and county council officials for the information extended to me. Indeed, a big thank you to every respondent who participated in this research. I am very grateful for your assistance, without which, this study would not have been possible. Cordial appreciation to my family members and relatives, for their support, love, encouragement and prayers. Special thanks to my love, Sharon Kavinya, for your unconditional love, encouragement, prayers (and fasting!) and well wishes – I don't take them for granted! May God bless you! Thank you to any other person who contributed in one way or another to the success of this work.

Above all, glory to Almighty God for knowledge, wisdom, provision, good health and protection.

Thank you and God bless you all!

DEDICATION

To my parents, Mr. and Mrs. Museleku

Thank you for instilling in me the values and virtues that guide my life and for sacrificing considerably to ensure that I got education, even when there were no means! You are special to me and your legacy in my life will forever remain. May Almighty God reward you abundantly!

To my love, Sharon Kavinya

Thank you for your sacrificial love that surpasses my understanding. Your companionship makes life easier and happier!

To my brothers and sisters

We have struggled together in search of education, knowledge and prosperity. May Almighty God give you the desires of your hearts.

ABSTRACT

Agricultural land use conversions into other uses in the urban fringes have been of great concern, not only to Kenya, but the world over. In Kenya, this has been more pronounced in the Nairobi-Kiambu interface, among other urban fringes, whereby coffee farmlands and other fertile agricultural land parcels are being developed with residential estates. This has resulted into wanton conversions of agricultural land into residential use with its negative consequences of reduced agricultural land for agricultural, especially food, production. This study was carried out to investigate causes and effects of the agricultural land use conversions in such urban fringes.

The Nairobi-Kiambu interface was chosen as a case study because it was noted to experience a lot of large-scale agricultural land conversions to residential use and no previous similar studies have been conducted. The area was selected to represent such other areas in the country. This was due to limitation of time and finances. Secondary data included written sources, both published and unpublished materials. Primary data entailed four sets of questionnaires which were administered to local residents/farmers in the study area; professionals (real estate valuers and physical planners) and real estate developers. Live interviews were also conducted to the district and ministry of Lands officials. The officials of the local land control board and county council were also interviewed. The respondents were selected randomly. Five large-scale residential estates were identified to be falling under the study area with approximately 500 homes. Ten per cent of the homes in each estate were given questionnaires, that is, 50 homes. 10 valuation firms, 5 physical planning firms and 5 property development firms were chosen to represent others, with bias towards the firms that were noted to be operating in the study area. The data was analysed by use of descriptive statistics and presented using tables, photographs and graphs.

The research revealed that the current agricultural land use conversions in the study area are very prevalent and have both positive and negative effects, with the negative effects far outweighing positive effects. The study also established that the agricultural land use conversions are as a result of interrelated 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, among others. Further the research established that the management framework to regulate agricultural land use conversions is inadequate and ineffective.

Adequate and effective policy, legal and institutional frameworks as well as effective public participation in land use conversions, comprehensive land use planning and good governance are recommended as appropriate solutions to counter the causes and negative effects of the agricultural land use conversions, revealed by the study.

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GLOSSARY OF ACRONYMS

1. **ASALs** - Arid and Semi-Arid Lands
2. **ASDS** - Agricultural Sector Development Strategy
3. **AAK** - Architectural Association of Kenya
4. **CBD** - Central Business District
5. **FAO** – Food and Agriculture Organization
6. **GDP** – Gross Domestic Product
7. **HBU** - Highest and Best Use
8. **KFSNS** - The Kenya Food Security and Nutrition Strategy
9. **LUC -** Land-Use Change
10. **LULCC** - Land-Use and Land-Cover Change
11. **MDGs** - Millennium Development Goals
12. **PRSP -**Poverty Reduction Strategy Paper
13. **NFSNP** - The National Food Security and Nutrition Policy
14. **NSP** - National Spatial Plan
15. **NMR** - Nairobi Metro Region
16. **PDRs/TDRs -** Purchase and/or Transfer of Development Rights
17. **SRA -** Strategy for Revitalizing Agriculture
18. **UN** - United Nations
19. **UNEP** – United Nations Environment Programme
20. **UGB -** Urban Growth Boundaries
21. **UC** - Urban Containment

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CHAPTER ONE

INTRODUCTION

1.1 INTRODUCTION

Land supports all forms of lives and other factors of production. Verheye and Paul (1997) noted that a vast majority of households, especially in developing countries, depend on land and other natural resources for satisfying their immediate needs and achieving their long-term ambitions. Land is often the only available resource on which rural families can rely to build their lives. American economist and philosopher, Henry George (1839-1897), emphasized the importance of land and remarked "so man not only lives off land, levying on it for its materials and forces, but he also lives on land. His very life depends on land. Land is the habitation of man, the store-house upon which he must draw for all his needs, the material to which his labour must be applied for the supply of all his desires; for even the products of the sea cannot be taken, the light of the sun enjoyed, or any of the forces of nature utilized, without the use of land or its products. On the land we are born, from it we live, to it we return again - children of the soil as truly as is the blade of grass or the flower of the field. Take away from man all that belongs to land and he is but a disembodied spirit". It was clear to George that there could be no production of any kind without land.

Similarly, land is critical to the economic, social and cultural development of Kenya. Land is a central category of property in the lives of Kenyans. It is the principal source of livelihood and material wealth, and invariably carries cultural significance for many Kenyans. Its importance is recognized by various Government initiatives including the initial Poverty Reduction Strategy Paper (PRSP), political party manifestoes and the Economic Recovery Strategy for Wealth and Employment Creation 2003-2007, to mention but a few. Land was a key reason for the struggle for independence and land issues remain politically sensitive and culturally complex (The National Land Policy, 2009).

Land is commonly known as real estate property characterised by its fixity in supply and location. Spatial fixity combined with the close proximity of housing units in urban areas suggests the potential for externalities inherent in a given location. In addition, real estate is heterogeneous meaning it is unique in its location, building and financing. This makes pricing difficult, increases search costs, creates information asymmetry and greatly restricts substitutability. It is also worth noting that land markets in East African countries are inefficient, corrupt and largely informal. They are also politically and socially influenced and involve many actors, some with conflicting interests (Urban LandMark and UN-Habitat, 2010). Consequently, land use management in Kenya, especially in the urban fringes, has

continued to face a myriad of challenges and thus agricultural land use conversions have not been done sustainably.

The Kenyan population has increased over the years from 10.9 million persons in year 1969 to 38.6 million persons in year 2009, 32.3% of it comprising of urban population, estimated at 61.5% by year 2030 (Kenya National Bureau of Statistics, 2009 and Nairobi Metro 2030). This population increase coupled with unique local characteristics of land poses further challenge to land use management in the urban fringes, especially to the achievement of twin goals of sustainable development and building a safe, secure and prosperous metropolitan as envisioned by Kenya Vision 2030 and Nairobi Metro 2030.

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 goal which is highly desired yet rarely achieved on both sides of the Atlantic. In nations where the use of land is determined largely by individual property owners, urban expansion is difficult to contain against rising demand for large houses and lots, diminishing need to access the central city, and steady immigration. Both North Americans and Europeans are battling these pressures with discernibly mixed success. In Scotland, greenbelts have been the policy of choice at both the national and local level and the subject of extensive and recent research. However, greenbelts in Scotland have flaws, much land formerly within greenbelts has been developed and considerable development has leapfrogged 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 U.S. 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.

In Kenya, agricultural land use conversions are mainly guided by The Constitution of Kenya (2010), The Land Control Act, Chapter 302, The Local Government Act, Chapter 265 and The Physical Planning Act, Chapter 286, Laws of Kenya, to mention but a few.

1.2 PROBLEM STATEMENT

Chapter 5 of the Kenyan Constitution (2010) on land and environment states that land in Kenya shall be held, used and managed in a manner that is equitable, efficient, productive and sustainable. The Republic of Kenya has an area of approximately 582,646 sq. km. comprising of 97.8% land and 2.2% water surface. Only 20% of the land area can be classified as medium to high potential agricultural land and the rest of the land is mainly arid or semiarid (The National Land Policy, 2009). Approximately 75% of the country's population lives within the medium to the high potential lands and the rest in the vast Arid and Semi-Arid Lands (ASALs). Consequently, size and distribution of land varies quite widely as does population density which ranges from as low as 2 persons per sq. km. in the ASALs to a high of over 2000 in high potential areas (The National Land Policy, 2009). The Draft Concept Paper on National Spatial Plan (2010) notes that the medium to high potential areas have ability to support rain-fed agriculture, which Kenya relies on mostly. Increase in population in the medium-and-high-potential areas has led to subdivision of land into uneconomic units, contributing to reduced productivity. Since these areas have also been the bread basket for the country, the decreased productivity has led to a persistent state of food insecurity (The Nairobi Metro 2030 Strategy, 2008). The study area can be classified as part of the medium to high potential agricultural land. The effect of these statistics is that there is increased pressure on the medium to high potential agricultural land for conversion into residential and other users, especially in the urban fringes.

On one hand, agriculture is the mainstay of the Kenyan economy with 26% and 25% having direct and indirect annual contribution to the GDP respectively. The sector accounts for 65% of Kenya's total exports and provides more than 70% of informal employment in the rural areas. Hence, the agricultural sector is both the driver of Kenya's economy and a means of livelihood for the majority of Kenyan people. Over 80% of the Kenyan population live in the rural areas and derive their livelihoods, directly or indirectly from agriculture. Given its importance, the performance of the sector is therefore reflected in the performance of the whole economy. The development of agriculture is also important for poverty reduction since most of the vulnerable groups like pastoralists, the landless, and subsistence farmers, also depend on agriculture as their main source of livelihoods. Growth in the sector is therefore expected to have a greater impact on a larger section of the population than any other sector. The development of the sector is therefore important for the development of the economy as a whole (Agricultural Sector Development Strategy 2010–2020). On the other hand, The Kenyan Constitution (2010) in article 43 (1b) recognizes importance of housing and provides that every person has the right to accessible and adequate housing, and to reasonable

standards of sanitation. Provision of shelter in Kenya, which requires land, remains a huge challenge with an annual housing supply at 35,000 housing units unable to keep pace with housing demand estimated at 150,000 units annually (The Kenya National Housing Policy, 2008). It is out of these facts that land use management in the urban fringes becomes a crucial and complex issue in the country.

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".

In Kenya, poor management of land use change at the urban fringes (especially from agricultural to residential use) has been of great concern since time immemorial. Lately, this has been more pronounced in the Nairobi-Kiambu interface, among other urban fringes, whereby coffee farmlands and other fertile agricultural land parcels are being developed with residential estates. The Fourways Junction estate (100.64 acres), Runda Mumwe estate (over 1,000 acres), the proposed Tatu City estate (2,565 acres), Mboi Kamiti (over 2,000 acres) and Migaa estate (774 acres) are some of the recent large scale conversions, to mention but a few examples (County Council of Kiambu, 2012). There are also numerous small-scale agricultural land conversions in the area, usually for development of residential estates. "Land that was traditionally agricultural is quickly being turned into concrete jungles to house city residents, leading to growth of suburbs. In Kiambu County, tracts of land that had hitherto been under coffee farming are being turned into residential estates, posing a threat to agricultural (food) production" (The Standard Newspaper, 2nd August, 2012). This is not a unique phenomenon in Nairobi-Kiambu urban fringe. The Kenya Federation of Agricultural Producers in North Rift, an area considered to be Kenya's grain basket, have raised a red flag on conversion of agricultural land into residential use in the fringes of urban centres whereby "land for agriculture has been reducing over the years and families continue to divide farms into agriculturally unviable pieces" (The Daily Nation Newspaper, 20th April, 2012, page 27). According to the Architectural Association of Kenya (AAK), 70% of new housing

development in Kenya is occurring in peri-urban zones. These are fertile agricultural land parcels being converted into residential use at an alarming rate. Consequently, there is need to understand this phenomenon so as to ensure that goals of food security and sustainable development are not left to chance.

Therefore, there is wanton conversions of agricultural land into residential use with its negative consequences of reduced agricultural land for agricultural (especially food) production. This negates the policy of food security in the country. Consequently, the on-going countrywide agricultural land conversions are unsustainable and should be checked for the interest of national food security. However, there is need to understand causes of this phenomenon so as to provide for sustainable management of the needs for food security and housing demand for urban growth. Identifying the causes of land-use change requires understanding both how people make land-use decisions (decision-making processes) and how specific environmental and social factors interact to influence these decisions (decision-making context).

Therefore, this research seeks to investigate what exactly are the causes and effects of unsustainable agricultural land use conversions, with view of recommending appropriate framework to guide on sustainable agricultural land use conversions.

1.3 STUDY HYPOTHESIS

Null Hypothesis ($H_{o)}$ = There is no significant differences in effectiveness of the land institutions in Kiambu District, for regulating agricultural land use conversions, hence the land institutions are causing the agricultural land conversions.

Alternative Hypothesis ($H_{I)}$ = There is significant differences in effectiveness of the land institutions in Kiambu District, for regulating agricultural land use conversions, hence the land institutions are not responsible for the agricultural land conversions.

1.4 STUDY OBJECTIVES

Main Objective

The main objective of this study is to investigate determinants of agricultural land use conversions in the urban fringes, with view of recommending appropriate solutions based on the research findings.

Sub-Objectives

1. To study prevalence of agricultural land use conversions in the study area
2. To establish exact causes of the agricultural land use conversions

3. To study effects of the agricultural land use conversions
4. To study state of management framework to regulate the agricultural land use conversions
5. To recommend appropriate management framework to regulate agricultural land use conversions

1.5 RESEARCH QUESTIONS

1. What is the extent of agricultural land use conversions in the study area?
2. What are the drivers of the agricultural land use conversions?
3. What informs decisions of authorities on agricultural land use conversions?
4. Are the existing policies, legal, institutional, public participation and land use planning frameworks adequate and effective enough to guide sustainable agricultural land use conversions?
5. What challenges do the stakeholders face in dealing with agricultural land use conversions?

1.6 SIGNIFICANCE OF THE STUDY

This study will be of great importance to the authorities responsible for management of agricultural land use conversions, especially in the urban fringes. The recommendations can guide them in formulating policies, enacting laws and strengthening and/or creating institutional frameworks to implement sustainable land use management in the urban fringes. 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 Millennium Development Goals (MDGs).

1.7 RESEARCH METHODOLOGY

This is a summary of study methodology. More details on research methodology is outlined in chapter three of this study.

A thoughtful thinking of research topic, led to my reconnaissance visit to the study area to establish some of new and upcoming residential developments that were identified in the problem statement. The reconnaissance established that the new residential developments are as a result of agricultural land use conversions and are sprawling to the rural agricultural areas. This was then followed by data collection procedures as below.

1.7.1 Primary data was collected through:

a) Carrying out physical inspections and observation of the case study area (field surveys) to familiarise myself more with the study area and note the extent/prevalence of the current agricultural land use conversions.
b) Administering questionnaires to the relevant respondents.
c) Oral interviews with key informers were also carried out.

1.7.2 Sampling Procedure

There are three counties bordering Nairobi County, thus creating urban fringes. These are Kiambu, Machakos and Kajiado counties. Kiambu County was chosen to represent other counties because it has fertile agricultural land and favourable climate for rain-fed agriculture. Owing to the nature of the study; land owners, facilitators of agricultural land use conversions (real estate valuers, physical planners and property developers) were identified as possible respondents. Others are director of physical planning department in the ministry of lands, Kiambu district officials, local land control board and county clerk.

The sampling frame (for the farmers/local land owners) consists of a 5-kilometre Kiambu Road distance from the Kiambu-Nairobi interface. The depth from both sides of the main Kiambu Roads is 5 kilometres, thus the area under study is approximately 50 square kilometres (see attached Google maps).

1.7.3 Data analysis

The data obtained from the study was sorted out, analyzed using descriptive statistics and presented using photographs, maps, charts, simple tables and graphs. This is because the study is qualitative in nature. Basically, the key objective of this would be to show the factors influencing agricultural land use conversions and their effects with aim of coming up with practical recommendations on appropriate agricultural land use management framework.

1.7.4 Secondary data is through:

Library research was conducted by reviewing works related to the area of study. These include information from textbooks, daily newspapers, journals, articles, and published and unpublished thesis. The secondary data was sourced from libraries, government departments and internet.

1.7.5 Special Reference to Provisions of Relevant Policies and Laws

The relevant policies include:

1. Current National Land Use Policy
2. The National Land Policy
3. The Kenya Vision 2030
4. The Agricultural Sector Development Strategy (ASDS) 2010 – 2020
5. The National Food Security and Nutrition Policy (NFSNP)
6. The Kenya Food Security and Nutrition Strategy (KFSNS)
7. Current National Spatial Plan
8. The Kenya National Housing Policy
9. The Millennium Development Goals (MDGs)

The relevant Laws and Bills include:-

1. The Constitution of Kenya (2010), Supreme Law of Kenya
2. The Land Control Act, chapter 302, Laws of Kenya
3. The Physical Planning Act, Chapter 286, Laws of Kenya
4. The Registered Land Act, Chapter 300, Laws of Kenya (Repealed in 2012)
5. The Local Government Act, Chapter 265, Laws of Kenya
6. The Agriculture Act, chapter 318, Laws of Kenya
7. The Housing Act, chapter 117, Laws of Kenya
8. The Housing Bill, 2009
9. The Government Lands Act, chapter 280, Laws of Kenya (Repealed in 2012)
10. The Sectional Properties Act, 1987 No. 21 of 1987
11. The Land Registration Act, 2012
12. The Land Act, 2012
13. The National Land Commission Act, 2012

The information sought here was to know what the existing and proposed policy and legal framework provides regarding agricultural land use conversions and how the policies and

laws are likely to influence future agricultural land use conversions. In addition, to establish what the regulatory framework mandates the relevant land institutions responsible for regulating agricultural land use conversions.

1.8 SCOPE AND JUSTIFICATION OF THE STUDY

The physical scope covered by the study is approximately 50 square kilometres. The study concentrated on studying factors and effects of agricultural land use conversions in the study area. The research also examined the current state of the land use management framework in the study area, all with a view of recommending appropriate management framework to regulate future agricultural land use conversions. The literature reviewed and findings of this study show that there is inadequate land use management framework to guide sustainable agricultural land conversions in the study area. The Nairobi-Kiambu interface was chosen as case study because it was noted to experience a lot of large-scale agricultural land conversions to residential user and no previous similar studies have been conducted. The area was selected to represent such other areas in the country. This was due to limitation of time and finances.

The study of the state of management framework to regulate agricultural land use conversions is limited to five items; policy, legal and institutional frameworks. Others include public participation and land use planning. The aim is to study whether these are adequate and effective or otherwise.

1.9 ORGANIZATION OF THE STUDY

The research is organized into five chapters each having a specific section of the research.

Chapter One is an introductory. It contains the problem statement, objectives, hypothesis, research methodology, scope and the significance of the study as well as definition of key terms.

Chapter Two discusses the literature reviewed and the theoretical framework that acts as a basis of the research. It includes various relevant definitions as enumerated by different authors; the policies, legislations and institutions governing agricultural land use conversions; factors and effects of agricultural land use conversions. Historical global land use conversions and changes in urbanization; instruments for containing agricultural land use conversions in the urban fringes and evaluation of protection of agricultural land in the urban fringes versus affordable housing are also discussed. A theoretical framework is established to act as benchmark for the study.

Chapter Three illustrates the case study area and methodology. In this section, the characteristics of the study area are provided. The sampling procedures, the sample and methods used in collection and analysis of data are highlighted.

Chapter Four presents the responses and analyses of various respondents to whom questionnaires were administered as well as oral interviews conducted. The problems encountered in carrying out the research are also highlighted as well as hypothesis testing.

Chapter Five entails the main findings of the research and conclusions. The proposed appropriate management framework to ensure sustainable agricultural land use conversions is presented in this chapter. Suggested areas of further research are mentioned.

1.10 DEFINITION OF KEY TERMS

Land - Means any ground, soil, or earth regarded as the subject of ownership, including trees, water, buildings added by humans, the air above, and the earth below. Real estate is a legal term that encompasses land along with improvements to the land, such as buildings, fences, wells and other site improvements that are fixed in location.

Agricultural Land - Denotes the land suitable for agricultural production, both crops and livestock. It is one of the main resources in agriculture; it is the land base upon which agriculture is practiced. Typically occurring on farms, agricultural activities are undertaken upon agricultural land to produce agricultural products. ***Agricultural land*** in this study is limited to cropland or cultivable land.

Land Use - Land use is defined by the purposes for which humans exploit the land resources. It is the human use of land. Land use involves the management and modification of natural environment or wilderness into built environment such as fields, pastures, and settlements Social scientists and land managers define land use more broadly to include the social and economic purposes and contexts for and within which lands are managed (or left unmanaged)

Highest and Best Use Principle - Land resources are at their highest and best use when they are used in a manner that provides an optimum return to their operators or to society. Depending on the criteria used, this return may be measured in strictly monetary terms, in tangible and social values, or in some combination of these values. Real estate is ordinarily considered at its highest and best use when it is used for that purpose or that combination of purposes for which it has the highest comparative advantage or least comparative disadvantage relative to other uses

Land Use Conversion - Land use conversion means complete replacement of one use by another, for instance a shift from one land use category to another, as is the case in urban expansion and deforestation

Land Use Planning – This is comparison of the suitability of different land uses for specific, mostly bio-physical conditions, identifying the most suitable land use between alternatives and allocating land according to optimization process. Therefore, land use planning is a process that is concerned with the preparation and actualization of spatial frameworks for orderly management of human activities. The principal objective is to ensure that such activities are carried out in a manner that promises utmost attainment of economy, safety, aesthetics, harmony in land use and environmental sustenance.

Land Use Management - Is the process of managing the use and development (in both urban and rural settings) of land resources. Effective land-use management entails planning of land-use and the management of natural resources in an integrated and holistic manner. This is achieved through full involvement of all stakeholders

Rural–Urban Fringe, also known as the outskirts or the urban hinterland, can be described as the "landscape interface between town and country", or also as the transition zone where urban and rural uses mix and often clash. Alternatively, it can be viewed as a landscape type in its own right, one forged from an interaction of urban and rural land uses. The fringe remains largely open with the majority of the land agricultural, woodland or other rural use.

Smart Growth or Sustainable Development – Smart growth is an urban planning and transportation theory that concentrates growth in compact walkable urban centers to avoid sprawl and advocates compact, transit-oriented, walkable land use, including neighborhood schools, complete streets, and mixed-use development with a range of housing choices.

Urban sprawl or **suburban sprawl** is a multifaceted concept centered around the expansion of low-density development. Topics range from the outward spreading of a city and its suburbs to its logical limits, to low-density and auto-dependent development on rural land, examination of impact of high segregation between residential and commercial uses, and analysis various design features to determine which may encourage car dependency

CHAPTER TWO

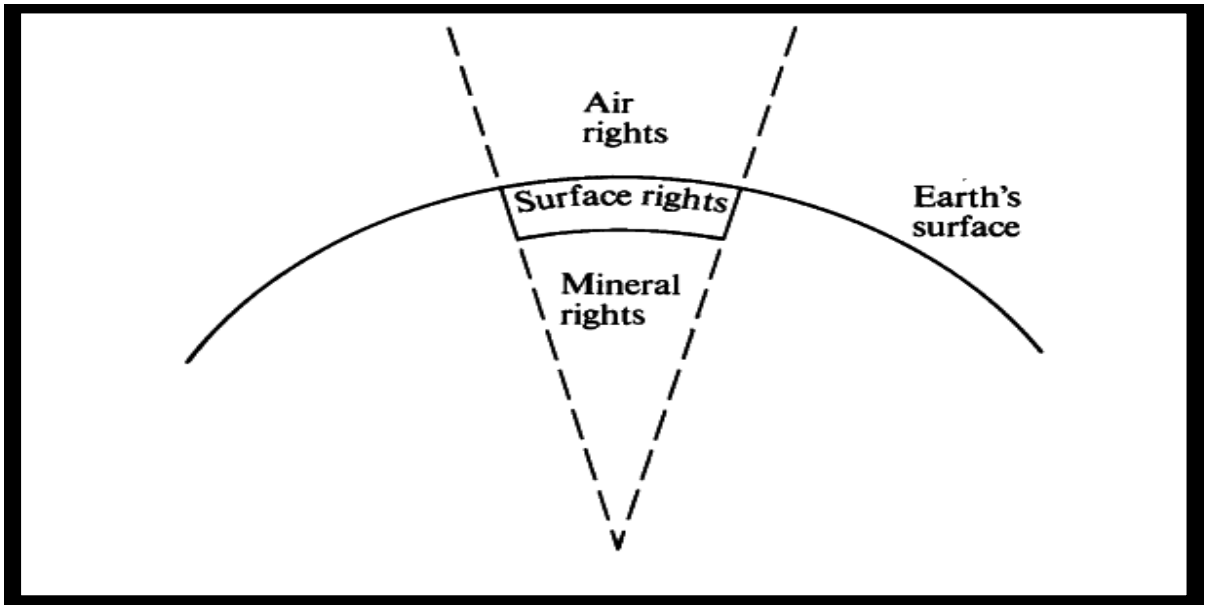
LITERATURE REVIEW AND CONCEPTUAL FRAMEWORK

2.1 INTRODUCTION

a) Land

In law, land means any ground, soil, or earth regarded as the subject of ownership, including trees, water, buildings added by humans, the air above, and the earth below. Real estate is a legal term that encompasses land along with improvements to the land, such as buildings, fences, wells and other site improvements that are fixed in location — immovable (http://www.answers.com/topic/land). United Nations Programme (2002) defines land as a physical entity in terms of its topography and spatial nature; a broader integrative view also includes natural resources: the soils, minerals, water and biota that the land comprises. These components are organized in ecosystems which provide a variety of services essential to the maintenance of the integrity of life-support systems and the productive capacity of the environment. Land resources are used in ways that take advantage of all these characteristics.

Diagram 2.1: Extent of Land Ownership



Source: http://www.answers.com/topic/land

Land has several unique characteristics that affect its use and value. Consequently, in order to apply simple supply and demand analysis to real estate markets, a number of modifications need to be made to standard microeconomic assumptions and procedures. In particular, the unique characteristics of the real estate market must be accommodated. Some of the unique characteristics of land include fixity in supply and location. Fixity in supply means that land is no longer being 'manufactured or made' hence the increasing human population have to

share the existing land. Spatial fixity means that consumers come to the good rather than the good going to consumers thus there is no physical market-place (Masakazu, 2003). Spatial fixity combined with the close proximity of housing units in urban areas suggests the potential for externalities inherent in a given location and appreciation in value over time. Land is also heterogeneous and permanent meaning it is unique in its location and quality. This makes pricing difficult, increases search costs, creates information asymmetry and greatly restricts substitutability (http://en.wikipedia.org/characteristics_land). Some of these unique characteristics of land may influence land use change, for instance, fixity in supply and location and appreciation in value may lead to land use conflicts as various categories of land uses competent for the limited available land.

b) Agricultural land (also agricultural area)

Agricultural land denotes the land suitable for agricultural production, both crops and livestock. It is one of the main resources in agriculture. The standard classification (used, e.g., by FAO — Food and Agriculture Organization of the United Nations) divides agricultural land into the following components, with their respective global land area:

- Arable land (13,805,153 km²) - land under annual crops, such as cereals, cotton, other technical crops, potatoes, vegetables, and melons; also includes land left temporarily fallow.
- Permanent Crops (1,462,421 km²) - Orchards and vineyards (e.g., fruit plantations).
- Pastures (33,569,402 km²) - areas for natural grasses and grazing of livestock, such as Meadows and pastures.

The first two components — arable land and land in permanent crops — constitute so-called *cultivable land*. The part of arable land actually under crops is called *sown land* or *cropped land*. The term *farmland* is ambiguous in the sense that it may refer, on the one hand, to agricultural land and, on the other hand, to cultivable or even only arable land.

Agricultural land covers 38% of the world's land area, with arable land representing less than one-third of agricultural land (11% of the world's land area). In the context of zoning, agricultural land (or more properly agriculturally zoned land) refers to plots that may be used for agricultural activities, regardless of the physical type or quality of land. Another common definition of the word agricultural land refers to an area of land with many farms and fields (Source: http://en.wikipedia.org/wiki/Agricultural_land). This study is limited to the cultivable land in the study area.

c) Land use

Land use is a complicated term. Land use is defined by the purposes for which humans exploit the land resources. It is the human use of land. Land use involves the management and modification of natural environment or wilderness into built environment such as fields, pastures, and settlements (Gary, 1997). It has also been defined as "the arrangements, activities and inputs people undertake in a certain land resource type to produce, change or maintain it" (FAO, 1997 FAO/UNEP, 1999). Natural scientists define land use in terms of syndromes of human activities such as agriculture, forestry and building construction that alter land surface processes including biogeochemistry, hydrology and biodiversity. Social scientists and land managers define land use more broadly to include the social and economic purposes and contexts for and within which lands are managed (or left unmanaged), such as subsistence versus commercial agriculture, rented vs. owned, or private vs. public land. As a result, scientific investigation of the causes and consequences of land-use and land-cover change (LULCC) requires an interdisciplinary approach integrating both natural and social scientific methods (http://www.eoearth.org/article/Land-use_and_land-cover_change**).**

The representation of interactions between various causes of land-use conversion may be based on different patterns: one cause may completely dominate the other causes, assuming that land use in a given locality is influenced by whatever factor exerts the greatest constraint; factors driving land-use conversion can be connected as causal chains, i.e., interconnected in such a way that one or several variables (underlying causes, mainly) drive one or several other variables (proximate causes, mainly); different factors can intervene in concomitant occurrence, i.e., independent but synchronous operation of individual factors leading to land change; they may also intervene in synergetic factor combinations, i.e., several mutually interacting variables driving land-use conversion and producing an enhanced or increased effect due to reciprocal action and feedbacks between causes (Geist et al. 2002). In short,

Land use = *f* (pressures; opportunities; policies; vulnerability; and social organization);
With;

Pressures = *f* (population of resource users, labour availability, quantity of resources, and sensitivity of resources);

Opportunities = *f* (market prices, production costs, transportation costs, and technology);

Policies = *f* (subsidies, taxes, property rights, infrastructure, and governance);

Vulnerability = *f* (exposure to external perturbations, sensitivity, and coping capacity); and

Social organization = *f* (resource access, income distribution, household features, and urban-rural interactions)

With; the functions *f* having forms that account for strong interactions between causes of land-use conversions (Lambin et al. 2003)

d) Land-Use Change (**LUC**); also known as **land change**)

Land use change is a general term for the human modification of Earth's terrestrial surface. Land use conversion means complete replacement of one use by another, for instance a shift from one land use category to another, as is the case in urban expansion and deforestation. Though humans have been modifying land to obtain food and other essentials for thousands of years, current rates, extents and intensities of LUC are far greater than ever in history, driving unprecedented changes in ecosystems and environmental processes at local, regional and global scales (Carmelita et al., 2002). These changes encompass the greatest environmental concerns of human populations today, including climate change, biodiversity loss and the pollution of water, soils and air. Monitoring and mediating the negative consequences of LUC while sustaining the production of essential resources has therefore become a major priority of researchers and policymakers around the world (Erle, 2010).

e) Land use management

Land use management is the process of managing the use and development (in both urban and rural settings) of land resources. Land resources are used for a variety of purposes which may include agriculture, residential development, infrastructure development, reforestation, water resource management and eco-tourism projects (Young, 1999). Effective land-use management entails planning of land-use and the management of natural resources in an integrated and holistic manner. This is achieved through full involvement of all stakeholders (The National Land Use Planning Commission of Tanzania, 1998). In land use management, development control or planning control is usually deployed. Development control, planning control, or (in Scotland) development management is the element of the town and country planning through which local government regulates land use and new buildings. It relies on a "plan-led system" whereby development plans are formed and the public is consulted. Subsequent development requires planning permission, which is granted or refused with reference to the development plan as a material consideration (Hails, 2002).

f) The rural–urban fringe, also known as the **outskirts or the urban hinterland**

This can be described as the "landscape interface between town and country", or also as the transition zone where urban and rural uses mix and often clash. Alternatively, it can be viewed as a landscape type in its own right, one forged from an interaction of urban and rural

land uses. The urban fringe remains largely open with the majority of the land agricultural, woodland or other rural use. However, the quality of the countryside around urban areas tends to be low with severance between areas of open land and badly maintained woodlands and hedgerows (http://en.wikipedia.org/wiki/Rural/urban_fringe). Answers.com defines urban fringe as the transition zone between the city and its suburbs, and the countryside. It is the area where the city gives way to the rural country. Due to city growth and urban sprawl, this area is always changing and is the source of much debate with developers.

The issues surrounding urban fringe are mostly negative, but there are a few advantages to actually living in the area. In a sense, residents have the best of both worlds. They are close enough to the conveniences of an urban center but are able to get away from it all. Businesses are able to stay one step ahead by following the suburban migration. However, the area is constantly in flux, and the rural populace is not always welcoming. Clashes often ensue over who pays the taxes on the new infrastructure elements, such as sewers and gas lines. It can take years for an identity to cement, and zoning battles often occur, as jurisdiction over the area is murky prior to city annexation (Ojima et al. 1994). Eventually, as sprawl continues, what was once a contested area will be just another part of the city. However, the environmental effects are continuously being studied. Increasingly, people are realizing the benefits of sustaining farms and natural areas (http://www.ehow.com/facts_urban-fringe.html). Therefore, it is evident that agricultural land in the urban fringes is likely to experience pressure from residential development as demand for housing in the suburbs increase. To mitigate such pressure, there is need for effective and responsive land use management framework to regulate agricultural land use conversions in the urban fringes.

Effective land use management in the urban fringes is aimed at achieving smart growth or sustainable development. Smart Growth (in U.S) or Sustainable Development (in Canada) or Urban Renaissance (in England) attempts to shape the form of urban development from one which features sprawling, low density communities consisting of uniform land uses, in which individuals ride alone in their personal autos to and from work as well as other destinations. Smart growth is development that serves the economy, the community, and the environment. It changes the terms of the development debate away from the traditional growth or no-growth question to "how and where new development should be accommodated (Kelly et al. 2007)."

2.1.1 Location Theories

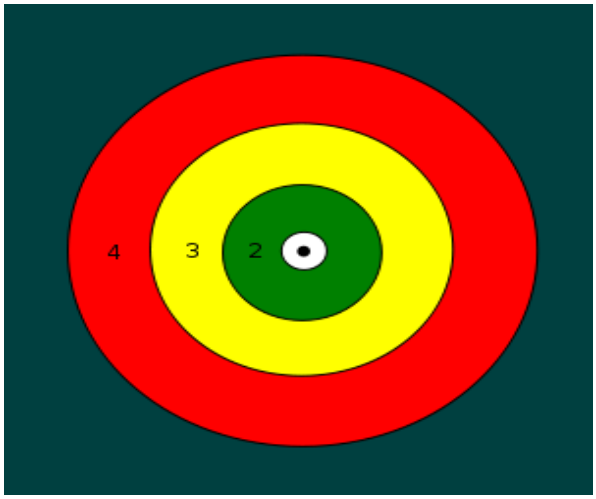
Location theory is concerned with the geographic location of economic activity; it has become an integral part of economic geography, regional science, and spatial economics. Location theory addresses the questions of what economic activities are located where and

why. Location theory rests — like microeconomic theory generally — on the assumption that agents act in their own self interest. Thus firms choose locations that maximize their profits and individuals choose locations that maximize their utility (http://www.britannica.com/EBchecked/topic/345682/location-theory). Some of the relevant location theories include;

a) Johann Heinrich von Thünen (1783 – 1850)

Von Thünen, often referred to as 'the father of location theorists', in his theory of "The Isolated State", he started out from Adam Smith's idea of "economic man": that the farmer is expected to maximize his profit ("economic rent") from his farmland. Consequently, the use of a piece of land is a function of the cost of transport to market and the land rent a farmer can afford to pay (determined by yield, which is held constant here). The model generated four concentric rings of agricultural activity as shown below:

Diagram 2.2: Model of Agricultural Land Use: The Thünen Rings



(Source: http://en.wikipedia.org/wiki/von_thunen)

Thünen's model: the black dot represents a city; 1 (white) dairy and market gardening; 2 (green) forest for fuel; 3 (yellow) grains and field crops; 4 (red) ranching; the outer, dark green area represents wilderness where agriculture is not profitable.

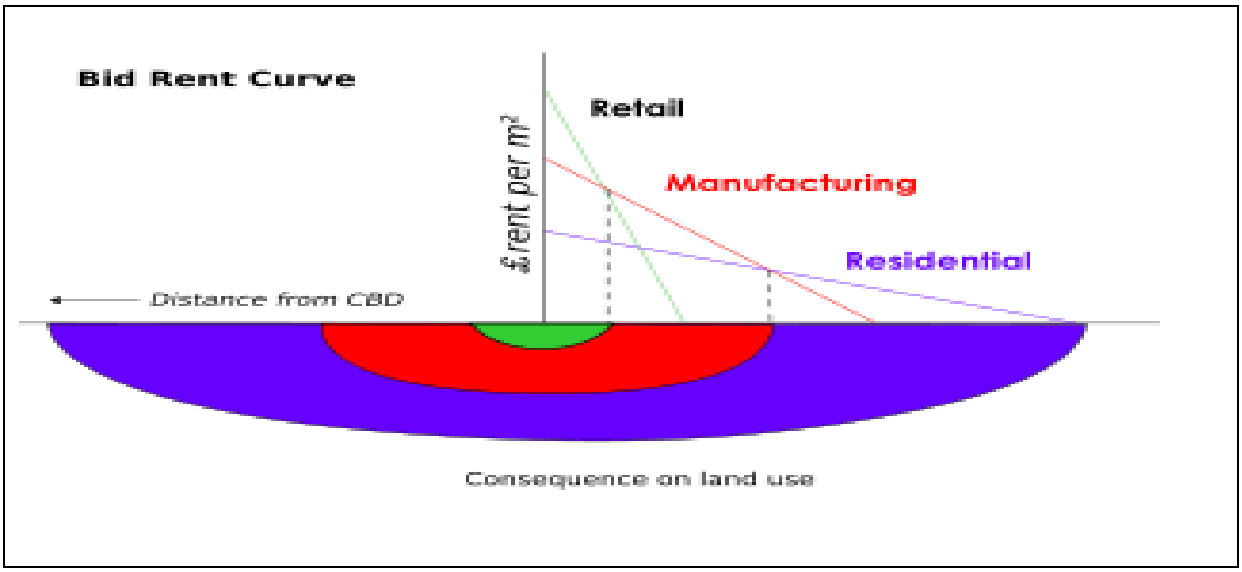
Von Thünen concluded that the cultivation of a crop is only worthwhile within certain distances from the city: beyond that, either the cost of the land becomes too high, with increasing distances transport costs also increase, or, if there is another product having greater yield or lower transport costs. After a distance from the market (the city) the production of a crop becomes unprofitable, either because its profits drop to zero or the profits earned by other crops are higher. Locational rent, therefore, is the highest possible amount one will pay for the use of the land for a certain cultivation, and is a relative indicator of competitiveness of it in the market.

The model was developed in an isolated state and did not take into consideration differences in sites (local physical conditions). However, the model tends to hold true in most instances. The theory may break down somewhat in industrial and post-industrial economies as urban expansion and/or sprawl occur. For instance, commercial activities are usually located in the central business districts of urban centres since they can afford inherent high rentals. Residential development is likely to be located further away from the town centres (like in urban fringes) while agricultural production is likely to be carried out in the rural areas. However, since individuals want to reduce transport costs and at the same time get cheap residential land, they are likely to prefer housing in the urban fringes thus exerting pressure on agricultural land. Increased demand for housing in the urban fringes is likely to trigger agricultural land use conversions and this can only be regulated sustainably by effective land use management framework.

b) Bid Rent Theory or Concentric Zone Model.

The bid rent theory is a geographical economic theory that refers to how the price and demand for real estate changes as the distance from the Central Business District (CBD) increases. It states that different land users will compete with one another for land close to the city centre. This is based upon the idea that retail establishments wish to maximize their profitability, so they are much more willing to pay more money for land close to the CBD and less for land further away from this area. This theory is based upon the reasoning that the more accessible an area is (i.e., the greater the concentration of customers), the more profitable.

Diagram 2.3: Bid Rent Curve



Source: http://en.wikipedia.org/wiki/Bid_rent_theory

Consequently, all land users compete for the most accessible land within the CBD. The amount they are willing to pay is called "bid rent". The result is a pattern of concentric rings of

land use, creating the concentric zone model. It could be assumed that, according to this theory, the poorest houses and buildings will be on the very outskirts of the city, as that is the only place that they can afford to occupy. However, in modern times this is rarely the case, as many people prefer to trade off the accessibility of being close to the CBD, and move to the edges of the settlement, where it is possible to buy more land for the same amount of money (as Bid Rent states). Likewise, lower income housing trades off greater living space for greater accessibility to employment. For this reason low income housing in many cities, for example, is often found in the inner city such as in slums, and high income housing is at the edges of the settlement.

Similarly, in Kenya many high income households are preferring housing in the urban fringes thus raising demand for residential land. Consequently, agricultural land in the urban fringes is experiencing pressure for change of user. Therefore, location theories are applicable in Kenya today. Every household wants to maximise utility while reducing costs such as transport costs. The households also prefer houses with large land parcels which are available in the rural-urban fringes. Therefore, we can aptly conclude that urban fringes are preferred for residential development since they are located close to the city centre and transport costs are affordable, especially with the current infrastructure improvement. High income households are able to live in urban fringes since they usually have private transport means to the city centre and the poor are likely to live near the city centre, often in slums, so as to reduce transport costs.

2.2 HISTORICAL GLOBAL LAND USE CONVERSIONS

Since humans have controlled fire and domesticated plants and animals, they have cleared forests to wring higher value from the land. About half of the ice-free land surface has been converted or substantially modified by human activities over the last 10,000 years. For instance, forests covered about 50% of the earth's land area 8,000 years ago, as opposed to 30% today. Agriculture has expanded into forests, savannas, and steppes in all parts of the world to meet the demand for food and fibre. Agricultural expansion has shifted between regions over time; this followed the general development of civilizations, economies, and increasing populations (Mittermeier, et. al 2003 and Ball, 2001). Historically, humans have increased agricultural output mainly by bringing more land into production. The greatest concentration of farmland is found in Eastern Europe, with more than half of its land area in crop cover. In the United Kingdom, about 70% of its area is classified as agricultural land (cropland, grassland/rough grazing), with agriculture and areas set aside for conservation or recreation intimately intertwined. Despite claims to the contrary, the amount of suitable land

remaining for crops is very limited in most developing countries where most of the growing food demand originates. Where there is a large surplus of cultivable land, land is often under rain forest or in marginal areas (Ramankutty et al 2002, Hails 2002 and Young 1999).

Globally, the cropland area per capita decreased by more than half in the twentieth century, from around 0.75 ha per person in 1900 to only 0.35 hectare per person in 1990. Note, however, that national statistics in developing countries often substantially underreport agricultural land area (Ramankutty et. al 2002) for instance, by as much as 50% in parts of China (Seto et. al, 2001). The mix of cropland expansion and agricultural intensification has varied geographically. Most of Africa and Latin America increased their food production through both agricultural intensification and extensification. In Western Europe and the north-eastern United States, cropland decreased during the last decades, after abandonment of agriculture or, in a few cases, following land degradation mostly on marginal land. Globally, this change has freed 222 million ha from agricultural use since 1900 (Ramankutty et. al 2002).

There is no doubt that land use conversion is a real challenge world over. It is also important to note that globally, agricultural land is dwindling as years goes by. This may pose serious food crisis in the long term especially in African countries where increased agricultural production is usually achieved through extensification (use of more land) and not intensification (use of more inputs such as fertilizers). For countries to avert this situation, therefore, there is every need to manage agricultural land use conversions sustainably. This can only be achieved by putting in place effective land use management framework.

2.3 RECENT GLOBAL CHANGES IN URBANIZATION

In 2000, towns and cities sheltered more than 2.9 billion people, nearly half of the world population. Urban population has been growing more rapidly than rural population worldwide, particularly in developing countries. According to the United Nations Population Division, the number of megacities, defined as cities with more than 10 million inhabitants, has changed from one in 1950 (New York) to 17 in 2000, the majority of which are in developing countries. Urban form and function have also changed rapidly. Built-up or paved-over areas are roughly estimated to occupy from 2% to 3% of the earth's land surface. However, urbanization affects land in rural areas through the ecological footprint of cities. This footprint includes, but is not restricted to, the consumption of prime agricultural land in peri-urban areas for residential, infrastructure, and amenity uses, which blurs the distinction between cities and countryside, both in developing and western developed countries (United Nations 2002, Grubler 1994 and Warren-Rhodes et. al 2001). A question still being debated

is whether urban land use is more efficient than rural land use and, therefore, whether urbanization saves land for nature.

The cities experiencing the most rapid change in urban population between 1990 and 2000 are mostly located in developing countries. It is estimated that 1 to 2 million ha of cropland are being taken out of production every year in developing countries to meet the land demand for housing, industry, infrastructure and recreation. This is likely to take place mostly on prime agricultural land located in coastal plains and in river valleys. Note that rural households may consume more land per capita for residential purposes than their urban counterparts (Doos, 2002). In Kenya, the Concept Paper on National Spatial Plan (2010) notes that Kenya's population is quickly urbanizing. It is estimated that about 50 percent of the total population will live in urban areas by the year 2050. Urban areas are already showing strain resulting from high population growths that are not commensurate with infrastructure, service provision and employment creation. Nearly all our towns are characterized by serious urban sprawl, poverty, informality and environmental deterioration, among other negative attributes.

It is evident that land use conversions and management in the urban fringes has been of great concern in the world over. In Kenya, for instance, the authorities responsible for land use management and other stakeholders are experiencing a dilemma as to what would be the most economically viable, technologically feasible and sustainable land use(s) in the fertile urban-rural fringes. In deed Nairobi Metro 2030 Strategy confirms this by stating as follows "the extent of Nairobi Metro Region (NMR) includes purely agricultural areas. These areas are intended for agricultural and agricultural-supporting services. Designation as agricultural will reinforce objectives of protecting the agricultural land base of the region. The strategy will address the dilemma on whether to allow indiscriminate land subdivisions and change of user or to promote agricultural activities by restricting urban growth and also address issues of food security" (Nairobi Metro Strategy 2030, page 42). One chief weakness identified by the strategy is urban sprawl – uneven and unplanned expansion of metropolitan or urban region into countryside.

2.4 PROTECTION OF AGRICULTURAL LAND IN THE URBAN FRINGES VERSUS AFFORDABLE HOUSING

Since the early times, man has made relentless efforts to obtain food and shelter. The struggle for these basic needs has increased progressively as the human race advances in numbers and cultural diversity. The Universal Declaration of Human Rights of 1948 recognizes the right to adequate housing as an important component of the right to adequate standard of living. This

has been further reaffirmed by subsequent various international instruments including the International Covenant on Economic, Social and Cultural Rights of 1966, the Istanbul Declaration and Habitat Agenda of 1996 and the Declaration on Cities and Other Human Settlements in the New Millennium of 2001. In all these instruments, housing is understood in the broader context of the shelter fabric together with the living environment.

Consequently, improvement of housing for the Kenyan population is a major concern to the Government. This concern has been influenced by the fact that the improvement in housing stock is a strategically important social and economic investment. In addition, well-planned housing and infrastructure of acceptable standards and affordable cost when combined with essential services affords dignity, security and privacy to the individual, the family and the community as a whole. Adequate shelter also prevents social unrest occasioned by depravity and frustrations of people living in slums and informal settlements. Besides this social function, housing is also an investment good contributing both directly and indirectly towards poverty reduction through employment generation, raising of incomes, improved health and increased productivity of the labour force. Smart growth, aimed at protecting agricultural land in the urban fringes, has clear-cut implications for housing and communities as it will result in higher density housing that is located near other land uses, often near city centres and other infill opportunities (Charles, 2007).

Charles (2007) further notes that providing decent affordable housing remains a challenge world over. In North America, for instance, 'providing a range of housing choices' is one of the ten principles of smart growth but, smart growth is often viewed as a cause of, not a solution to, the problems of housing affordability. Jef Van den Broeck (2006) describes the problem of planning for residential development as having become engrained in the larger problem of planning for residential development. The resolution is a larger role in planning and housing assistance by state and nation state levels of government. Cornerly (2005) characterizes smart growth as both a threat and an opportunity for advocates of affordable housing.

The threats are well known. Smart growth policies, to facilitate high density, compact development, must contain urban growth. Such containment can reduce residential land supplies, raise land prices and increase the costs of housing. A large body of literature provides collaborating evidence. Empirical evidence, however, also suggests the possibility of mitigating these effects. Flexible land use regulations, inclusionary zoning policies and housing finance programs, for example, can be used to promote both smart growth and housing affordability (Cornerly, 2005). The state of Florida, a national leader in smart

growth legislation, does not allow development to take place unless public facilities are concurrently in place. This limits housing production. Florida also, however, requires local governments to include housing elements in their comprehensive plans, allows local governments to adopt inclusionary zoning ordinances, requires housing to be considered in its development of Regional Impact review process, and maintains the nation's largest housing trust fund.

Jef Van de Broeck (2007) examined the problem of housing affordability in Flanders, the Dutch speaking region of Belgium and noted that affordable housing is a spatial as well as financial problem, hence he identifies three elements of affordable housing; the cost, the quality and the location of the dwelling, the last having implications for transportation and energy costs. Loosening development controls to continue to allow the dispersion of large households in the countryside, is an unsustainable approach to the housing affordability problem. For this reason, Van de Broeck recommends an integrated housing and spatial development strategy. Elements of such strategy include the spatial structure plan (for Flanders) that requires that each settlement should accommodate a specific number of new dwelling units; include urban projects, which involve brown-field redevelopment; facilitate 'area-specific' approaches by binding contracts among stakeholders; and incorporate public housing. Therefore, it is possible to achieve smart growth (protect agricultural land in the urban fringes) and affordable housing with proper land use management framework.

2.5 FACTORS INFLUENCING AGRICULTURAL LAND USE CONVERSIONS

2.5.1 Proximate Versus Underlying Causes

Land use is defined by the purposes for which humans exploit the land resources. There is high variability in time and space in biophysical environments, socioeconomic activities, and cultural contexts that are associated with land-use change. Identifying the causes of land-use change requires an understanding of how people make land-use decisions and how various factors interact in specific contexts to influence decision making on land use. Decision making is influenced by factors at the local, regional, or global scale. Proximate (or direct) causes of land-use change constitute human activities or immediate actions that originate from intended land use and directly affect land resources (Ojima et. al, 1994). They involve a physical action on land resources. Proximate causes generally operate at the local level (individual farms, households, or communities). By contrast, underlying causes may originate from the regional (districts, provinces, or country) or even global levels, with complex interplays between levels of organization. Underlying (or indirect or root) causes are fundamental forces that underpin the more proximate causes of land-use change. They

operate more diffusely (i.e., from a distance), often by altering one or more proximate causes (Leemans et. al 2003). Underlying causes are formed by a complex of social, political, economic, demographic, technological, cultural, and biophysical variables that constitute initial conditions in the human-environment relations and are structural (or systemic) in nature. Underlying causes are often exogenous to the local communities managing land and are thus uncontrollable by these communities (Geist et. al. 2002, Ledec 1985 and Contreras 2000).

a) 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. Though natural and socioeconomic changes may operate independently, natural variability may also lead to socio-economic 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, 1998)

b) Economic and Technological 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 of wealth 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. 2001). 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 conversion to cropland, depending on how the new technologies affect labour markets and migration, whether the crops are sold locally or globally, how profitable farming is at the forest frontier, and the capital and labour intensity of the new technologies (Barbier, 1997)

c) 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 (e.g. the demographic transition), but also changes in household structure and dynamics, including labour 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. 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 (Angelsen et. al. 1999). 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.

d) Institutional Factors

Land-use conversions 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-rights; environmental policies; decision-making systems for resource management (e.g., decentralized, democratized, state-controlled, local communal, legal) and social networks concerning distribution and access to resources. 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. On the other hand, the recovery or restoration of land is also possible with appropriate land-use policies (Poteete et. al. 2004). It is therefore critical that institutions that influence land management decisions are built around participation by local land managers and concern for the environment.

e) Cultural Factors

Numerous cultural factors also influence decision making on land use. 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 (Leemans et al. 2003). 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.

f) 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. Although the environmental effects of macroeconomic policies and trade liberalization are particularly important in countries with fragile ecosystems (e.g., 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 (Barbier, 2000). 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.

g) Interaction of Causes

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. Therefore, land-use changes tend to be driven by a combination of factors that work gradually and factors that happen intermittently. 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, both 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 (Eric, et. al 2007).

It is, therefore, necessary to identify exact causes of land use change so as to take precautionary measures that will ensure sustainable development. Although it is difficult to identify and mitigate underlying causes, knowing their effects on land use change can lead to

better understating and control of direct causes of land use change. This can only be achieved if effective land use management framework is in place.

2.5.2 A Finite Set of Pathways of Land-Use Conversions

The various sectoral drivers of land-use conversions discussed above are strongly linked within and between levels of organization of human-environment systems. They interact directly, are linked via feedback, and thus often have synergetic effects. Any land manager also constantly makes trade-offs between different land-use opportunities and constraints associated with a variety of external factors. Moreover, various human-environment conditions react to and reshape the impacts of drivers differently, which leads to specific pathways of land-use change (Lambin et al. 2001). The complexity in the combinations of causes giving rise to land-use change can be greatly reduced by recognizing that there are a limited number of ways in which these causes interact. In other words, a limited suite of processes and variables at any scale makes the problem tractable. The critical challenge is thus to identify dominant pathways and associated causes of land-use change. The risk factors associated with each pathway can then be identified.

2.5.3 The Five Fundamental High-Level Causes of Land-Use Conversions

In summary, despite the large diversity of causes and situations leading to land-use conversions, there are some generalizable patterns of conversions that result from recurrent interactions between driving forces, following specific sequences of events. Even though, at the detailed level, these sequences may play out differently in specific situations, their identification may confer some predictive power by analogy with similar pathways in comparable regional and historical contexts. Summarizing a large number of case studies, Lambin et al. (2001) found that land-use change is driven by a combination of the following fundamental high-level causes (Table 1):

Table 2.1: Typology of the Causes of Land-Use Conversions

	Resource scarcity causing pressure of production on resources	**Changing opportunities created by markets**	**Outside policy intervention**	**Loss of adaptive capacity and increased vulnerability**	**Changes in social organization, in resource access, and in attitudes**
Slow	Natural population growth and division of land parcels Domestic life cycles that lead to changes in labour	Increase in commercialization and agro-industrialization Improvement in accessibility through road construction	Economic development programs Perverse subsidies, policy induced price distortion and fiscal incentive	Impoverishment (e.g., creeping household debts, no access to credit, lack of alternative income sources, and weak buffering capacity)	Changes in institutions governing access to resources by different land managers (e.g., shift from communal to

	availability Loss of land productivity on sensitive areas following excessive or inappropriate use Failure to restore or to maintain protective works of environmental resources Heavy surplus extraction away from the land manager	Changes in market prices for inputs or outputs (e.g., erosion of prices of primary production, unfavourable global or urban-rural terms of trade) Off-farm wages and employment opportunities	Frontier development (e.g., for geopolitical reasons or to promote interest groups) Poor governance and corruption Insecurity in land tenure	Breakdown of informal social security networks Dependence on external resources or on assistance Social discrimination (ethnic minorities, women, members of lower classes or castes)	private rights, tenure, holdings, and titles) Growth of urban aspirations Breakdown of extended family Growth of individualism and materialism Lack of public education and poor information flow on the environment
Fast	Spontaneous migration, forced population displacement, refugees Decrease in land availability due to encroachment by other land uses (e.g., natural reserves)	Capital investments Changes in national or global macro-economic and trade conditions that lead to changes in price (e.g., surge in energy prices or global financial crises) New technologies for intensification of resource use	Rapid policy changes (e.g., devaluation) Government instability War	Internal conflicts Illness (e.g., HIV) Risks associated with natural hazards (e.g., leading to a crop failure, loss of resource, or loss of productive capacity)	Loss of entitlements to environmental resources (e.g., expropriation for large-scale agriculture, tourism and wildlife conservation), which leads to an ecological marginalization of the poor

Source: Lambin, Geist and Lepers, 2001

1. Resource scarcity leading to an increase in the pressure of production on resources,
2. Changing opportunities created by markets,
3. Outside policy intervention,
4. Loss of adaptive capacity and increased vulnerability, and
5. Changes in social organization, in resource access, and in attitudes.

Some of these fundamental causes are experienced as constraints. They force local land managers into degradation, innovation, or displacement pathways. The other causes are associated with the seizure of new opportunities by land managers who seek to realize their diverse aspirations. Each of these high-level causes can apply as slow evolutionary processes that change incrementally at the timescale of decades or more, or as fast changes that are

abrupt and occur as perturbations that affect human-environment systems suddenly (Table 2.1). Only a combination of several causes, with synergetic interactions, is likely to drive a region into a critical trajectory (Puigdef´abregas, 1998). Some of the fundamental causes leading to land-use change are mostly endogenous, such as resource scarcity, increased vulnerability and changes in social organization, even though they may be influenced by exogenous factors as well. The other high-level causes, such as changing market opportunities and policy intervention, are mostly exogenous, even though the response of land managers to these external forces is strongly mediated by local factors.

In Kenya, the five factors are likely to cause land use change. Under resource scarcity, natural population growth and division of land parcels may be a cause of slow land use change while decrease in land availability due to encroachment by other land uses may be a cause of fast change. Changing opportunities created by markets, especially improvement in accessibility through road construction (such as Thika Super Highway) may be another common cause of land use change. Outside policy intervention, especially poor governance and corruption and rapid change in policy may be another cause of land use change. Perhaps the most notable cause of land use change in Kenya may be changes in social organization, in resource access and in attitudes occasioned by changes in institutions governing access to resources by different land managers; growth of urban aspirations; growth of individualism and materialism and lack of public education and poor information flow on the environment. However, it is important to carry out research so as to determine exact causes of land use conversions in a particular area before generalizations and assumptions are made.

2.5.4 Characteristics of Land Markets in Kenya Influencing Land Use Conversions

Land markets in Kenya and other East African countries have peculiar characteristics that can influence unsustainable land use conversions. According to Urban LandMark and UN-Habitat (2010), some of these characteristics include:

i) High transaction costs - Buying and/or moving into a home or buying land costs much more than most types of transactions. These costs are exacerbated by existence of many land actors (central government, local authorities, political elite, professionals, collective action groups and individual households), with sometimes diverse and conflicting interests that may facilitate or restrain transactions. The costs include search costs, real estate fees, moving costs, legal fees, land transfer taxes and deed registration fees. Therefore, real estate market has high purchase costs and sale costs. These costs can raise the effective purchase price well beyond the price the seller will actually receive. Because of the high costs of “trading” real estate, longer holding periods are common. Due to the high transaction costs, some real estate

investors may evade formal land transaction processes and prefer informal land markets and/or transactions that are not regulated by the government. As a result, regulation of real estate transactions becomes difficult and illegal transactions may become norm rather than exception. These may open doors to corruption and unsustainable land use management practices as real estate investors try to reduce transaction costs.

ii) Political and social influence - Land markets cannot be separated from the political and social contexts within which they occur. In socially dominated land market transactions, management of land resources are mediated more by social relationships than by financial and sustainability logic. As a result, land use management becomes difficult and unsustainable practices may become common place. This may lead to unsustainable agricultural land use conversions in the urban fringes.

iii) Market imperfections - The lack of information and secrecy in property market has not helped land managers in regulating land use. For instance, land use conversions may occur without knowledge of relevant authorities responsible for land use management. In addition, the playing fields are not level thus all real estate investors cannot compete effectively. This may exclude some land owners from participating in land use management.

iv) Corruption - Corruption is rife and rampant in East African land markets. This has been caused by failures and inefficiencies of formal land markets. In Kenya, land processes and transactions are marred with corruption practices which are meant to speed up the processes. This has created a norm rather than exception whereby land institutions and officials must be bribed in order to perform their duties. Due to corruption, many land regulation rules and policies may be ignored. Consequently, unsustainable land use management practices may become common since the correct procedures are not followed, for instance in land use conversions.

v) Formal and informal land markets - In Kenya, formal land market uses the statutory or coded land transaction process supplies and controls a relatively limited amount of urban land within the cities while the informal land market alongside that supplies bulk of the urban land occupied by the majority urban residents mainly in the informal settlements. Informal land transactions take place without documentation and rely on social recognition for ownership acknowledgment and security of tenure. Though informal markets are considered cheap and fast, they are difficult to regulate and land use management becomes complex and challenging (Source: Urban LandMark and UN-Habitat, 2010)

2.6 EFFECTS OF AGRICULTURAL LAND USE CONVERSIONS

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.

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).

Agricultural land use conversions, therefore, have both positive and negative effects**.** Consequently, there is need to manage agricultural land use conversions sustainably, especially in the urban fringes, if the twin goals of achieving food security and sustainable development are to be achieved simultaneously. This requires effective land use management framework that is responsive to the many factors causing land use conversions.

2.7 INSTRUMENTS FOR CONTAINING AGRICULTURAL LAND USE CONVERSIONS IN THE URBAN FRINGES

According to Gerrit-Jan et al (2007) some of the instruments that can be used to control agricultural land use conversions in the urban fringes include the following.

a) Farmland Preservation Ordinances

A favoured argument for urban containment strategies is to preserve prime agricultural land (Daniels, 1999). One issue is how much prime agricultural land is close to urban expansion

areas. Another is the "highest and best use" question. One benefit of farmland preservation ordinances adopted by the American counties is that they may direct development to land that is unsuited for agriculture. A key question is: how much agricultural land does Kenya need? The quantity and quality of cultivable land has declined over the years and agricultural productivity has dwindled as well. A study carried out by Verheye and Paul (1997) found out that "at world level the per capita available land has been reduced from 0.39ha in 1961 to 0.27ha in the 990s. The land/man ratio for the African Continent has decreased from 0.62ha in 1965 to merely 0.26ha in 1995. In countries like Rwanda and Malawi this figure has even dropped to almost 0.15ha". In addition, Kenya has experienced devastating persistent and unpredictable droughts and famines. One can thus argue that we need every fertile agricultural land parcel for agricultural production if the twin goals of achieving food security and sustainable development in this country will be actualized. It is also important to note that Kenya, among many African countries, depend largely on rain-fed agriculture, thus any fertile agricultural land in areas that receive good rainfall should be jealously protected against unsustainable conversions into other uses.

b) Purchase and/or Transfer of Development Rights (PDRs/TDRs)

Property ownership can be described as a bundle of individual rights. The right to develop a piece of land for residential, commercial, or industrial purposes is also a right within the bundle. Use of these rights is not absolute. Governmental entities do have the right to constrain, to a certain extent, a property owner's use of these rights and thus the economic value that the property owner can derive from the property. The purchase of development rights involves the sale of that right while leaving all the remaining rights as before. Once an agreement is made, a permanent deed restriction is placed on the property which restricts the type of activities that may take place on the land in perpetuity. In this way, a legally binding guarantee is achieved to ensure that the parcel will remain agricultural, or as open (green) space forever. This is because the agency involved retires the development rights upon purchase (American Farmland Trust, 2001).

This is an excellent market based approach because it can simultaneously prevent sprawl in outlying areas and promote densification closer to city centers thus preserving agricultural land in the urban fringes. In exchange for the commitment to forgo development at a site ('sending area', certainly open space, often agricultural land or environmental sensitive land) a land owner (or land purchaser) will obtain additional development rights (such as density bonuses) at some alternative centrally located site ('receiving area'). Unfortunately, the market for such programs, as observed elsewhere, in most cases remains relatively thin. That is, there are too few participants (Bae, 2000; Machemer and kaplowitz, 2002). There are

several technical problems, such as identification of 'receiving areas' and determining the appropriate 'exchange rate' (for example, acres of undeveloped land for square feet of additional development. One recent success story, however, can be found in United States in King County, Washington, which protected more than 90,000 acres of Snoqualmie Forest and is the largest TDR scheme in the America (King county, 2005). The PDR/TDR approach remains a policy instrument that merits more attention on how to expand its use.

However, this approach could be tried in Kenya. Property owners or developers with fertile agricultural land in areas like Kiambu County can be given additional development rights (such as bigger land parcels for residential estate developments) in less fertile areas such as Machakos and Kajiado Counties. The government can use incentives to encourage land owners and property developers to acquire land for estate development in less fertile areas. Alternatively, government of Kenya (especially the counties) may use this strategy and purchase development rights in fertile agricultural areas so that the agricultural land remain agricultural in perpetuity.

c) Ballots Prior to the Approval of Large-Scale Development Projects

A recent effort to slow down development popular in the outlying jurisdictions of southern California is ballot initiatives that require vote approval for residential subdivisions above a certain size (Huibert, 2007). This could be a major check on (especially peripheral) development because the rational voter hypothesis implies that opponents of development will be more likely to vote. In Kenya, we are yet to adopt this approach; however, it could be a feasible strategy to incorporate effective public participation in development process by ensuring that many local residents participate. For such programmes to succeed, however, there is need for increased public awareness so as to ensure meaningful participation in land use decision-making process.

d) Highest and Best Use Principle

Most land areas are suited for a variety of uses. The highly valued land found in most central business districts could be used for forestry, grazing, crop production, or residential purposes as well as for commercial uses. It is used as it is, however, because owners have an economic incentive to use their land resources for those purposes that promise them the highest return. In this respect they allocate their land resources in accordance with the concept of highest and best use (Ely et al. 1964). Land resources are at their highest and best use when they are used in a manner that provides an optimum return to their operators or to society. Depending on the criteria used, this return may be measured in strictly monetary terms, in tangible and social values, or in some combination of these values. Real estate is ordinarily considered at its

highest and best use when it is used for that purpose or that combination of purposes for which it has the highest comparative advantage or least comparative disadvantage relative to other uses (Johnson et al. 1954).

Empirical evidence show that when land uses are based purely on their monetary returns, some land uses, such as agricultural land use, fair poorly compared to other land uses, for instance, residential/commercial use (Renne, 1958). Consequently, the prescriptions of this principle dictate that land use conversions should be approached holistically before such conversions take place. In Kenya, land managers usually consider only monetary values or returns when making their decisions on land use conversions hence some land uses are outbid in the process, leading to poor and unsustainable land use management.

e) Urban Growth Boundaries (UGB)

This is an urban management tool that can help limit urban sprawl by creating a clear edge to a city region beyond which urban development is prohibited. An urban growth boundary is one among the various urban containment tools like policies on timing and sequencing public infrastructure, construction and public ownership of land or land acquisition (Pendall et al., 2002; Parliament of South Australia, 2003). These tools are intended to limit the rate of urban growth and associated impacts. Establishing an urban growth boundary and encouraging the "inner city development" concept can help achieve a more equitable approach to urban community services.

Therefore, the goal of UGB is to confine development inside the boundary and thereby to achieve the parallel goals of increasing urban competiveness and reducing sprawl. The UGB is usually combined with other policy measures with similar goals so that it is difficult to separate out the particular effect of the urban growth boundary (Pendal et. al. 2002). Kenya's Metro 2030 Strategy proposes boundaries for expanded Nairobi City. However, the proposed land uses raises questions by designating arid and semi arid areas of the Machakos County for agricultural cultivation and Kajiado County for further agricultural use in addition to livestock while designating most of the fertile Kiambu County for residential development. The proposed boundaries may be appropriate but the proposed land uses may require more evaluation and information before implementation of the strategy.

f) Mixed Land Uses

Besides containing urban growth and increasing urban densities, mixing land uses has become one of the leading prescriptions for protection of agricultural land and smart growth. Mixed land use is thought to provide a large number of potential benefits: shorter distances between destinations, more pedestrian and less automobile travel, more efficient use of space

over time, and greater mixing of social classes and activities. Mixing of land uses has proven difficult to achieve (Jill Grant and Claus Wiegandt, 2007). With proper planning, however, mixed land uses can be achieved by combining compatible uses hence leading to better use of land resources and reducing pressure on fertile agricultural land found in the urban fringes.

g) Critical Area Protection Measures

Many Urban Containment (UC) and agricultural land protection programs include measures to protect critical areas and environmentally sensitive lands (for example, wetlands, species protection areas and stream protection areas), even UGBs. Few would disagree that growth should, and can, be directed away from these areas. The debate hinges on the definition of critical areas (Hails, 2002). A common remedy in marginal cases is to release some of the land for development in return for funds from the developer to restore the remainder. The government of Kenya can use this strategy and declare certain fertile agricultural areas as critical areas that need to be protected from conversions into other uses. This, however, would require an effective land use management framework that is responsive to changing economic, political and social trends so as to ensure sustainable development.

h) Urban Revitalization Strategies

Urban revitalization is often promoted as an antidote to sprawl, hence protecting agricultural land in the urban fringes. Urban revitalization efforts, provided that they are primarily private sector financed with modest levels of public support, are worthy in their own right, regardless of their effects on sprawl. The problem is that this argument has been used too cavalierly to justify public subsidies for rail transit, sports stadia, convention centers and other costly projects. There has been some revival in a few downtowns in America (for example, Seatle, Denver) but probably the result of unusual amenities and/or niche demands rather specific policies (Downs, 1999)

In Kenya there are efforts to revitalize some areas of Nairobi City by increasing density and infilling vacant parcels in estates like Makongeni, Jericho and Uhuru, to mention but a few examples. However, the results of such efforts are yet to be seen. This would be an effective strategy to reduce urban sprawl and protect fertile agricultural land in the urban fringes.

i) Greenbelt Concept

A green belt or greenbelt is a policy and land use designation used in land use planning to retain areas of largely undeveloped, wild, or agricultural land surrounding or neighbouring urban areas. Similar concepts are greenways or green wedges which have a linear character and may run through an urban area instead of around it. In essence, a green belt is an invisible line designating a border around a certain area, preventing development of the area and

allowing wildlife to return and be established. This concept can be used in Kenyan urban fringes to protect agricultural land from conversions by designating a border around the urban areas. This would protect the unique character of rural communities that might otherwise be absorbed by expanding suburbs. However, implementation of this policy in Kenya has been met with many economic, social and political challenges (http://www.greenbeltmovement.org). Consequently, for this policy to succeed in Kenya there must be strong political will, hence good governance is a must.

2.8 MANAGEMENT FRAMEWORK TO REGULATE AGRICULRAL LAND CONVERSIONS

Land is a finite resource, while the natural resources it supports can vary over time and according to management conditions and uses. Expanding human requirements and economic activities are placing ever increasing pressures on land resources, creating competition and conflicts and resulting in suboptimal use of both land and land resources. If, in the future, human requirements are to be met in a sustainable manner, it is now essential to resolve these conflicts and move towards more effective and efficient use of land and its natural resources.
Integrated physical and land-use planning and management is an eminently practical way to achieve this (UNEP, 2002). By examining all uses of land in an integrated manner, it makes it possible to minimize conflicts, to make the most efficient trade-offs and to link social and economic development with environmental protection and enhancement, thus helping to achieve the objectives of sustainable development. The essence of the integrated approach finds expression in the coordination of the sectoral planning and management activities concerned with the various aspects of land use and land resources According to UNEP (2002), sustainable agricultural land use conversions should be guided by the following:-

(1) Developing supportive policies and policy instruments

Governments at the appropriate level, with the support of regional and international organizations, should ensure that policies and policy instruments support the best possible land use and sustainable management of land resources. Particular attention should be given to the role of agricultural land. To do this, they should:

(a) Develop integrated goal-setting and policy formulation at the national, regional and local levels that takes into account environmental, social, demographic and economic issues;
(b) Develop policies that encourage sustainable land use and management of land resources and take the land resource base, demographic issues and the interests of the local population into account;

(c) Review the regulatory framework, including laws, regulations and enforcement procedures, in order to identify improvements needed to support sustainable land use and management of land resources and restricts the transfer of productive arable land to other uses;
(d) Apply economic instruments and develop institutional mechanisms and incentives to encourage the best possible land use and sustainable management of land resources;
(e) Encourage the principle of delegating policy-making to the lowest level of public authority consistent with effective action and a locally driven approach.

(2) Strengthening planning and management systems

Governments at the appropriate level, with the support of regional and international organizations, should review and, if appropriate, revise planning and management systems to facilitate an integrated approach. To do this, they should:

(a) Adopt planning and management systems that facilitate the integration of environmental components such as air, water, land and other natural resources, using landscape ecological planning (LANDEP) or other approaches that focus on, for example, an ecosystem or a watershed;
(b) Adopt strategic frameworks that allow the integration of both developmental and environmental goals; examples of these frameworks include sustainable livelihood systems, rural development, the World Conservation Strategy/Caring for the Earth, primary environmental care (PEC) and others;
(c) Establish a general framework for land-use and physical planning within which specialized and more detailed sectoral plans (e.g., for protected areas, agriculture, forests, human settlements, rural development) can be developed; establish intersectoral consultative bodies to streamline project planning and implementation;
(d) Strengthen management systems for land and natural resources by including appropriate traditional and indigenous methods; examples of these practices include pastoralism, Hema reserves (traditional Islamic land reserves) and terraced agriculture;
(e) Examine and, if necessary, establish innovative and flexible approaches to programme funding;
(f) Compile detailed land capability inventories to guide sustainable land resources allocation, management and use at the national and local levels.

(3) Raising awareness and promoting public participation

Governments at the appropriate level, in collaboration with national institutions and interest groups and with the support of regional and international organizations, should launch

awareness-raising campaigns to alert and educate people on the importance of integrated land and land resources management and the role that individuals and social groups can play in it. This should be accompanied by provision of the means to adopt improved practices for land use and sustainable management.

In addition, governments at the appropriate level, in collaboration with national organizations and with the support of regional and international organizations, should establish innovative procedures, programmes, projects and services that facilitate and encourage the active participation of those affected in the decision-making and implementation process, especially of groups that have, hitherto, often been excluded, such as women, youth, indigenous people and their communities and other local communities. Public participation implies that the public's contribution will influence the decision. Public participation is regarded as a way of empowerment and as vital part of democratic governance. Consequently, means of incorporating public participation should ensure that many people participate by using media that can reach and be understood by many people as possible. Consideration of needs for accessibility, scheduling, location, format and language of informational materials should be structured to allow informed and constructive exchanges.

(4) Strengthening institutions

Governments at the appropriate level, with the support of appropriate international organizations, should:

(a) Review and, where appropriate, revise the mandates of institutions that deal with land and natural resources to include explicitly the interdisciplinary integration of environmental, social and economic issues;

(b) Strengthen coordinating mechanisms between institutions that deal with land-use and resources management to facilitate integration of sectoral concerns and strategies;

(c) Strengthen local decision-making capacity and improve coordination with higher levels.

(d) Equip land institutions with adequate trained personnel, funds and ensure the institutions encourage public participation.

(5) Good governance

It is evident from the above discussion that most of the responsibility of protecting and guiding sustainable agricultural land use conversions lies with the government (governance). In a cross-section of more than 150 countries, The World Bank (1999) through Kaufmann, Kraay, and Zoido-Lobatón, provided empirical evidence of a strong causal relationship from better governance to better development outcomes, they then constructed six aggregate indicators corresponding to six basic governance concepts: voice and accountability, political

instability and violence, government effectiveness, regulatory burden, rule of law, and graft. As measured by these indicators, governance matters for development outcomes. UNEP (2002) concurs and states that "good governance is essential for sustainable development. Sound economic policies, solid democratic institutions responsive to the needs of the people and improved infrastructure are the basis for sustained economic growth, poverty eradication, and employment creation. Freedom, peace and security, domestic stability, respect for human rights, including the right to development, and the rule of law, gender equality, market-oriented policies, and an overall commitment to just and democratic societies are also essential and mutually reinforcing". Therefore, without good governance there will be no relevant policies, regulatory and institutional frameworks to regulate sustainable agricultural land use conversions. In addition, land use planning, management and public awareness and participation may not be achieved.

2.8.1 Policy Framework in Kenya

Some of the relevant policies affecting agricultural land use conversions in Kenya include:-

i) Current 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.

ii) The National Land Policy

Kenya has not had a clearly defined or codified National Land Policy since independence up to late 2010 when a National Land Policy was formulated. This, together with the existence of many land laws, some of which are incompatible, has resulted in a complex land management and administration system. From the advent of colonialism, Kenya has been grappling with the land question, which subsequent government regimes have been unable to

or are unwilling to solve. This has resulted in environmental, social, economic and political problems including deterioration in land quality, squatting and landlessness, disinheritance of some groups and individuals, urban squalor, under-utilization and abandonment of agricultural land, tenure insecurity and conflict. To address these problems, the Government of Kenya formulated a National Land Policy in 2010 with the aim of guiding the country towards a sustainable and equitable use of land.

The policy therefore provides broad principles and guidelines on land use management issues recommending the formulation of a National Land Use Policy. 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.

iii) The Kenya Vision 2030

Kenya Vision 2030 is the new country's development blueprint covering the period 2008 to 2030. 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 utilisation 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. Similalrly, 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.

iv) 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). 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 (page 9 and 59). 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.

v) The National Food Security and Nutrition Policy (NFSNP)

NFSNP identifies food security as a basic human right. To achieve food and nutrition security, NFSNP sets the overall goal as being to ensure that all Kenyans throughout their

lifecycle enjoy at all times safe food in sufficient quantity and quality to satisfy their nutritional needs for optimal health through sustainable domestic production increases for diversified & affordable food that meet basic nutrition requirements. To meet this goal, Kenya has to increase her agricultural production and since land is the most important factor of production, there is a need to protect our limited fertile agricultural land. Agricultural land use conversions, therefore, must be sustainable so as to achieve this goal and this requires effective land use management framework.

vi) The Kenya Food Security and Nutrition Strategy (KFSNS)

The food and nutrition insecure in Kenya form about a third of the country's total population, currently estimated at 34 million. Ensuring food security and nutrition in Kenya is therefore a critical challenge. A growing problem of food and nutrition insecurity in Kenya is linked to the disappointing growth of agricultural production. The country has a majority (about 80%) of its population residing in the rural areas where agriculture dominates. Even though the country has generally experienced positive growth in agricultural output over the last four decades, it has experienced serious declines in the agricultural sector in parts of the 1980s and 1990s and has had several periodic food deficits and acute food shortages, especially in drought and flood prone areas.

The strategy recognizes importance of land for rural agriculture, since majority of Kenyan population (80%) reside in rural areas. Consequently, in order to ensure a sustained increase in the production of food that is diversified, affordable and healthy, the government undertakes to support and promote farming systems that enhance sustainable food production and support measures that improve security, access and use of land. Land, therefore, is a critical asset in agricultural sector, thus agricultural land need to be jealously protected against unsustainable conversions, if the goals of food security and nutrition will be achieved in Kenya and this cannot be achieved without effective land use management framework.

vii) National Spatial Plan

Spatial Planning is defined as the method used by public authorities to influence the future distribution of activities in space. It aims at rationalizing the national organization of land uses and linkages with environmental protection to balance developmental demands. It also regulates the conversion of land and property uses. In summary, the National Spatial Plan seeks to achieve a better social and physical developmental balance and quality of life for people to create a strong competitive economy and provide the highest quality of environment. Despite numerous reasons to have a National Spatial Plan (NSP), Kenya does not have one. The Kenya Vision 2030 and the National Land Policy (2010) have noted

importance of a national spatial plan and insisted that for the above policies to be implemented there is need to formulate and implement a National Spatial Plan.

However, the Government of Kenya has commenced the preparation of an ambitious National Spatial Plan (NSP) that will guide physical development activities over the next 50 years. A specific objective of the National Spatial Plan is to promote National Integration and Cohesion through a more competitive and balanced regional, social and economic growth by addressing national challenges such as population and demographic dynamics; resource-use conflicts; urbanization and human settlements, among others. A national spatial plan should be formulated before land use planning and policies are formulated and implemented. It is worth to note that Kenya is in the process of formulating a National Land Use Policy without a National Spatial Plan. As a result, the National Land Use Policy may not be fully informed since it should be based on the National Spatial Plan. Similarly, land use planning and development control may not be properly managed due to lack of a national spatial plan thus it may be challenging in trying to formulate and implement a national spatial plan in retrospect.

viii) The Kenya National Housing Policy

According to this policy, the estimated current urban housing needs is over 120,000 units per annum hence the Government is committed to addressing this situation through development of urban middle-cost and low-cost housing and upgrading of slums and informal settlements. The policy observes that supply of serviced land at affordable prices in suitable locations is one of the critical inputs for housing development. Land in and near urban areas, especially Nairobi City is expensive. Any attempts to provide adequate and affordable housing in urban areas, will require government to either subsidize the cost of housing, including cost of land and/or looking for land in the urban fringes – leading to increased pressure on agricultural land. There is a need, therefore, to manage agricultural land use conversions in the urban fringes in order to ensure sustainable development and achieve twin goals of increased agricultural production and affordable housing. This noble goal can only be achieved by putting in place effective and responsive land use management framework.

ix) The Millennium Development Goals (MDGs)

The Millennium Development Goals (MDGs) are eight international development goals that all 193 United Nations member states (including Kenya) and at least 23 international organizations have agreed to achieve by the year 2015. They include: Goal 1: Eradicate extreme poverty and hunger ; Goal 2: Achieve universal primary education ; Goal 3: Promote gender equality and empower women; Goal 4: Reduce child mortality rates; Goal 5: Improve

maternal health; Goal 6: Combat HIV/AIDS, malaria, and other diseases; Goal 7: Ensure environmental sustainability and Goal 8: Develop a global partnership for development (United Nations Development Programme, 2000). These goals are interconnected (International Land Coalition, 2000). For Kenya to achieve the MDGs therefore, especially goal 1, there is need to improve agricultural performance and provide adequate and affordable housing, among other measures. These will obviously require Kenya to manage her land resources in a sustainable manner by putting in place effective land use management framework.

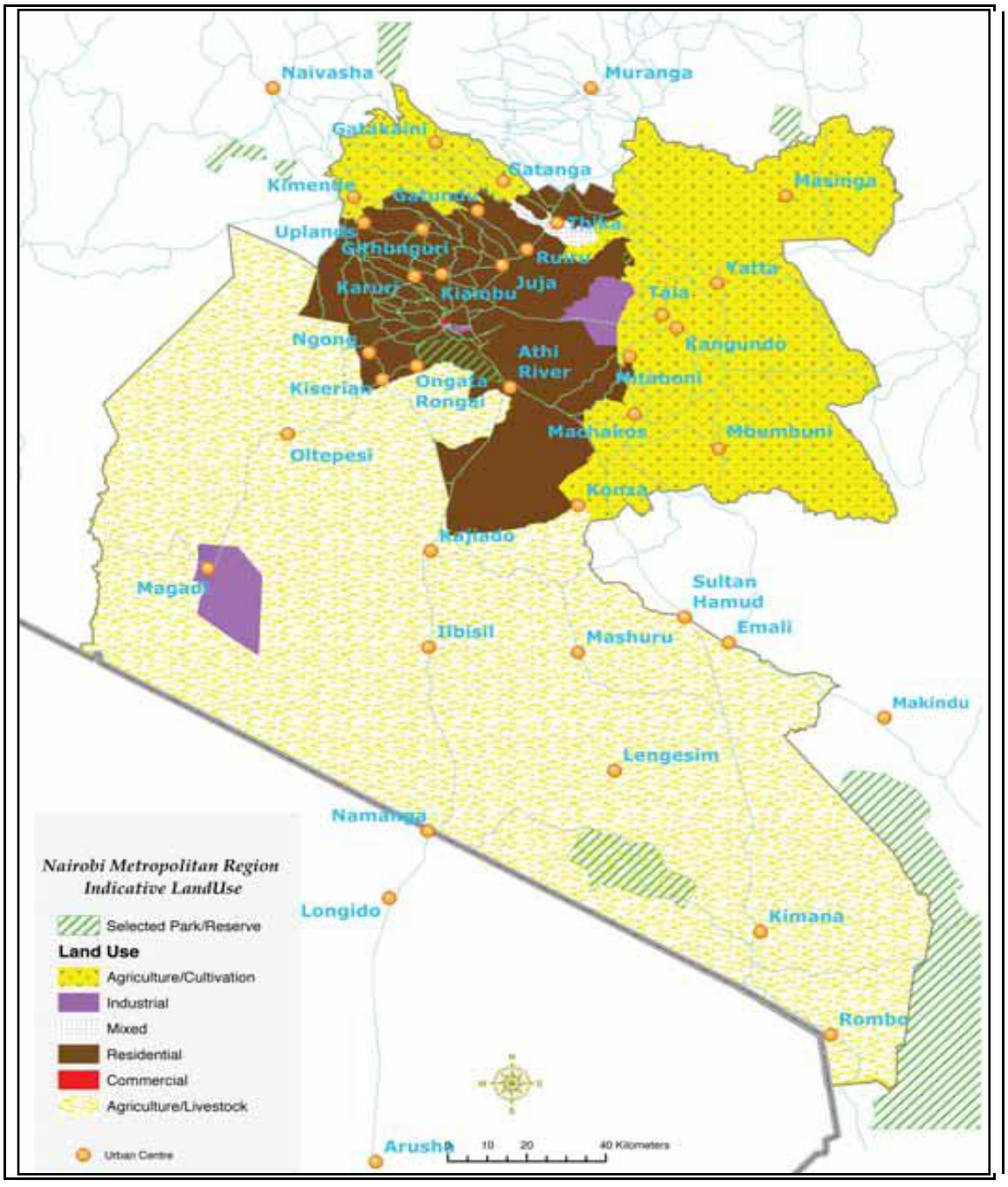
x) The Nairobi Metro 2030 Strategy

The vision of Nairobi Metro Strategy is to make Nairobi City a world class African metropolis through building a safe, secure and prosperous metropolitan so as to achieve objectives of Kenya Vision 2030. To meet housing demand, the strategy notes, there will be significant land requirements of approximately 49,000 acres, raising to 149,000 acres in year 2030 and this land must be found within the urban growth areas. Therefore, there is no doubt that agricultural land found in the urban fringes will experience a lot of pressure for conversion to residential and other uses. In deed the strategy notes that the extent of the NMR includes purely agricultural areas. Designation as agricultural land will reinforce objectives of protecting the agricultural land base of the region. The strategy undertakes to address the dilemma on whether to allow indiscriminate land subdivisions and change of user or to promote agricultural activities by restricting urban growth and also address issues of food security (page 41). The strategy notes that already urban sprawl has rapidly decimated the rural land uses by encroaching into rich agricultural hinterland in Kiambu, Thika and Kajiado areas and that the large coffee, tea and livestock estates are under serious threat from urbanisation. Some of the causes of this scenario have been identified as poor governance, poor land use planning and management practices including lack of a comprehensive up-to-date land use plan and development control guidelines leading to land use conflicts, among others

The map below shows proposed Nairobi Metropolitan Region with various land uses. The proposed NMR may be appropriate but the proposed land uses may require further evaluation and information before adoption and implementation of the strategy. Particularly, the dilemma on whether to allow indiscriminate agricultural land subdivisions and change of user or to promote agricultural activities by restricting urban growth so as to address issues of food security must be sorted out first. It is also questionable how the proposed land uses were arrived at yet Kenya does not have a National Spatial Plan and/or National Land Use Policy that could have informed allocation of the various land uses. Secondly, the fertile agricultural

land in Kiambu County has largely been designated for residential development while the arid and semi-arid Machakos and Kajiado Counties have been designated for agriculture and livestock, yet Kenya relies heavily on rain-fed agriculture.

Diagram 2.4: Proposed Nairobi Metropolitan Region and Various Land Uses



Source: Nairobi Metro 2030 Strategy, Page 108

From the above discussion, it is evident that most of the relevant national policies necessary for managing agricultural land conversions are either inexistent or new. Sustainable development cannot be achieved without deliberate efforts and planning. Therefore, land use

management has been left to chance hence agricultural land has not been managed sustainably and this may have negative effects in the long run.

2.8.2 Land Use Regulatory and Institutional Frameworks in Kenya

The institutions responsible for managing land in urban and rural Kenya are many and varied, being the product of a series of legislative measures and administrative decrees promulgated throughout the last century. Generally, all land institutions in Kenya are regarded as highly centralized in the Ministry of Lands and the Presidency; performing poorly in service provision and inadequately funded; corrupt and does not involve stakeholders in decision making. In addition, the institutions have a land information system that is manual, inefficient and urgently needing computerizing and use complex legal and administrative processes that are neither understood by users nor effectively applied as required (The National Land Policy, 2010). Due to these problems, the National Land Policy recommended a complete overhaul of the existing land administration and management system and related institutional structures to ensure that service delivery is efficient, effective and equitable. However, the new recommended institutional framework is not yet in place but is in the process of being constituted. This research, therefore, concentrated in the old institutional framework and more specifically on the land institutions at Kiambu; the local land control board and the county council.

The Constitution of Kenya is the supreme law of the Republic and binds all persons and all State organs at both levels of government. Other legal framework for land use management in Kenya is mainly provided by The Land Control Act, chapter 302 and The Physical Planning Act, chapter 286, among others. These laws are supposed to be implemented by the local land control boards and local authorities. Strictly speaking, the power to allow agricultural land use conversions is bestowed on the local land control boards under the Land Control Act.

i) The Constitution of Kenya (2010)

In an ideal situation, a constitution should set out the broad principles on land, and establish an efficient and equitable institutional framework for land ownership, administration and management. Land policy reforms are not likely to succeed in the absence of such a sound constitutional framework. The desired constitutional changes have, however, not been realized throughout the history of the Republic of Kenya, until late 2010. The Government has not been accountable in its governance of land, which has been occurring under a regime that does not facilitate meaningful public participation hence cases of mismanagement of land resources abound (National Land Policy, 2010). There was thus a need to facilitate better access to land and management of land resources hence Kenyans promulgated a new

Constitution in 2010 to address these issues. Article 10 of the new Constitution provides for the national values and principles of governance which bind all State organs, State officers, public officers and all persons to include; the rule of law, democracy and participation of the people; good governance, integrity, transparency and accountability and sustainable development, among others. Further, Article 232 provides for the values and principles of public service including; high standards of professional ethics; efficient, effective and economic use of resources; responsive, prompt, effective, impartial and equitable provision of services; involvement of the people in the process of policy making; accountability for administrative acts; and transparency and provision to the public of timely, accurate information, to mention but a few. National values and principles of governance have been lacking in the old Constitution, however, now that they have been included in the new Constitution may change attitudes and actions of public servants, including land managers. In addition, the new Constitution under article 43 (b & c), regarding economic and social rights, provides that every person has right to accessible and adequate housing, and to reasonable standards of sanitation and to be free from hunger, and to have adequate food of acceptable quality. This means that the government must do everything possible to provide adequate and affordable housing as well as adequate agricultural production to feed the citizens. These two competing goals cannot be achieved unless effective and proper land use management practices are put in place.

Consequently, the new Constitution under chapter 5 on land and environment recognises the need for the land to be held, used and managed in a manner that is equitable, efficient, productive and sustainable, aimed at sustainable and productive management of land resources. Specifically, article 66 gives the State power 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. Parliament is mandated to enact legislation ensuring that investments in property benefit local communities and their economies. Article 67 establishes the National Land Commission and its mandate include having oversight responsibilities over land use planning throughout the country among other functions. Article 68 gives parliament power to revise, consolidate and rationalise existing land laws; revise sectoral land use laws and enact legislation to prescribe minimum and maximum land holding acreages in respect of private land and regulate the manner in which land may be converted from one category to another.

Kenya is in the process of implementing her new Constitution amidst many political, economic and social challenges. The provisions in the Constitution regarding land and environment are good, however, implementation is very important if the benefits therein are

to be realised. If the provisions in the new Constitution are implemented, we could reverse some of the negative effects of poor land use practices and thus start managing our land resources more sustainably. For Kenya to implement her Constitution well there is need for an effective land use management framework that is responsive to land reforms and Constitutional changes.

ii) The Land Control Act, Chapter 302, Laws of Kenya

This is an Act of Parliament to provide for controlling transactions in agricultural land. The 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.

Where an application for the consent of a land control board has been refused, then the agreement for a controlled transaction becomes void. It is important to note the composition of the local land control boards include District Commissioner or District Officer (who is the chairman of the board), two public officers, two county council representatives and at least three area residents (who should be owning agricultural land in the area), all appointed by the minister for Ministry of Lands. As a result, political influence can affect functions of the boards. It is also worth to note that legal provisions are not effective if they are not implemented by the relevant institutions. Effectiveness of institutions is greatly determined by capacity and competence of the institutions.

iii) The Physical Planning Act, Chapter 286, Laws of Kenya

This is an Act of Parliament to provide for the preparation and implementation of physical development plans and for connected purposes. Under this Act, the local authorities have power to prohibit or control the development of land and buildings, subdivision of land and implementation of approved physical development plans among others, in the interests of proper and orderly development of its area. Consequently, no person should carry out

development within the area of a local authority without a development permission granted by the local authority. The development application, accompanied by relevant plans and particulars, should be made to the clerk of the local authority concerned; then be referred to the Director of Physical Planning for his comments. The local authority may consult as may deem appropriate, with other relevant authorities such as the Director of Survey, the Director of Agriculture, and the Director of Urban Development, among others. The local authorities' decisions should be guided by but not limited to the following; relevant regional or local physical development plans, health, amenities and conveniences of the community. If any development application requires subdivision or the change of user of any agricultural land, the local authority should require the application to be referred to the relevant land control board. Subject to such comments as the Director of Physical Planning may make on a development application referred to him, a local authority may grant (with or without conditions) or refuse (stating the grounds for refusal) development permission. The Act also requires that notices for change of user to be advertised in two daily newspapers and on the land parcel that is changing user. Consequently, this Act does not provide for public participation, as provided by the Constitution (2010)

It is important to note that what the law provides may be different from what actually institutions do on practical situations. It is important, therefore, to find out what happens under practical situations, that is, what procedures are followed by the local authorities when granting or refusing development permission. The competence and capability of local authorities is a must so that their decisions are well informed and objective.

iv) The Registered Land Act, Chapter 300, Laws of Kenya (Repealed in 2012)

This is an Act of Parliament to make further and better registration of title to land and for the regulation of dealings in land so registered and connected purposes. This Act affects land use management to great extent, especially for the land registered under it. Article 28 gives the land owner absolute ownership with all rights and privileges, meaning the land owner has right to deal with land as he/she wishes, only subject to the Act. This Act may have negative effects on agricultural land conversions since in most cases agricultural land is registered under this Act. For instance, the authorities may have no power to refuse subdivision of agricultural land into smaller uneconomical portions or change of user from agricultural to other uses. However, this Act has been repealed by the new Land Registration Act, 2012. In addition, the new Constitution has laid down broad guidelines on how land should be used and/or managed. What is required now is effective land use management framework that can implement the new laws and/or identify more conflicting laws and propose appropriate remedies so as to achieve sustainable land use management.

v) The Agriculture Act, Chapter 318, Laws of Kenya

An Act of Parliament to promote and maintain a stable agriculture, to provide for the conservation of the soil and its fertility and to stimulate the development of agricultural land in accordance with the accepted practices of good land management and good husbandry. The Act establishes boards (Central Agricultural Board, Provincial Agricultural Board and District Agricultural Board) with no proper job description save for the Central Agricultural Board which is mandated to come up with agricultural policy. Most of the functions of these boards are decided by the minister for agriculture and are highly bureaucratic, according to the provisions of the Act. Central Agricultural Boards may make order for preservation of soil fertility and development of idle agricultural land. However, empirical evidence shows that a lot of agricultural land has degraded due to erosion and neglect, a situation that may influence agricultural land use conversions.

Article 184 gives the Minister for agriculture power, on the advice of the Central Agricultural Board, to make general rules for the preservation, utilization and development of agricultural land, including for controlling the erection of buildings and other works on agricultural land. In the past, we have not seen minister for agriculture exercising this power by taking actions to preserve agricultural land and controlling erection of buildings on agricultural land, yet so much agricultural land is being taken out of production every year. In addition, article 185 gives the minister power to dispossess agricultural land or even compulsorily acquire that land. Under this Act, the minister is given a lot of powers to make decisions regarding agricultural land and agricultural matters. It is interesting to note that ministers in Kenya are politicians, who may not have academic qualifications and/or experience in the profession of their ministries. Consequently, their decisions and actions may be prone to political influence and ignorance. This may explain why Kenya has grappled with policy issues on almost every sector of her economy.

vi) The Housing Act, Chapter 117, Laws of Kenya

An Act of Parliament to provide for loans and grants of public moneys for the construction of dwellings; to establish a housing fund and a housing board for these purposes; and for connected purposes. This Act, therefore, does not regulate housing development per se, rather it is meant to guide functions of the National Housing Corporation, which is but a small portion of the housing sector. Consequently, one can thus conclude that housing sector is ill regulated. Due to ineffectiveness of this Act, the Government of Kenya is in the process of enacting a new Housing law to regulate housing sector.

vii) The Housing Bill 2009

A Bill for an Act of Parliament to provide for the effective coordination, facilitation, capacity building and monitoring of the housing and human settlement sector; to establish the Kenya Housing Authority and the National Social Housing and Infrastructure Fund for the provision of housing and for connected purposes. The Bill establishes an Authority to be known as the Kenya Housing Authority, whose functions would include identifying land for housing and securing it. The Bill provides that the Authority shall facilitate access to land for housing, human settlements development and related infrastructure by safeguarding land zoned for purposes of housing and human settlements from reallocation; ensuring that allottees of urban land zoned for housing develop the land within the period stipulated in the terms of allotment and participating in land use planning and management. Similarly, agricultural sector should also undertake such stern measures to safeguard agricultural land from reallocation/conversions into other uses and also ensure that farmers utilize their land for agricultural purposes. In addition, agricultural sector should also participate in land use planning and management; indeed there is need for all sectors to participate in land use planning and management so as to ensure transparency and sustainability. Through effective land use management framework, meaningful and effective participation of agricultural sector in land use planning can be achieved.

viii) The Government Lands Act, Chapter 280, Laws of Kenya (Repealed in 2012)

An Act of Parliament to make further and better provision for regulating the leasing and other disposal of Government lands, and for other purposes. Some agricultural lands are leased by Government under this Act hence the Act has potential for influencing agricultural land use and land use conversions. For instance, article 3 gives the President of the Republic of Kenya special powers of administration including power to make grants or dispositions of any unalienated government land and vary conditions of leases as he thinks fit. The President is a politician hence his/her decision is prone to political influence, nepotism and favouritism. In the past, for instance, Kenya has witnessed several instances whereby the President grants titles to citizens as a political campaign strategy. Such actions are likely to be subjective and unsustainable in the long run, leading to poor land use management.

Article 7 gives the Commissioner for Lands power to execute conveyances and do other acts on behalf of President, indeed the powers of the President under Article 3 have been delegated to the Commissioner. In addition, Article 9 gives the Commissioner power to grant permission or refusal for subdivision, assignment and subletting of Government land. The Commissioner of Lands has been, therefore, given a lot of powers and authority under this Act. It is worthy to note that the Commissioner is also prone to corruption, political influence

and pressure from the President and other politicians hence his actions regarding land may not be objective and rational, and this may lead to unsustainable land use management practices such as unsustainable conversions of land use. However, this Act has been repealed by the new Land Registration Act, 2012.

ix) The Local Government Act, Chapter 265, Laws of Kenya

This is an Act of Parliament to provide for the establishment of authorities for local government; to define their functions and to provide for matters connected therewith and incidental thereto. Article 166 gives local authorities power to prohibit and control the development and use of land and buildings in the interest of the proper and orderly development of its area. The effectiveness of local authorities depends on their competence and capacity to implement relevant policies and laws. If the relevant policies and laws are inadequate and/or ineffective, the situation may become worse.

x) The Sectional Properties Act, 1987 No. 21 of 1987

An Act of Parliament to provide for the division of buildings into units to be owned by individual proprietors and common property to be owned by proprietors of the units as tenants in common and to provide for the use and management of the units and common property and connected purposes. This Act has helped land resources to be utilized more effectively by allowing several owners to own a piece of the same building. However, the Act has encouraged land owners and real estate investors to subdivide land into uneconomical units for development of high-rise residential flats with the aim of selling or letting individual units. Multiple ownership of one building has encouraged land use conversions and subdivision since the developers are ensured of high returns thereafter. The new Constitution has, however, mandated the Parliament to enact laws regulating maximum and minimum acreage of land and if the Constitution is implemented could check the provisions of this Act and thus preserve our limited arable agricultural land from conversions to other users.

xi) The Land Registration Act, 2012

An Act of Parliament to revise, consolidate and rationalize the registration of titles to land, to give effect to the principles and objects of devolved government in land registration and for connected purposes. This Act has repealed the following Acts; The Indian Transfer of Property Act of 1882, The Government Lands Act, chapter 280, The Registration of Titles Act, chapter 281, the Land Titles Act, chapter 282 and The Registered Land Act, chapter 300, laws of Kenya. Article 94 allows partition/sub-division of land among tenants in common. However, article 95 gives Registrar of titles ancillary powers to prohibit sub-division if the resultant parcels are less in acreage than minimum prescribed under The Land Act, 2012. In

addition, Article 76 gives the Registrar of titles power to impose a restriction for the prevention of any fraud or improper dealing or for any other sufficient cause, either with or without the application of any person interested in the land or restricting dealings with any particular land. This could reduce agricultural land sub-divisions to uneconomical sizes and reduce corrupt dealings in land such as illegal subdivisions of land and change of user. Agricultural land would benefit from provisions of this Act, if implemented well.

xii) The Land Act, 2012

An Act of Parliament to give effect to Article 68 of the Constitution, to revise, consolidate and rationalize land laws; to provide for the sustainable administration and management of land and land-based resources and for connected purposes. This Act has repealed The Wayleaves Act, chapter 292 and The Land Acquisition Act, chapter 295. The guiding values and principles of land management and administration are provided in article 4 to include sustainable and productive management of land resources, transparency, participation, accountability, democracy and inclusiveness of the people in decision making process, among others. This provision, if implemented, would ensure effective and meaningful public participation in land use decision making, a vital component to ensure sustainability in agricultural land conversions. The National Land Commission, under article 8(d), may require certain public land to be used for specific purposes. Article 159 gives Cabinet Secretary mandate to commission a scientific study to determine minimum and maximum acreages of private land for various land zones in the country. These provisions may help in guiding land institutions to make sustainable land use conversion decisions. However, the Act does not provide explicitly on how conversion of land use would be carried out.

xiii) The National Land Commission Act, 2012

This is an Act of Parliament to make further provision as to the functions and powers of the National Land Commission, qualifications and procedures for appointments to the Commission; to give effect to the objects and principles of devolved government in land management and administration, and for connected purposes. Article 5 outlines functions of the Commission to include managing public land, recommending national land policy and monitoring land use planning throughout the country, among others. The Commission is given powers under article 18 to establish county land management boards, whose chief function will be, subject the physical planning and survey requirements, to process applications for allocation of land, change and extension of user, subdivision of public land and renewal of leases. The members of the boards will be appointed by the National Land Commission, subject to approval by the county assembly. The members will have at least one physical planner or surveyor, nominated by the county executive member and appointed by

the governor – this may assist in making informed decisions on land use conversions. However, appointment of the physical planner or surveyor may be prone to political influence and may lack professional expertise and experience hence may make biased or unsustainable decisions on land use. This is due to involvement of the governors and county assembly.

From the above discussion, it is evident that most of our laws are either too old or in the process of being enacted by the Parliament. As a result, land matters, including land use conversions, have not been sustainably managed for many years. Laws are important to enforce policies and guide functions of institutions mandated to manage land. Absence, or inadequacy of relevant laws, therefore, has got negative effect on implementation of policies and proper functioning of institutions. However, with vibrant land use management framework in place, reforms could be initiated to make sure that all relevant policies, laws and institutions are in place so as to guide sustainable land use. For instance, there may be a need to revise some of the old laws such as Agriculture Act, which was enacted 57 years ago, in tandem with provisions of the new Constitution (2010) and Land Policy (2009).

2.8.3 Land Use Planning in Kenya

The proper planning, design and management of land use demands a careful balancing of many goals, and the search for desirable land uses, coupled with effective and sustainable management practices, is made more complex by the interactions between the environment, the economy and society. Therefore, land use planning is a process that is concerned with the preparation and actualization of spatial frameworks for orderly management of human activities. The principal objective is to ensure that such activities are carried out in a manner that promises utmost attainment of economy, safety, aesthetics, harmony in land use and environmental sustenance. Consequently, land use planning and management is a subject of policy, legal and institutional frameworks (Masakazu, 2003). At the policy level, principles or rules to guide decisions and achieve rational land uses are formulated. The policies are then enforced through legal and institutional frameworks, meaning policies should be formulated before the laws are enacted and institutions implement the policy and laws (Pennsylvania Environmental Council, 2005). It is recognized that land use planning is essential to the efficient and sustainable utilization and management of land and land based resources.

In Kenya, however, little effort has been made to ensure that such plans are effectively prepared and implemented. This has been largely due to the glaring functional disconnect between the plan preparatory authorities and agencies, lack of appropriate technical and institutional capacity of local authorities, inadequate human resource establishment in the ministry responsible for physical planning, lack of an effective coordinating framework for

preparation and implementation of the planning proposals and regulations. Lack of a national land use policy has made the situation worse. These problems manifest themselves in terms of unmitigated urban sprawl, land use conflicts, environmental degradation, among others. In addition, development control (usually referred to as the Police Power) which is the power of the State to regulate property rights in land, has not been extensively used to control or otherwise regulate the use of land and to enforce sustainable land use practices throughout the country. Furthermore, the Police Power is exercised by various Government agencies whose activities are uncoordinated with the result that the attendant regulatory framework is largely ineffective (The National Land Policy, 2010). In addition, Kenya does not have up-to date land use plans (for instance, Agriculture Land Use Master Plans) and development control guidelines, a situation that has led to urban sprawl and wanton conversions of agricultural land (The Kenya Vision 2030, (2007), the Nairobi Metro 2030 (2008) Strategy and Agricultural Sector Development Strategy 2010 – 2020 (2010).

In an ideal situation, the Government should empower all planning authorities in the country to regulate the use of land to take account of the public interest; establish clear standards which override proprietary land use practices, and better enforcement frameworks. In particular, there should be effective legislative framework embodying International Conventions and national policies relating to the sustainable use of land and the preservation of environmental values; ensure that the exercise of the Police Power takes into account local or community values on land use and environmental management and ensure effective participation in the exercise of the Police Power (The National Land Policy, 2010).

2.9 CONCEPTUAL FRAMEWORK

From the literature reviewed, generally speaking, it is evident that sustainable agricultural land use conversions should be guided by the following:

1) Adequate and effective policy framework

According to the UNEP (2002) et al, sustainable agricultural land use conversions should be guided by adequate and effective polices and policy instruments. The relevant policies should stipulate the current status of the agricultural land and future desired status, by stipulating measures to be taken so as to actualise the desired future status. Therefore, policies should inform legislation before being implemented by the institutions. Policies should provide the overall objectives of various land uses and protect against land use conflicts since some land uses are “inferior” to others, for instance agricultural land use cannot compete with residential or commercial land use. Consequently, we can aptly say that there should be a deliberate

policy framework to protect agricultural land from unsustainable conversions into other uses. Specifically, there should be:-

- A National Spatial Plan (NSP) 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 to national level from which regional and local development plans can be formulated and implemented (National Spatial Plan Draft Concept Paper, (2010), The National Land Policy (2010) and The Kenya Vision 2030 (2007)
- A National Land Use Policy must be in place to provide broad principles of land use, and this should be informed by the National Spatial Plan (NSP). This way, there will be no land use conflicts and land resources will be used sustainably (UNEP 2002), The National Land Policy (2010), Agricultural Sector Development Strategy 2010-2020 (2010) UNEP, 2002).
- A National Land Policy must be in place to provide broad principles on land and land management (UNEP (2002) and The National Land Policy (2010)
- A National Development Policy such as Kenya Vision 2030 so that sustainable development is not left to chance (UNEP, 2002).
- Agriculture Land Use Master Plan (The Kenya Vision 2030 (2007) and The Nairobi Metro 2030 Strategy, 2008)
- Proper regulatory and institutional frameworks to implement and enforce the policies. Good governance and meaningful public participation are also important (UNEP, 2002)

To determine whether Kenya has adequate and effective policy framework to deal with agricultural land use conversions, the researcher carried out a literature review of the relevant policies to establish whether they are existing and adequate or otherwise. The study has established that there is a big gap between the existing policy framework and the desired/ ideal policy framework to deal with agricultural land use conversions in Kenya since the relevant policy framework needed to regulate land use conversions in Kenya is currently new, inadequate or lacking altogether. This means that the existing policy framework is ineffective and does not guide sustainable agricultural land use conversions. The researcher, however, asked respondents on their views on adequacy of the policy framework for confirmation purposes.

2) Adequate and effective Regulatory framework

According to Gerrit-Jan et al (2007) and UNEP (2002), agricultural land use conversions should be guided by adequate and effective regulatory framework. For instance, American counties use specific farmland preservation ordinances that direct development of residential housing to land that is unsuited for agriculture (Daniels, 1999). Therefore, sustainable agricultural land use conversions should be guided by:-

- Specific farmland preservation ordinances that prohibit conversions of fertile agricultural land into other users. The regulatory framework should be capable of enforcing the relevant policies and policy instruments (Gerrit-Jan et al (2007 and UNEP, 2002)
- Formulation of legal framework should be guided by the policy and policy instruments, thus inadequate and ineffective policy framework has a negative effect on regulatory framework to guide sustainable agricultural land conversions (UNEP, 2002).
- The Constitution should set out the broad principles on land and establish an efficient and equitable institutional framework for land management since sustainable agricultural land conversions are not likely to succeed in the absence of such a sound constitutional framework (The National Land Policy, 2010)
- The legal framework should create adequate institutions and give them power to enforce relevant policies and laws (The National Land Policy, 2010).

To study the current state of relevant regulatory framework in Kenya, the researcher carried out a literature review of the relevant existing laws and Bills of Parliament to find out whether the existing legal framework is adequate and what it provides for in regard to agricultural land use conversions. This was meant to establish whether there is a gap. The researcher then collected data/opinions of relevant stakeholders to establish whether the existing legal framework is effective. The literature reviewed has established that there are so many Acts of Parliament meant to guide sustainable agricultural land use conversions, however, most of the relevant Acts are old and conflicting hence requires amendment in tandem with the new Constitution and the National Land Policy (2010). Other Acts have been repealed altogether and replaced with new land laws, which are not yet tested to determine their effectiveness or otherwise.

3) Adequate and effective institutional framework

The policy and regulatory frameworks cannot operate in a vacuum. They require adequate and effective institutions for implementation and enforcement, respectively so as to achieve

sustainable agricultural land use conversions and sustainable development (Huibert et al 92007). More specifically;

- First and foremost, there must be adequate and effective policy and legal frameworks to guide and empower institutions when making their decisions regarding agricultural land use conversions, inadequacy and ineffectiveness of these frameworks means poor land use management (UNEP, 2002, The National Land Policy, 2010 and the Nairobi Metro 2030 Strategy, 2008).

- Proper coordinating mechanisms among various land institutions should be in place (UNEP, 2002 and the National Land Policy, 2010)

- Land institutions should be able to make local decisions and improve coordination with higher levels. This calls for operational and resource autonomy (The National Land Policy, 2010 and UNEP, 2002)
- In addition, the institutions should be competent (for instance, having adequate trained personnel) and have adequate capacity to implement the policy and legal provisions to the letter (The National Land Policy, 2010 and UNEP, 2002)
- Encourage effective public participation in their decision making processes through carrying out public awareness and education. This makes actions taken by institutions more transparent and accountable (UNEP, 2002).

The researcher set out to establish whether the above requirements are in place to the relevant institutions meant to protect agricultural land use conversions in the study area, especially the Kiambu Local Land Control Board and the County Council).

4) Effective Public Awareness and Participation

Effective land-use management entails planning of land-use and the management of natural resources in an integrated and holistic manner. This is achieved through full involvement of all stakeholders (The National Land Use Planning Commission of Tanzania, 1998). Effective public participation of all stakeholders is important so as to make development decisions more predictable, fair and objective. Effective public participation will check excesses of the institutions. According to UNEP (2002) effective public participation in agricultural land conversions is achieved where;

- There is public awareness and education on the importance of public participation. If the public is ignorant, then their participation is greatly curtailed. The land institutions should come up with awareness campaigns to alert and educate people on importance

of public participation in land use decision making and the role people can play in land use management (UNEP, 2002).

- There is proper media of informing the public about agricultural land use conversions. For instance, if majority of the local residents are illiterate, the media chosen for communicating intended conversions should incorporate that fact and choose media that can reach as many people as possible. This requires innovative procedures, programmes, projects and services that facilitate and encourage the active participation of those affected in decision making and implementation process (The National Land Policy, 2010, The Kenya Constitution, 2010 and UNEP, 2002)
- The policies, laws and institutions should encourage meaningful participation by putting in place participation procedures that favour all stakeholders (The Kenya Constitution (2010), the National Land Policy (2010) and the Physical Planning Act, chapter 286, laws of Kenya, among others).

The researcher set out to establish whether the local residents/land owners in the study area participate in agricultural land use conversions, the manner and their level of participation, if any.

5) Comprehensive Land Use Planning

There is no denying that land as a productive asset is fixity in supply and location. The quality of land also varies with every piece of land. Due to growth of urban aspirations and population, there is need to prepare comprehensive national, regional and local development plans. This can be achieved by;

- Preparing a National Spatial Plan for allocation of our limited land resources among various, and sometimes competing uses. The National Spatial Plan should then guide regional and local development plans and not the other way round (National Spatial Plan Draft Concept Paper, 2010, The National Land Policy, 2010 and The Kenya Vision 2030, 2007)
- Preparing local master plans that stipulate various land uses, for instance Agriculture Land Use Master Plan, based on the National Spatial Plan, National Land Use Policy, National Land Policy and other relevant policies (The Kenya Vision 2030 (2007) and The Nairobi Metro 2030 Strategy, 2008)
- Relevant policies, laws, institutions and public participation should enforce the zoning regulations and rules (The Nairobi Metro 2030 Strategy, 2008).

The objective of the researcher in this regard was to find out whether the study area has comprehensive land use planning and whether there are master plans to guide sustainable

agricultural land conversions. From literature review, Kenya does not have a National Spatial Plan and a National Land Use policy while the National Land Policy (2010) is relatively new.

6) Good Governance

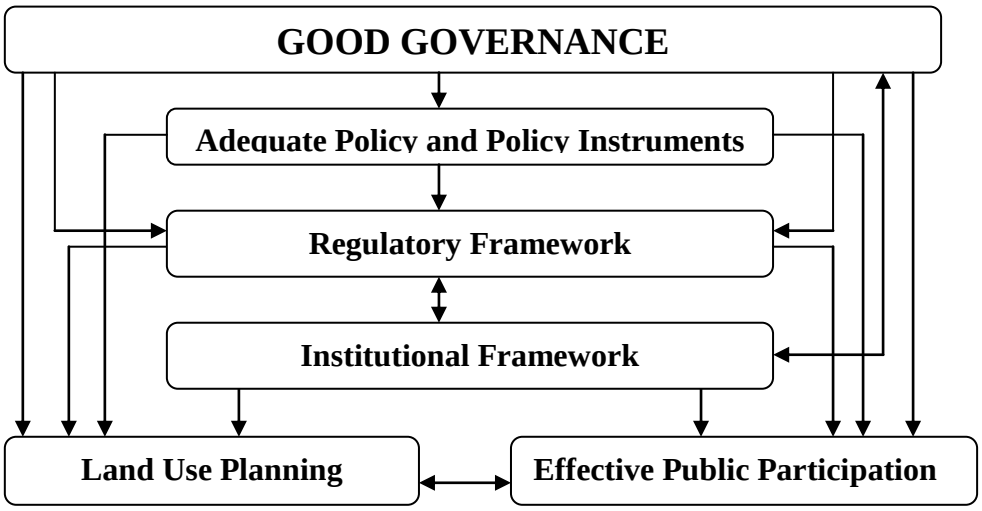
Good governance is an indeterminate term used in development literature to describe how public institutions conduct public affairs and manage public resources in order to guarantee the realization of human rights. Governance describes "the process of decision-making and the process by which decisions are implemented (or not implemented)". Good governance should apply to corporate, international, national, local governance or to the interactions between other sectors of society. Although it is not easy to define good governance, there is no doubt that good governance is a prerequisite for achieving sustainable development (The Kenya Constitution, 2010, UNEP, 2002, The World Bank, 1999, The Nairobi Metro 2030 Strategy, 2008 and the National Land Policy (2010). This is evident from countries with good governance such as liberal democratic states in Europe and America that often set the standards by which to compare other states' institutions. For instance, in America farm land preservation ordinances are recognized (Daniels, 1999). For instance, Kenya has achieved many positive changes since change of government regime in 2003; a new Constitution has been promulgated (with good provisions on land and environment), new National Land Policy formulated and series of other relevant policies have been formulated or are in the process of formulation, thanks to improved governance. It is evident therefore, that good governance is a must for Kenya to achieve sustainable development.

According to The Kenya Constitution, 2010, UNEP, 2002, The World Bank, 1999, The Nairobi Metro 2030 Strategy, 2008 and the National Land Policy (2010), good governance should;

- Ensure that relevant land policies, laws and effective institutions are put in place to guide sustainable agricultural land conversions.
- Ensure public awareness and meaningful participation mechanisms are put in place to guide sustainable land use conversions.
- Ensure proper land use planning that leads to sustainable development
- Ensure rule of law by following and implementing laid down regulatory framework
- Curb corruption and ensure land managers are transparent and accountable in managing public resources
- Reduce government instability and violence by fostering public participation and reducing exclusion, all of which contribute to causes of land use conversions (Geist et al, 2001).

The researcher set out to establish how the Kiambu local land control board and County Council of Kiambu carry out their duties by asking people who use their services their opinions about their experiences with the two institutions. The literature review has already revealed that Kenya Does not have adequate policy and legal framework due to bad governance up to year 2003 (The Kenya Constitution (2010) and the National Land Policy (2010).

Diagram 2.5: A Simple Diagrammatic Model of Land Use Management Framework



Source: World Bank (1999) and UNEP (2002), with Adaptations

Good governance is the key determinant factor of sustainable agricultural land use conversions, which is measured by effectiveness of existing policies, regulatory and institutional frameworks, as well as the level of land use planning and public participation in land use management. It is from this perspective that the analysis of the research will be carried out. Of special interest to this study will be to investigate exact determinants of agricultural land conversions in the study area.

CHAPTER THREE

CASE STUDY AREA AND METHODOLOGY

3.1 INTRODUCTION

In chapter one, the topic of study was introduced by looking at several aspects ranging from problem statement to definition of key terms. Chapter two dealt with literature review and conceptual framework regarding land use conversions. It is now necessary that some characteristics of the study area and methodology of the study are highlighted so as to acquaint the reader to the study area prior to data analysis in chapter four and recommendations in chapter five.

3.1.1 Geographical Position and Size

The study area is in Kiambu County. Kiambu County is located in central Kenya, bordering Murang'a County to the North and North East, Machakos County to the East, Nairobi and Kajiado Counties to the South, Nakuru County to the West, and Nyandarua County to the North West. The County covers an area of about 2,543.4 square kilometers. The area under study, along Kiambu Road, covers approximately 50 square kilometers (see attached Google maps). Historically, the study area was a large-scale coffee area owned by white settlers. However, this changed when land ownership changed hands in the 1970's and 1980's when African land-buying companies bought the land and sub-divided among their members (Ng'ayu, 2012)

3.1.2 Characteristics of Kiambu County and Study Area

The climate of Kiambu County and Central Province is generally cooler than that of the rest of Kenya, due to the region's higher altitude. Rainfall is fairly reliable, falling in two seasons, one from early March to May (the long rains) and a second during October and November (the short rains). The average rainfall is 989 mm per annum. The temperatures range from a minimum of 12.8°C to a maximum of 24.6°C with an average of 18.7°C per day. The topography is usually undulating while soils are generally arable red soils. The road network covers 1,358 km of bitumen surface, 682.6 km gravel surface and 430.1 Km earth surface. The County's population is 1,623,282 (Male – 49%, Female – 51%) with population density of 638 people per square kilometer. This represents 4.20% of the national population with 2.56% annual growth rate. The number of households is estimated to be 469,244.

The poverty level is 25% and age dependency ratio is 100: 62. The main economic activities include farming with main agricultural products being pineapples, tea, coffee, wheat, macadamia nuts, poultry, horticulture, dairy and fish. Other economic activities include food

processing, manufacturing (leather), mining (carbacid), textile (cotton), motor vehicle assembly, wholesale and retail trade.

The County has 1,508 educational institutions: Primary (1,135), Secondary (373) with primary enrolment of 291,765 pupils and secondary enrolment of 73,831 students. The teacher to pupil ratio in primary schools is 1:43 (Public Schools) and 1:20 in public secondary schools. Tertiary institutions are estimated to be more than 15 and adult literacy class enrolment to be over 9,337. The County has 4 district hospitals, 3 sub-district hospitals, 108 dispensaries, 29 health centres, 170 medical clinics, 9 nursing homes, 1 maternity home and 22 other medical institutions/facilities. Doctor to population ratio is1:25,000 (Kiambu District) and 1:21,940 (Thika District). Infant Mortality Rate **is** 7/1000 while under five mortality rate is 8/1000. Prevalent Disease**s** include malaria, respiratory tract infections, intestinal worms and broncho-pneumonia. Notable hospitals include Kiambu District Hospital, Thika District Hospital and Immaculate Heart of Mary Hospital.
(Source: Kenya National Bureau of Statistics and http://softkenya.com/kiambu-county/)

It is evident that Kiambu County is suitable for human settlement as well as agricultural production. However, it is worth to note that not all parts of Kenya are as arable as the Kiambu County is hence it is necessary to protect our limited agricultural land found in this County. There is no doubt that due to the County's ability to support human settlement and its nearness to the capital city of Nairobi that agricultural land in this urban fringe is and will continue facing pressure for conversion into other uses. This requires effective land use management framework to guide sustainable land use conversions.

3.2 RESEARCH METHODOLOGY

This section describes the procedures and methodology that were followed in conducting the study. It discusses data collection, sampling methods and procedures, statistical parameters and data analysis.

3.2.1 Data Collection

According to Kothari (1990), research using a case study is designed as a form of qualitative analysis and involves a careful and complete observation of the social unit which can either be a person, family, an institution, a cultural group or the entire community. The research seeks to obtain information that describes the existing phenomenon by asking individuals about their perceptions, values and attitudes. For this particular study the case is Nairobi-Kiambu interface (urban fringe). According to Arleck and Settle (1995), it is seldom necessary to sample more than 10% of the population provided that the resulting sample is

not less than 30 and not more than 1,000 units. They recommend a minimum sample of 100 for 1,000 population.

3.2.2 Primary Data

Primary data was obtained through:-

i) Visual Inspections and Observation

A reconnaissance visit was conducted before the research began in an effort to scan and familiarize with the area. This enabled the researcher to get a general overview of the study area and this contributed substantially in the problem statement chosen. The units of observation included new and upcoming residential developments. This captured the real situation in the ground, which respondents would be reluctant to share willingly. More physical inspections and observation were later undertaken in the course of the study. In addition, photographs were taken to capture the actual situation.

Units of Observations

- New and proposed residential estates in the study area.
- Nature of the new and proposed residential estate developments
- Current state of the agricultural land parcels in the study area.

ii) Oral Interviews

Face to face interviews with key informers were undertaken. This method is usually very effective due to its flexibility in allowing for clarifications of questions asked. The key informers include the Director of Physical Planning Department in the Ministry of Lands; Chairperson of the Kiambu Local Land Control Board and two other members of the board; Kiambu District Physical Planner, District Lands Officer, District Valuer, District Surveyor and County Clerk. These gave information on what informs their decision when granting or refusing permission for agricultural land use conversions. They also gave their opinions on what are the causes and effects of unsustainable agricultural land use conversions in the study area. Moreover, they gave their views on the state of the current management frameworks to regulate agricultural land use conversions, specifically on whether the current policy, legal institutional, public participation and land use planning frameworks are adequate to guide their operations in dealing with land use conversions in the study area. During the interview sessions, the researcher asked questions pertinent to the study.

iii) Questionnaires

The research demanded that some qualitative aspects of the stakeholders concerned are captured, which can only be adequately captured by administration of questionnaires by the researcher.

3.2.3 Sampling Methods and Procedures

Sampling is the process of selecting a sub group of a population to act as a representative of the whole population. The technique was adopted since there are many urban fringes with agricultural land. In addition, Kiambu County is large and it is not possible to study the whole area due to limitation of time, personnel and financial resources. Information that was collected from the study area was used as a base to generalize the findings to all other urban fringes with agricultural land.

The data sought in this exercise include but not limited to:-

- Prevalence of agricultural land use conversions in the study area
- Exact causes of the agricultural land use conversions
- Effects of the agricultural land use conversions
- State of the management framework to regulate agricultural land use conversions

All this is geared towards investigating agricultural land use conversions in the urban fringes.

3.2.4 Statistical Parameters

i) Population

The population of this study is made up of the three counties (urban fringes) surrounding the Nairobi City; Kiambu County, Machakos County and Kajiado County, although it is always difficult to define the extent of an urban fringe (Ojima, 1994). It is, however, commonly agreed that an urban fringe is the landscape interface between town and country, or the transition zone where urban and rural uses mix and often clash. Alternatively, it can be viewed as a landscape type in its own right, one forged from an interaction of urban and rural land uses. All urban fringes have certain characteristics in that they are under pressure from expansion of urban areas hence experience urban sprawl and conflicting land uses. Consequently, the Nairobi-Kiambu interface, with fertile agricultural land is subject to similar conditions and was chosen to represent similar urban fringes. The population of the respondents in the case study area was estimated as follows; 500 land owners/farmers, 121 registered real estate valuation firms, 45 real estate developers and 50 physical planning firms

ii) The Sample

Given that the researcher cannot be everywhere at once or take every possible view point at the same time, the researcher need to get to the general population through a sample. Owing to the nature of the study; land owners, facilitators of agricultural land use conversions (real estate valuers, physical planners and property developers) were identified as possible

respondents. The study area is situated in an agricultural area thus development of housing is not done in an organised manner as the intensive uncontrolled sub-divisions have created very irregular settlement patterns that proved difficult to use any systematic picking of respondents. This makes it difficult to determine exact number of households in the study area. However, by use of Google maps and reconnaissance visit to the study area, five large-scale residential estates were identified to be falling under the study area: Fourways Junction (approximately 100 homes), Runda Mumwe (approximately 100 homes), Thindigua (approximately 100 homes), Riverview (approximately 50 homes) and Kugeria North (approximately 100 homes). Ten percent (10%) of the homes in each estate were given questionnaires, that is, 50 homes.

Convenience sampling was used purposely to choose land owners/local residents within the five chosen estates in order to avoid cost and time implications. Informal interviews were also conducted to at least two local land owners from each of the five estates falling under the area of study so as to gauge the accuracy of the answers to the questionnaires. Simple random sampling was used to pick out specific houses in each estate, to be given questionnaires. The sampling unit was housing unit while the sample size was approximately 500 houses. The questionnaires were given to the household heads. The information sought here would be to know causes and effects of agricultural land use conversions in the study area. The local land owners also gave their views on the level of public participation in agricultural land use conversions, especially when large scale conversions are being carried out. The statistics obtained were then used to make inferences.

The major facilitators of agricultural land use conversions were indentified to be real estate valuers, physical planners and property developers. Real estate appraisers/ valuers carry out feasibility studies of planned residential developments. The valuers are also familiar with land value trends, especially before and after agricultural land use conversions. Out of about 121 registered valuation firms, 50 physical planning firms and 45 property development firms in Kenya, 10 valuation firms, 5 physical planning firms and 5 property development firms were chosen to represent others. The firms chosen to participate in this study were selected by aid of the Nairobi Directory (2012), which further assisted in identifying physical locations of the firms. The researcher, however, was biased towards the firms that were noted to be operating in the study area during reconnaissance and subsequent visits to the study area. Therefore, systematic random sampling and judgement sampling was used to select the firms that were chosen to participate in this study. Real estate valuers gave information regarding trends in values (before and after agricultural land use conversions), causes and effects of the agricultural land use conversions. Moreover, valuers informed the researcher on what informs

their decisions when preparing feasibility studies for agricultural land that is about to change user.

The physical planners prepare planning briefs before any change of user or development can take place, to be presented to the county council for approval. Therefore, physical planners gave information on what informs their decisions when preparing planning briefs for agricultural land user change and what in their opinion is the cause and effects of the agricultural land use conversions in the study area. Property developers are likely to look for land for residential estate development in the urban fringes thus increasing pressure on agricultural land. Consequently, property developers gave their views on the causes and effects of the agricultural land use conversions in the study area. The researcher also sought to find out why developers prefer land in the urban fringes to the urban area.

All respondents were also asked their views on the state of the current management framework to regulate agricultural land use conversions and what should be done (proper management framework) to regulate agricultural land use conversions.

Table 3.1: Response Rate of the Questionnaires Administered & Interviews

Respondent	**Total Number Issued**	**Response**	**Percentage (%)**
Director of Physical Planning	1	1	100
Kiambu District Officials (Lands Officer, Valuer, Physical Planner & Surveyor)	4	4	100
Professionals (Real Estate Valuers & Physical Planners)	15	13	87
Farmers/ Land Owners	50	32	64
Real Estate Developers	5	4	80
Kiambu County Council (County Clerk)	1	1	100
Kiambu Local Land Control Board Chairperson	1	1	100
TOTAL	**78**	**56**	**72**

Source: Field Survey, 2012

Mugenda (1999) has stated that; while administering questionnaires, a response rate of 50 per cent is adequate for analysis and reporting, 60 percent is a good response while 70 per cent is very good. Therefore, response rate in this research was very good.

3.2.5 Secondary data is through:

Library research was conducted by reviewing works related to the area of study. These include information from textbooks, journals, articles, and published and unpublished thesis. The secondary data was sourced from libraries, government departments and internet.

3.2.6 Data analysis and presentation

The data obtained from the study was sorted out, analyzed using descriptive statistics and presented using photographs, maps, charts, simple tables and graphs. This is because the study is qualitative in nature. Basically, the key objective of this was to show the factors influencing agricultural land use conversions and their effects with aim of coming up with practical recommendations on appropriate agricultural land use management framework.

Some of the problems and challenges encountered during the study was that the researcher got 72 per cent response rate from the respondents and not 100 per cent. This affected the analysis since the sample was reduced. This is because some respondents were so busy and could not get time to fill the questionnaires or grant interviews. However, according to Mugenda (1999), a response rate of 70 per cent and above is a very good response. Therefore, the findings of this study are justified. The other main problem the researcher encountered was mainly in getting the relevant respondents to divulge the information required. Some respondents declined to answer some questions which they felt were touching on sensitive areas, for instance on their job security. In addition, some respondents refused to fill the questionnaires completely. Those who agreed after a great deal of persuasion ended up giving stereotyped answers that were too general. However, the literature reviewed and answers from other honest respondents were used to assess truthfulness of the responses. Finally, limitation of time and finances also posed a great challenge during fieldwork.

CHAPTER FOUR

DATA ANALYSIS AND PRESENTATION

4.1 INTRODUCTION

This research was an endeavour to investigate agricultural land use conversions in the urban fringes. Nairobi-Kiambu interface was chosen as a case study to represent other urban fringes. 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.

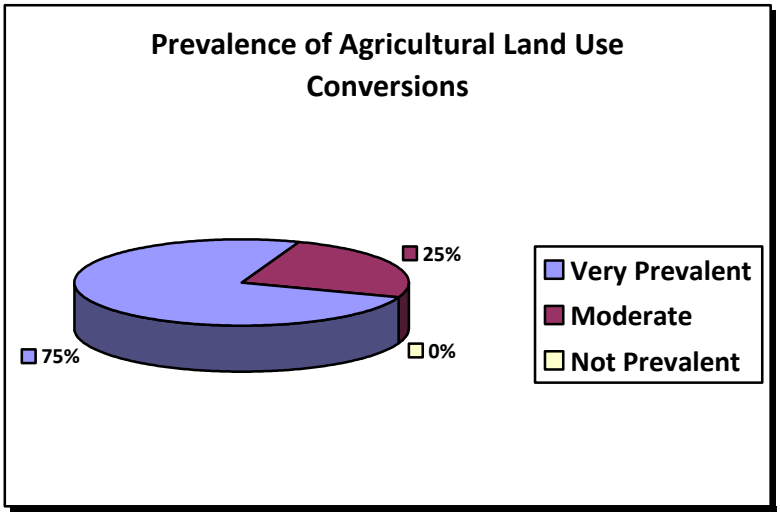
4.2 PREVALENCE OF AGRICULTURAL LAND CONVERSIONS IN NAIROBI-KIAMBU INTERFACE

Table 4.1: Responses on Prevalence of Agricultural Land Use Conversions

Prevalence	**Yes**	**Percentage (%)**
Very Prevalent	42	75
Moderate	14	25
Not Prevalent	0	0
Total	**56**	**100**

Source: Field Survey, 2012

Graph 4.1: Responses on Prevalence of Agricultural Land Use Conversions



Source: Field Survey, 2012

The research revealed that agricultural land use conversions in the study area are very prevalent (75%). Only 25% of the respondents felt that the conversions are moderate, none (0%) felt 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.

Plates 4.1 & 4.2: Coffee estates being replaced with residential and commercial buildings respectively

Source: Field Survey, 2012

The study also revealed that the relevant institutions/authorities responsible for regulating agricultural land use conversions do not have records of the total acreages of agricultural land

that has been converted over the last two years, meaning they are not aware of how much agricultural land has been taken out of production over the years. However, according to Kiambu District Physical Planner, over 1,000 acres are being converted every year. Indeed, minutes for Kiambu Local Land Control Board over the last one year show 1,543 acres of agricultural land were converted in year 2011. (See also attached Google earth map of the study area, showing prevalence of the agricultural land conversions).

Plates 4.3 & 4.4: Maize farms being replaced with residential houses

Source: Field Survey, 2012

The Kiambu Local Land Control Board has not refused consent for change of user for agricultural land over the last five years. The Board cited lack of coordination among all the offices responsible for granting change of user as the reason for its inability to refuse change of user for agricultural land. The Board revealed that their mandate and powers has somewhat been reduced to advising farmers not to sub-divide their farms beyond economical sizes since once the relevant departments have given their consent the Board cannot refuse. However, according to the Land Control Act Chapter 302, laws of Kenya, the Board is supposed to grant or refuse the consent for change of user of agricultural land before the application can be submitted to the county council for further processing. In effect, the Kiambu Land Control Board is ineffective and cannot regulate agricultural land use conversions to achieve sustainable development in the study area

4.3 CAUSES OF AGRICULTURAL LAND USE CONVERSIONS IN NAIROBI-KIAMBU INTERFACE

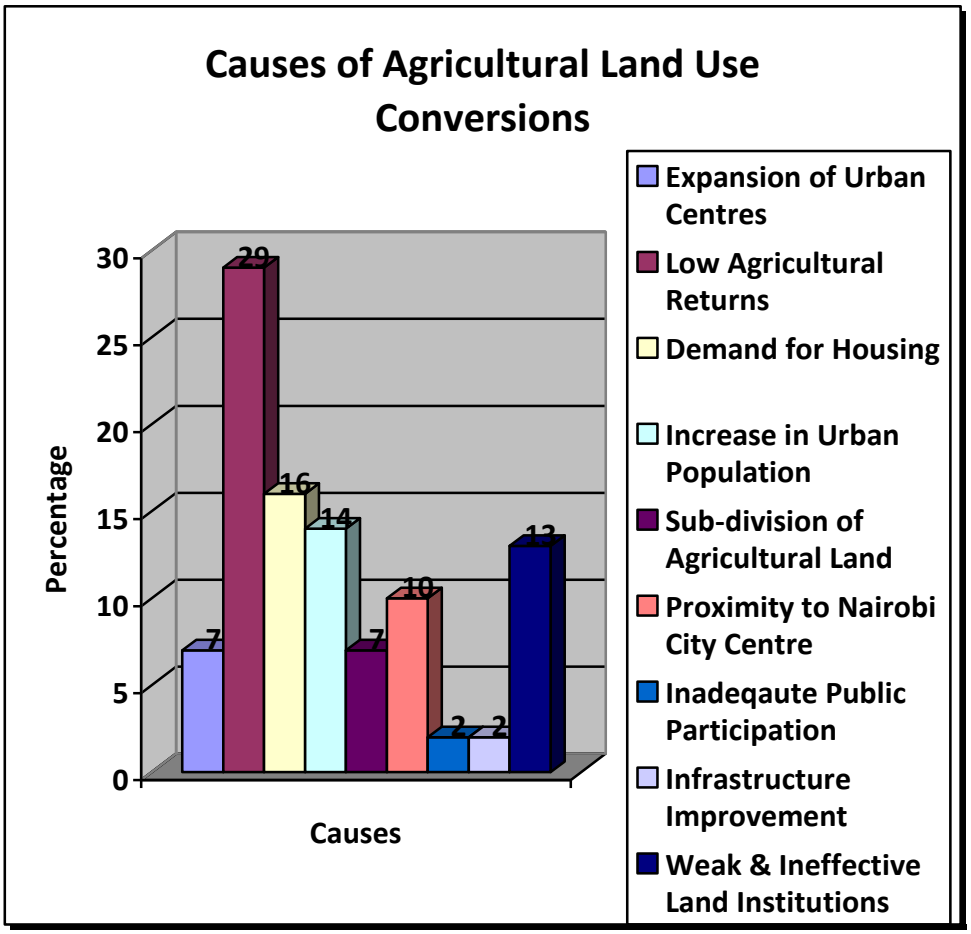
According to the responses given by the respondents, the causes of agricultural land use conversions in the study area are many and varied. However, the responses can be summarised in the following categories:-

Table 4.2: Responses on Causes of Agricultural Land Use Conversions

Causes	Total Score	Percentage (%)
Expansion of Urban Centres	10	7
Low Agricultural Returns	43	29
Demand for Housing	23	16
Increase in Urban Population	20	14
Sub-division of Agricultural Land	10	7
Proximity to Nairobi City Centre	16	10
Inadequate Public Participation	3	2
Improvement in Infrastructure	3	2
Weak and Ineffective Institutions	19	13
Total	**147**	**100**

Source: Field Survey, 2012

Graph 4.2: Responses on Causes of Agricultural Land Use Conversions



Source: Field Survey, 2012

a) Low Agricultural Returns

The research revealed that low economic returns from agricultural activities (29%) has the greatest influence on agricultural land use conversions in the study area. 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. Further, the study revealed that there are no incentives (87%) for farmers to preserve their agricultural land against conversions into other users. For instance, the respondents (100%) revealed that land values increase once agricultural land is converted into other users. 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 of over 1,000 acres annually. 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. According to various real estate valuation firms operating in the study area (Kiambu County), like Lloyd Masika Limited and Knight Frank Kenya, an acre of agricultural land after conversion can sell at approximately Kenya shillings 30 million, depending on location. According to Commercial Coffee Millers and Marketing Agents Association, a well-managed farm in the area would produce one tone of coffee per acre with net return of about Kenya shillings 200,000 per annum. Such a farmer may choose to sell his agricultural land for the attractive lump sum of Kenya shillings 30 million and diversify his investments to real estate or otherwise.

Farmers peg their decisions, on whether to convert or sell their farms based on returns from the land. One wonders if the ongoing uptake of agricultural land by real estates would still be witnessed were Nairobi City to be surrounded by vast, profit making agricultural estates in the urban fringes? However, the big question remains, whether it is worth and sustainable to continue diminishing agricultural land for the concrete jungle?

b) Demand for Housing

Demand for housing (16%) is the second greatest influence on agricultural land use conversions. 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 (The Kenya Vision 2030). The minister for 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" (The *Standar*d Newspaper, Thursday, November 24, 2011). With the increase in demand for affordable housing, farmers are being enticed by developers to sell their farms for a better and immediate return on their investment in real estate. Further, the location theories state that households want to maximise utility while reducing transportation costs to the urban centres, especially Nairobi City and Kiambu Town. 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 urban fringes.

Plates 4.5 & 4.6: New palatial residential houses competing for fertile agricultural land

Source: Field Survey, 2012

c) Increase in Urban Population

Another factor related to demand for housing is increase in urban population. The study revealed that increase in urban population is the third greatest influence (14%) on agricultural land use conversions. The population of Nairobi City has increased from 2,143,254 persons (1999 national census) to 3,138,369 persons (2009 national census), 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 (Kenya National Bureau of Statistics, 2009 and the Nairobi Metro 2030 Strategy, 2008). The concept paper on National Spatial Plan (2010), notes that Kenya's population is quickly urbanising and it is estimated that more than 50 per cent of the total population will live in urban areas by the year 2050. With a steady increase in urban population, the need for housing in Nairobi has led to an upsurge of development projects within the city and its environs. It is inevitable that increase in urban population will

lead to increased demand for housing thus putting pressure on agricultural land in the urban fringes for conversion into residential development.

d) Weak and ineffective land institutions

Another factor that the study revealed to be contributing to the current agricultural land use conversions is weak and ineffective land institutions responsible for regulating agricultural land use (13%). The reasons given by the respondents were that the Kiambu Local 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. In addition, the District Agricultural Officer does not have power to stop agricultural land conversions and some land officials are corrupt. The fact that over the last five years no application for change of user has been rejected and the Board does not know how many acres of agricultural land have been converted over the years strengthens this viewpoint. Indeed, the new National Land Commission Act, 2012 has disbanded the local land control boards and replaced them with county land management boards, which will be responsible for processing applications for change and extension of user, among other functions. To further illustrate this point, the National Land policy (2010) recommended a complete overhaul of the land administration and management system as well as related structures and proposed a new institutional framework. This confirms that the existing institutional framework for regulating agricultural land use conversions is weak and ineffective.

e) Proximity to Nairobi City Centre

Proximity to Nairobi City Centre (10%) is also a contributing factor to agricultural land conversions in Nairobi-Kiambu interface. Nairobi and Kiambu Counties border each other and the distance from that boundary to Kiambu Town is only 8 kilometres (see attached Google earth maps of the study area). This makes it possible for people to live in Kiambu County and work in Nairobi City by commuting on daily basis. Consequently, real estate developers are developing housing in the urban fringes to meet demand for housing for such people. This is also linked to the fact that increase in urban population, which leads to increased demand for housing, will put pressure on agricultural land in the urban fringes where large land parcels are available at lower cost compared to land in and around the Nairobi City Centre (according to location theories).

f) Expansion of Urban Centres

Expansion of urban centres (7%) like Nairobi and Kiambu are also influencing agricultural land use conversions in the urban fringes. This is confirmed by the fact that estates which

were once located in Kiambu such as Muthaiga North, Runda Mimosa, parts of Kitsuru, and Nyari (an area considered as coffee belt), are now under the jurisdiction of Nairobi City Council (Nairobi). Indeed, the boundary between Nairobi and Kiambu County has become blurred. According to literature reviewed, that is characteristic of urban fringe and it can take years for an identity to cement and zoning battles often occur, as jurisdiction over the area is murky prior to city annexation. Eventually, as sprawl continues, what was once a contested area will be just another part of the city (Ojima et al 2004). The Nairobi Metro 2030 Strategy, (2008) acknowledges that the boundaries of the Nairobi city have 'extended' due to urban sprawl and has rapidly decimated agricultural land in the urban fringes by encroaching on agricultural land in Kiambu, Thika and Kajiado areas, and that the large coffee, tea and livestock estates are under serious threat from urbanisation (The Nairobi Metro 2030 Strategy, 2008, page 41). The Strategy has even proposed an extended Nairobi Metropolitan Region which covers most parts of Kiambu, Machakos and Kajiado counties (see page 45 of this research). This is a testimony to the fact that urban centres (for instance, Nairobi City) are expanding over time. The literature review confirmed that "the cities experiencing the most rapid change in urban population are mostly located in developing countries (like Kenya) and it is estimated that 1 to 2 million hectares of prime cropland are being taken out of production every year to meet the land demand for housing, industry, infrastructure and recreation" (Doos, 2002).

g) Sub-division of agricultural land

Sub-division of agricultural land (7%) contributes to agricultural land use conversions in the study area. The respondents revealed that agricultural land parcels/ farms are being sub-divided, especially due to traditional practice of land inheritance, into agriculturally unviable sizes that cannot warrant adequate returns thus leaving conversions into other uses as only viable alternative. In addition, farmers are sub-dividing their farms into small plots before selling so as to obtain higher prices (in real estate, the bigger the parcel, the cheaper it is and vice versa). A case in point, given by the Kiambu district officials, was L.R Number 28223/33 (Fourways Junction, one of the estates under this study). This was initially a coffee farm measuring approximately 100.64 acres, but the farm was sub-divided into 33 sub-plots ranging from 0.26 of an acre to 5 acres in size. Consequently, the resultant sub-plots could not be used for agricultural purposes, leaving conversion into residential user as only viable option. Another example was an agricultural plot in Runda Mumwe (another estate under this study), L.R Number Kiambu Municipality/ Block III/3, measuring approximately 1 acre. This parcel was sub-divided among the owner's four children, resulting into less than ¼ of an acre sub-plots.

h) Inadequate public participation

Another factor revealed by the research to be contributing to agricultural land use conversions is inadequate public participation in land use conversions (2%). The research revealed that notices of agricultural land use conversions are usually displayed on sites/parcels that are about to change user and advertised on daily newspaper classifieds, for fourteen days. This is meant to inform the immediate/neighbouring land owners of the proposed change of user so as to forward their objections and claims to the county clerk, if any, before permission for change of user is given. This was in fact noted during field survey/ data collection whereby sign boards with "Change of User" notices were seen on agricultural land parcels that are about to change user. This is not adequate public participation since public participation implies that the public's contribution will influence the land use decisions by ensuring that the media used can reach and be understood by many people in a form and language that is widely understood by the target group. For instance, putting the advert on a newspaper classifieds and on site, limits a lot of interested parties since not all people have access to a newspaper and can read. In fact, the respondents noted that although they knew they should participate (71%), many local residents/farmers are illiterate and their participation is greatly curtailed. The minutes of the Kiambu Local Land Control Board did not show evidence of public meetings to discuss large scale agricultural land conversions.

Inadequate public participation in agricultural land conversions/ land use decision making process has been perpetuated by the Physical Planning Act, chapter 286, laws of Kenya that requires only notices of change of user to be advertised on the land parcel that is changing user and in two daily newspapers, for fourteen days. The Act does not provide for public participation explicitly. However, according to UNEP (2002), effective public awareness and participation in land use decision making is a must so as to ensure sustainable land use management. Public participation is regarded as a way of empowerment and as vital part of democratic governance.

i) Improvement in Infrastructure

Improvement in infrastructure was cited by the respondents to be contributing to agricultural land conversions (2%). This is due to the fact that there has been improved road network, especially over the last five years. For instance, roads like Thika Superhighway, the Eastern and Northern By-passes, which passes through Kiambu County, have led to growth of real estate sector by opening up areas that were not accessible in the past. This was indeed noted during the field survey whereby high-rise residential blocks of flats were noted to be coming up along the major roads in the study area like Kiambu Road and the Eastern By-pass.

From the above findings, it is evident that causes of agricultural land use conversions in the study area are varied and interrelated. For instance, increase in urban population is likely to lead to expansion of urban centres and increased demand for affordable housing in the urban fringes due to proximity to Nairobi City Centre. This may lead to sub-division of agricultural land in the urban fringes into uneconomical sizes forcing land owners to convert their agricultural lands/ farms into other uses that have higher returns than agricultural activities. Existence of weak and ineffective land institutions and lack of public participation, make the bad situation worse.

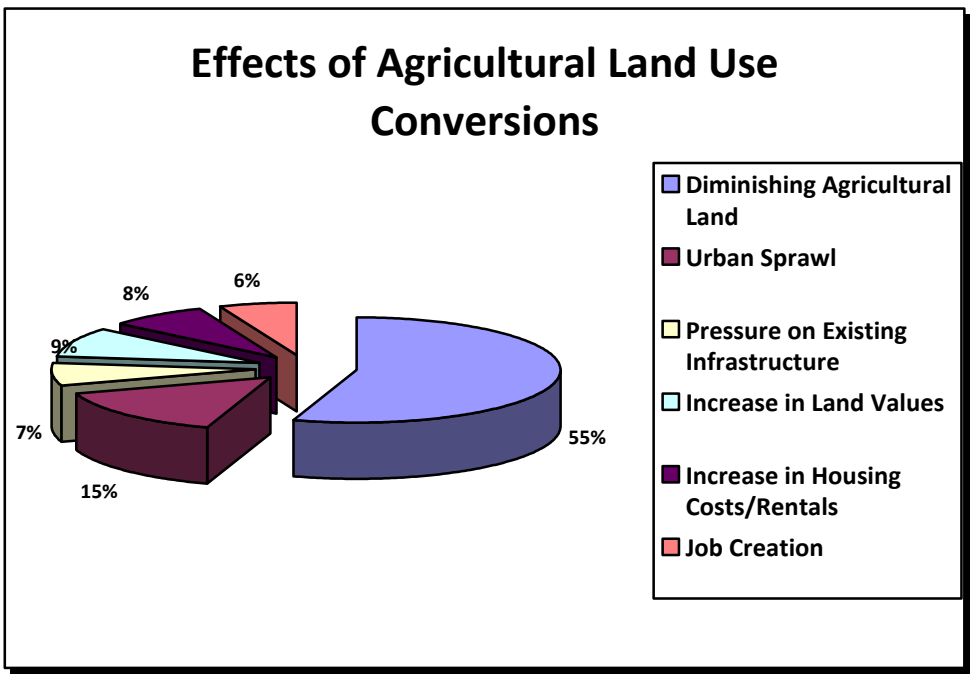
4.4 EFFECTS OF AGRICULTURAL LAND CONVERSIONS IN THE STUDY AREA

Table 4.4: Responses on Effects of Agricultural Land Conversions

Effect	Total Score	Percentage (%)
Diminishing Agricultural Land	66	55
Urban Sprawl	18	15
Pressure on the Existing Infrastructure	9	7
Increase in Land Values	11	9
Increase in Housing Cost/Rentals	10	8
Job Creation	7	6
Total	**121**	**100**

Source: Field Survey, 2012

Graph 4.3: Responses on Effects of Agricultural Land Conversions



Source: Field Survey, 2012

i) Diminishing agricultural land

The research revealed that the agricultural land use conversions have both positive and negative effects. Diminishing agricultural land has the highest effect (55%), which is negative. This research has also established that agricultural land use conversions in the study area are very prevalent (75%) as evidenced by the attached Google earth maps). According to minutes of the Kiambu Local Land Control Board, over 1,000 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 (The Agricultural Sector Development Strategy (ASDS) 2010-2020). For instance, 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 food-secure and prosperous nation as envisioned 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 attainment of the Millennium Development Goals (MDGs). 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.

ii) Urban sprawl

Another negative effect revealed by the study is urban sprawl (15%) whereby the respondents reported that, 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 (see plates 4.7 and 4.8 below). The attached Google earth maps of the study area shows the actual

situation on the ground whereby real estate developments are sprawling to the agricultural areas (rural areas). Indeed, the Nairobi Metro 2030 Strategy (2008) has already confirmed this by observing that Nairobi city is sprawling to the rural areas of Kiambu and other surrounding fringes by encroaching on prime agricultural land as a result of uncontrolled development.

iii) Pressure on the Existing infrastructure

Due to urban sprawl and uncontrolled development, pressure on the existing infrastructure (7%) has emerged as another negative effect. 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.

Plates 4.7 & 4.8: New high rise residential flats and houses developed in coffee and maize farms respectively

Source: Field Survey, 2012

iv) Increase in land values and housing cost/rentals

Increase in land values (9%) and housing cost/rentals (8%) were revealed to be others effects of the agricultural land use conversions. These have both positive and negative effects at the same time, depending on the viewpoint one looks at them. 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 housing

cost/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.

A case in point is L.R number 28223/33, measuring approximately 100.64 acres (Fourways Junction, which is under this study. See attached Google map). The land value of this agricultural land in 2009 was about Kenya shillings 15,000,000 per acre. The farm was converted into residential user, sub-divided into 33 sub-plots and built with 331 double storey residential houses (valued at Kshs 14 million, each), 640 residential apartments (valued at Kshs. 7 million, each), 32 office blocks (valued at Kshs. 80 million, each), shopping mall (valued at Kshs. 1.75 billion), a 3-star hotel (valued at Kshs. 100 million) and club house (valued at Kshs. 70 million). The value of the resultant vacant residential plots after conversion was Kshs. 40 million per acre (167 per cent increase). (Source: real estate valuation firm, Lloyd Masika limited). The above housing costs are not affordable to majority of Kenyans. Similarly, the rentals charged are quite high (ranges between Kshs. 60,000 per month, for the double storey houses and Kshs. 30,000 per month, for the apartments). These rentals are unaffordable to majority of Kenyans. In effect, the agricultural land use conversions in the urban fringes are not providing affordable housing.

v) Creation of Jobs

Probably the only clear positive effect of the agricultural conversions is job creation (6%) in the study area. 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)

It is evident that the agricultural land use conversions have both positive and negative effects. However, the negative effects far outweigh positive effects. There is need, therefore, to regulate agricultural land use conversions so as to optimise positive effects while minimising the negative effects in order to achieve the twin goals of sustainable development and improved agricultural (food) production.

4.5 THE STATE OF MANAGEMENT FRAMEWORK TO REGULATE AGRICULTURAL LAND CONVERSIONS

The fourth objective of this research was to study the state of management framework to regulate agricultural land use conversions in the study area. Under this objective, this study is restricted to five major items that constitute agricultural land use management framework. More specifically, this research wanted to find out the state of the current management framework to determine its adequacy or otherwise. The literature reviewed in chapter two of this study revealed that there is inadequate policy, legal and institutional frameworks to regulate agricultural land use conversions. Further, the literature review revealed that land use planning is inadequate. This is largely due to the fact that Kenya does not have a national land use policy while the Land Policy was recently formulated in 2010. In addition, other relevant policies that must be in existence such as a national spatial plan do not exist – meaning land use conversions are not guided by policy framework. Further, most of Kenya's relevant legal framework is too old, new or non-existent. Inadequacy or lack of policy framework has negative effect on legal framework which stipulates functions and duties of land institutions.

Below is a summary of responses given by the respondents, which concurs with the literature reviewed on the state of agricultural land use management framework.

Table 4.5: Responses on State of Land Use Management Framework

State	**Policy Framework**		**Regulatory Framework**		**Institutional Framework**		**Public Participation**		**Land Use Planning**	
	Responses	%	Responses	%	Responses	%	Responses	%	Responses	%
Inadequate	49	88	45	80	52	93	46	82	42	75
Adequate	7	12	11	20	4	7	10	18	14	25
Total	**56**	**100**	**56**	**100**	**56**	**100**	**56**	**100**	**56**	**100**

Source: Field Survey, 2012

a) Policy framework

The study revealed that policy framework is inadequate (88%). 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 felt that there must be deliberate efforts (national policy) to regulate agricultural land use conversions.

b) Regulatory framework

Further, the study revealed that there is inadequate and ineffective legal framework (80%). The respondents cited existence of many and conflicting land laws. 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.

c) Institutional framework

The relevant institutional framework is also inadequate and ineffective (93%). This is because the Kiambu 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. Also, the Kiambu County Council 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 Council'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 (13%). 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 (2010) and new land laws (2012).

d) Public participation

The study established that there is inadequate public participation (82%). In fact, this was identified as one of the causes of agricultural land use conversions in the study area mainly because notices of agricultural land use conversions do not reach many local residents since the notices are usually displayed in the daily newspaper classifieds and/or on sites/parcels that are changing user. In addition, many local residents/farmers are illiterate and their participation is greatly hampered hence they rely on advice of other people such as their

neighbours, real estate valuers and physical planners, who usually encourage them to change user of their agricultural lands.

d) Land use planning

Finally, the study revealed that there is inadequate land use planning (75%) in the study area since there are no current local development plans to guide future developments by designating various land uses such as agricultural and residential zones. The district officials, when making their recommendations on applications for change of user, are mainly guided by the character of immediate neighbourhood thus if agricultural lands are changing user in the neighbourhood they give their approval. Lack of a National Spatial Plan and National Land Use Policy has worsened the situation.

4.6 TESTING HYPOTHESIS

H_o= There is no significant differences in effectiveness of the land institutions in Kiambu District, for regulating agricultural land use conversions.

H_I= There is significant differences in effectiveness of the land institutions in Kiambu District, for regulating agricultural land use conversions.

The testing of the hypothesis was done by the use of Analysis of Variance (ANOVA) which is used to test the difference between two or more means. In its simplest form, ANOVA provides a statistical test of whether or not the means of several groups are all equal, and therefore generalizes t-test to more than two groups. It tries to find out whether the samples differ significantly in relation to a specified population parameter. This approach was used because the data in this study cannot be subjected to regression analysis, which indicates how a change in one variable changes the other variable.

The key indicators of effective institutions to guide sustainable agricultural land conversions were revealed by literature review and the respondents asked to rank their perceived levels of dominance varying from rank 1 indicating least dominance to rank 5 indicating most dominance indicator. The results obtained are in the Tables below (Tables 4.6 & 4.7).

Table 4.6: Key Indicators of Effective Land Institutions at District Level

Trained Personnel	9
Coordination among other Institutions	8
Availability of Funds	7
Public Participation	8

Autonomy of Institutions	7
Grand Total	**39**

From the above Table 4.6;

Grand Total = 39

n= 5 (the number of the indicators)

Mean ($\overline{Xa}$) = 39/5 = 7.8

Table 4.7: Key Indicators of Effective Land Institutions at Municipal Government (County level)

Trained Personnel	8
Coordination among other Institutions	7
Availability of Funds	9
Public Participation	5
Autonomy of Institutions	6
Grand Total	**35**

From the above Table;

Grand Total = 35

n= 5 (the number of the indicators)

Mean ($\overline{Xb}$) = 35/5 = 7

Variation between the two = n $(\overline{Xa} - \overline{X}$ (grand mean)^2 + n $(\overline{Xb} - \overline{X})^2$, where $\overline{X}$ = 74/10

$= 5(7.8-7.4)^2 + 5(7-7.4)^2$

$= 5(0.16)^2+5(0.16)^2$

$= 0.8+0.8$

$= 1.6$

Degrees of freedom (df) = k-1; where k = sets of data

$= 2-1$

$= 1$

Variation within = n-1(Va) + n-1(Vb), where Va and Vb indicates variances

$= 5-1(0.7) + 5-1(2.5)$

= 4(0.7) + 4(2.5)

= 2.8+10

= 12.8

Degree of freedom (Within) =N-K, where N = total number of indicators in both sets

=10-2

= 8

F-Value = SS (between)/df (between), Where SS = Variation

SS (within)/df (within)

$$\frac{1.6/1}{12.8/8}$$

F calculated = 1

At 0.05 level of significance, the F critical value = 5.32

Therefore, at 0.05 level of significance, there was no enough evidence to reject the Null Hypothesis ($H_{0)}$ thus it can be concluded that there is no significant differences in effectiveness of the land institutions in Kiambu District, for regulating agricultural land use conversions.

CHAPTER FIVE
CONCLUSIONS AND RECOMMENDATIONS

5.1 CONCLUSIONS

The main objective of this research was to investigate determinants of agricultural land use conversions in the urban fringes, using Nairobi-Kiambu interface as a case study, 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.

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.

Further the research has established that the management framework to regulate agricultural land use conversions is either inadequate or ineffective. The policy, legal and institutional frameworks are non-existent or new or inadequate and/or ineffective. Further, there is lack of public participation and land use planning. According to literature reviewed, these are must to ensure sustainable agricultural land use conversions.

5.2 RECOMMENDATIONS

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.

1. Adequate and effective policy framework

There is urgent need to formulate a National Spatial Plan (NSP) 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 to national level from which regional and local development plans can be formulated and implemented. In addition, a National Land Use Policy should be formulated to provide broad principles of land use, and this should be informed by the National Spatial Plan (NSP). This way, there will be no land use conflicts and land resources will be used sustainably. The land use policy should stipulate minimum land size beyond which arable agricultural land can be sub-divided. Similarly, the National Land Policy (2010) should be implemented as it provides broad principles on land and land management. Indeed, all other sectors that rely on land should have their specific policies such as agriculture, housing and national development policies like the Kenya Vision 2030 so that sustainable development is not left to chance. In other words, every sector must make deliberate efforts to put in place development plans (policies) to enable them achieve their goals. The policies should be revised over time so as to accommodate changing economic, political and social realities. Policies should determine the legal framework required while laws should determine institutions required to implement the policies and laws, thus policies should always inform legal and institutional frameworks.

More specifically, 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. 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. Policies should also be put in place to define Nairobi City growth boundaries and various land uses. The government should then encourage vertical growth as opposed to horizontal growth, for instance by encouraging development of high rise residential flats and allowing mixed use developments. The proposed Nairobi Metropolitan Region may be appropriate but the proposed land uses requires further evaluation and study before implementation of the Nairobi Metro 2030 Strategy. This will control influence of expansion of urban centres due to their proximity to fertile agricultural lands in the urban fringes. As a policy measure, agricultural land use conversions should only be allowed where services and infrastructure facilities have been provided so as to minimise pressure on existing facilities and uncontrolled developments. However, it is more advisable to provide services and infrastructural facilities to the low fertile lands so as to attract residential estate developments there instead. 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.

Purchase and/or transfer of development rights (PDRs/TDRs) strategies could prove to be the most successful way of protecting agricultural land because once the developments rights have been purchased or transferred, the value and use of agricultural land is preserved in perpetuity.

2) Adequate and effective Regulatory framework

There is need to implement the new Constitution (2010) since it provides broad principles on land use management. All land laws should be revised and/or rationalised in accordance to provisions of the new Constitution and the Land Policy. The National Land Use Policy (once formulated) should also inform further revision or rationalisation of the land laws, if need be. Indeed, there is need to revise, consolidate and rationalize the many conflicting land laws. Consequently, the Land Control Act chapter 302 and the Physical Planning Act chapter 286, laws of Kenya should be revised or repealed to reflect provisions of the new Constitution (2010) and the National Land Policy (2009). The newly formulated Land Registration Act, 2012, which is meant to revise, consolidate and rationalize the registration of titles to land and give effect to the principles and objects of devolved government in land registration should be implemented. Proper implementation of this Act could reduce sub-divisions of agricultural land into uneconomical sizes. Similarly, the new Land Act, 2012, formulated to give effect to Article 68 of the Constitution (to revise, consolidate and rationalize land laws) and provide for the sustainable administration and management of land and land-based resources should be implemented. The provisions in this Act, if implemented, would ensure effective and meaningful public participation in land use conversions, a vital component to ensure sustainability in agricultural land conversions. In addition, the new National Land Commission Act, 2012, establishing the National Land Commission which is mandated to manage public land (process applications for allocation of land, change and extension of user, subdivision of public land and renewal of leases), recommending national land policy and monitoring land use planning throughout the country, should be implemented. In essence, the agricultural land user change legal framework should be tightened such that large scale conversions of arable agricultural land become difficult or impossible so as to protect agricultural land. Formulation of legal framework should always be guided by policies and not the other way round.

3) Adequate and effective institutional framework

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. The National Land Commission Act, 2012 has disbanded the local control boards and replaced them with the county land management boards, tasked with processing applications for change or extension of user, among other functions. In addition, the National Land policy (2010) has recommended a complete overhaul of all land administration and management system in the country. This could be the solution to tackling institutional challenges, thus the proposed institutional framework should be implemented. Indeed, agricultural land use conversions should be approached holistically by involving as many technical officials/experts as possible such as District Agricultural Officers and impartial private professionals. Proper coordination of all relevant institutions is also paramount. Institutional framework should always be guided by relevant policies and laws.

4) Effective public education and participation in agricultural land use conversions

To ensure sustainable agricultural land use conversions, public awareness and participation of all stakeholders is a must. Proper and effective means of notifying local residents of land use conversions should be devised, such as part of agricultural extension services. Effective public participation of all stakeholders is important so as to make development decisions more predictable, fair and objective. Public participation should be encouraged throughout the development process since it will check excesses of the institutions hence the policies, laws and institutions should encourage meaningful participation by putting in place participation procedures that favour all stakeholders. Civic education and awareness is necessary on land use conversions matters, especially to the farmers/land owners. The causes and negative effects of agricultural land use conversions should be made public and all stakeholders educated on how to contribute towards solving the problem so as to ensure sustainable development and improved agricultural performance. For instance, relevant authorities can encourage use of ballots prior to approval of large-scale development projects as a tool to encourage public participation which could be a major check on agricultural land use conversions because the rational voter hypothesis implies that opponents of development will be more likely to vote.

5) Comprehensive land use planning

There is need to prepare comprehensive national, regional and local development plans in accordance with National Spatial Plan, National Land Policy, National Land Use Policy, the new Constitution, Kenya Vision 2030 and other policies. These are necessary for allocation of our limited land resources among various competing uses. There should be proper and

clear guidelines on planning and development controls. Development control or police power, is a state function that cannot be left to chance for a country to achieve sustainable development. Through comprehensive land use planning, agricultural land will be protected and land use conflicts reduced as each sector will be allocated its own land. Relevant policies, laws, institutions and public participation can then enforce the zoning regulations and rules.

The Government should empower all planning authorities in the country to regulate the use of land to take account of the public interest; establish clear standards which override proprietary land use practices, and better enforcement frameworks. In particular, there should be effective legislative framework embodying International Conventions and national policies relating to the sustainable use of land and the preservation of environmental values; ensure that the exercise of the Police Power takes into account local or community values on land use and environmental management and ensure effective participation in the exercise of the Police Power.

6) Good Governance

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.

5.3 AREAS OF FURTHER RESEARCH

Land use management is a very wide subject. In regard to agricultural land use conversions, the following issues may form basis for further study.

a) How to make agricultural land use more competitive compared to other land uses
b) Factors to consider in delineating agricultural land uses from urban uses
c) Effects of protecting agricultural land in the urban fringes versus affordable housing

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University Of Nairobi

Department of Real Estate and Construction Management

QUESTIONNAIRE FOR THE RESIDENT LAND OWNERS/ FARMERS

PREAMBLE

This questionnaire is in aid of a research project being conducted by Mr. Erastus K. Museleku, MA in Valuation and Property student at the University of Nairobi, to facilitate investigation into agricultural land use conversions at the Nairobi-Kiambu interface. This is carried out in recognition of the fact that agricultural land use conversions can only be sustainable if there exists a responsive and effective land use management framework.

The information sought here is for academic purposes and will be treated with utmost confidentiality.

1. For how long have you been resident/ land owner in this area?.....

2. What motivated you to own land/ reside in this area?.....

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3. (a) Are you aware of the current agricultural land conversions in this area?

Yes ☐ No ☐

(b) If your answer to question number 3 (a) above is yes, are you concerned?.....

Yes ☐ No ☐

4. How prevalent would you say are the current agricultural land conversions in this area?

Very prevalent ☐ Moderate ☐ Not prevalent ☐

5. Are you aware that residents should participate/ be consulted before agricultural land use conversions take place? Yes ☐ No ☐

6. (a) As farmers/ residents in this area, do you usually participate in agricultural land use conversions? Yes ☐ No ☐

(b) If your answer to question number 6 (a) is no, state reasons for not participating.....

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7. (a) Are the following frameworks to regulate agricultural land use conversions adequate and effective? (i) Policy framework Yes ☐ No ☐

(ii) Legal framework Yes ☐ No ☐

(iii) Institutional framework Yes ☐ No ☐

(iv) Land Use Planning Yes ☐ No ☐

(v) Public participation Yes ☐ No ☐

(b) Please explain your answer to question 7 (a) above.....

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8. In your opinion, what are the causes of the agricultural land use conversions in this area?.....

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9. What have you observed to be the effects of the agricultural land use conversions in this area?.....

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10. In a scale of 0 to 5, rate the following factors influencing agricultural land use conversions in urban fringes:-

- Natural environmental changes ☐
- Economic factors, e.g poverty ☐
- Increase in urban population/expansion of urban centres ☐
- Poor national governance and corruption, e.g political influence ☐
- Weak and ineffective institutions regulating land use ☐
- Lack of public education and participation in land use management ☐
- Land scarcity, e.g due to population growth ☐
- Global forces, e.g international treaties ☐
- Cultural factors, e.g attitudes and values of land managers ☐
- Improvement in infrastructure, e.g construction of roads ☐

11. As farmers/land owners, what are you doing to regulate agricultural land use conversions in this area?.....

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12. What challenges do you encounter in trying to regulate agricultural land use conversions in this area?.....

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13. (a) Are there incentives to farmers/land owners to preserve their agricultural lands from conversions into other uses? Yes ☐ No ☐

(b) If your answer to question 13 (a) above is yes, please give details.....

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14. In your opinion, what should be done to regulate agricultural land use conversions in the urban fringes?.....

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Thank you for filling in the questionnaire.

Erastus K. Museleku BA (Land Economics), GMISK

University Of Nairobi

Department of Real Estate and Construction Management

QUESTIONNAIRE FOR THE REAL ESTATE VALUERS/ PROFESSIONALS

PREAMBLE

This questionnaire is in aid of a research project being conducted by Mr. Erastus K. Museleku, MA in Valuation and Property Management student at the University of Nairobi, to facilitate investigation into agricultural land use conversions at the Nairobi-Kiambu interface. This is carried out in recognition of the fact that agricultural land use conversions can only be sustainable if there exists a responsive and effective land use management framework.

The information sought here is for academic purposes and will be treated with utmost confidentiality.

1. For how long have you been practising as a real estate valuer?.....

2. How often do you value properties in Nairobi-Kiambu interface?

Often ☐ Rarely ☐ Never ☐

3. (a) Are you aware of the current agricultural land conversions in the Nairobi-Kiambu interface?

Yes ☐ No ☐

(b) If your answer to question number 3 (a) above is yes, are you concerned?

Yes ☐ No ☐

4. How prevalent would you say are the current agricultural land conversions in the Nairobi-Kiambu urban fringe? Very prevalent ☐ Moderate ☐ Not prevalent ☐

5. When preparing feasibility studies for agricultural land that is about to change user, what informs your final report?.....

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6. (a) Are the following frameworks to regulate agricultural land use conversions adequate and effective? (i) Policy framework Yes ☐ No ☐

(ii) Legal framework Yes ☐ No ☐

(iii) Institutional framework Yes ☐ No ☐

(iv) Land Use Planning Yes ☐ No ☐

(v) Public participation Yes ☐ No ☐

(b) Please explain your answer to question 6 (a) above.....

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7. In your opinion, what are the causes of the agricultural land use conversions in our urban fringes today?.....

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8. What is the effect on value of agricultural land after change of user, say to residential?

Increases ☐ Decreases ☐ Remains Constant ☐

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

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10. In a scale of 0 to 5, rate the following factors influencing agricultural land use conversions in urban fringes:-

- ❖ Natural environmental changes ☐
- ❖ Economic factors, e.g poverty ☐
- ❖ Increase in urban population/expansion of urban centres ☐

- ❖ Poor national governance and corruption, e.g political influence ☐
- ❖ Weak and ineffective institutions regulating land use ☐
- ❖ Lack of public education and participation in land use management ☐
- ❖ Land scarcity, e.g due to population growth ☐
- ❖ Global forces, e.g international treaties ☐
- ❖ Cultural factors, e.g attitudes and values of land managers ☐
- ❖ Improvement in infrastructure, e.g construction of roads ☐

11. (a) What advice do you usually give to farmers in this area who want to convert their agricultural land into other uses?.....

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(b) Please explain your answer to question number 11 (a).....

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12. In your opinion, what should be done to regulate agricultural land use conversions in the urban fringes?.....

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Thank you for filling in the questionnaire.

Erastus K. Museleku BA (Land Economics), GMISK

University Of Nairobi

Department of Real Estate and Construction Management

QUESTIONNAIRE FOR THE PHYSICAL PLANNERS/ PROFESSIONALS

PREAMBLE

This questionnaire is in aid of a research project being conducted by Mr. Erastus K. Museleku, MA in Valuation and Property Management student at the University of Nairobi, to facilitate investigation into agricultural land use conversions at the Nairobi-Kiambu interface. This is carried out in recognition of the fact that agricultural land use conversions can only be sustainable if there exists a responsive and effective land use management framework.

The information sought here is for academic purposes and will be treated with utmost confidentiality.

1. For how long have you been practising as a physical planner?.....

2. How often do you prepare planning briefs for properties in Nairobi-Kiambu interface?

Often ☐ Rarely ☐ Never ☐

3. (a) Are you aware of the current agricultural land conversions in the Nairobi-Kiambu interface?

Yes ☐ No ☐

(b) If your answer to question number 3 (a) above is yes, are you concerned?

Yes ☐ No ☐

4. How prevalent would you say are the current agricultural land conversions in the Nairobi-Kiambu urban fringe? Very prevalent ☐ Moderate ☐ Not prevalent ☐

5. When preparing planning briefs for agricultural land that is about to change user, what informs your final report?.....

.....

.....

6. (a) Are the following frameworks to regulate agricultural land use conversions adequate and effective? (i) Policy framework Yes ☐ No ☐

(ii) Legal framework Yes ☐ No ☐

(iii) Institutional framework Yes ☐ No ☐

(iv) Land Use Planning Yes ☐ No ☐

(v) Public participation Yes ☐ No ☐

(b) Please explain your answer to question 6 (a) above.....

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7. In your opinion, what are the causes of the agricultural land use conversions in our urban fringes today?.....

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8. From your experience, what are the effects of agricultural land use conversions in urban fringes?.....

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9. In a scale of 0 to 5, rate the following factors influencing agricultural land use conversions in the urban fringes:-

- Natural environmental changes ☐
- Economic factors, e.g poverty ☐
- Increase in urban population/expansion of urban centres ☐
- Poor national governance and corruption, e.g political influence ☐
- Weak and ineffective institutions regulating land use ☐
- Lack of public education and participation in land use management ☐

- ❖ Land scarcity, e.g due to population growth ☐
- ❖ Global forces, e.g international treaties ☐
- ❖ Cultural factors, e.g attitudes and values of land managers ☐
- ❖ Improvement in infrastructure, e.g construction of roads ☐

10. (a) What advice do you usually give to farmers in urban fringes who want to convert their agricultural land into other uses?.....

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(b)Please explain your answer to question number 10 (a).....

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11. In your opinion, what should be done to regulate agricultural land use conversions in the urban fringes?.....

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Thank you for filling in the questionnaire.

Erastus K. Museleku BA (Land Economics), GMISK

University Of Nairobi

Department of Real Estate and Construction Management

QUESTIONNAIRE FOR THE REAL ESTATE DEVELOPERS

PREAMBLE

This questionnaire is in aid of a research project being conducted by Mr. Erastus K. Museleku, MA in Valuation and Property Management student at the University of Nairobi, to facilitate investigation into agricultural land use conversions at the Nairobi-Kiambu interface. This is carried out in recognition of the fact that agricultural land use conversions can only be sustainable if there exists a responsive and effective land use management framework.

The information sought here is for academic purposes and will be treated with utmost confidentiality.

1. For how long have you been developing properties in Nairobi-Kiambu interface?.....

2. (a) Are you aware of the current agricultural land conversions in the Nairobi-Kiambu interface?

Yes ☐ No ☐

(b) If your answer to question number 2 (a) above is yes, are you concerned?

Yes ☐ No ☐

3. How prevalent would you say are the current agricultural land conversions in the Nairobi-Kiambu urban fringe? Very prevalent ☐ Moderate ☐ Not prevalent ☐

4. What motivates you to look for property development land in the urban fringes?.....

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5. (a) Are the following frameworks to regulate agricultural land use conversions adequate and effective? (i) Policy framework Yes ☐ No ☐

(ii) Legal framework Yes ☐ No ☐

(iii) Institutional framework Yes ☐ No ☐

(iv) Land Use Planning Yes ☐ No ☐

(v) Public participation Yes ☐ No ☐

(b) Please explain your answer to question 5 (a) above.....

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6. In your opinion, what are the causes of the agricultural land use conversions in our urban fringes today?.....

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7. From your experience, what is the effect on value of agricultural land after change of user, say to residential? Increases ☐ Decreases ☐ Remains Constant ☐

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

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9. In a scale of 0 to 5, rate the following factors influencing agricultural land use conversions in the urban fringes:-

- ❖ Natural environmental changes ☐
- ❖ Economic factors, e.g poverty ☐

- ❖ Increase in urban population/expansion of urban centres ☐
- ❖ Poor national governance and corruption, e.g political influence ☐
- ❖ Weak and ineffective institutions regulating land use ☐
- ❖ Lack of public education and participation in land use management ☐
- ❖ Land scarcity, e.g due to population growth ☐
- ❖ Global forces, e.g international treaties ☐
- ❖ Cultural factors, e.g attitudes and values of land managers ☐
- ❖ Improvement in infrastructure, e.g construction of roads ☐

10. In your opinion, what should be done to regulate agricultural land use conversions in the urban fringes?.....

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Thank you for filling in the questionnaire.

Erastus K. Museleku BA (Land Economics), GMISK

University Of Nairobi

Department of Real Estate and Construction Management

QUESTIONNAIRE FOR THE KIAMBU COUNTY COUNCIL CLERK

PREAMBLE

This questionnaire is in aid of a research project being conducted by Mr. Erastus K. Museleku, MA in Valuation and Property Management student at the University of Nairobi, to facilitate investigation into agricultural land use conversions at the Nairobi-Kiambu interface. This is carried out in recognition of the fact that agricultural land use conversions can only be sustainable if there exists a responsive and effective land use management framework.

The information sought here is for academic purposes and will be treated with utmost confidentiality.

1. For how long have you been Clerk to Kiambu County Council?.....

2. What is your educational/professional background?.....

3. (a) Are you aware of the current agricultural land conversions in the Nairobi-Kiambu interface?

Yes ☐ No ☐

(b) If your answer to question number 3 (a) above is yes, are you concerned?.....

Yes ☐ No ☐

4. How prevalent would you say are the current agricultural land conversions in the Nairobi-Kiambu urban fringe? Very prevalent ☐ Moderate ☐ Not prevalent ☐

5. How many acres of agricultural land have been converted into other uses over the last two years?.....

6. (a) Does Kiambu County Council have capacity to regulate agricultural land use conversions?

Yes ☐ No ☐

(b) Please explain your answer to question 6 (a) above.....

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7. What constraints/ challenges does the council face while regulating agricultural land use in this area?.....

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8. (a) Are the following frameworks to regulate agricultural land use conversions adequate and effective? (i) Policy framework Yes ☐ No ☐

(ii) Legal framework Yes ☐ No ☐

(iii) Institutional framework Yes ☐ No ☐

(iv) Land Use Planning Yes ☐ No ☐

(v) Public participation Yes ☐ No ☐

(b) Please explain your answer to question 8 (a) above.....

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(c) In a scale of 1 to 5, how would you rate the following factors as far as institutional framework in Kiambu District is concerned?

i) Kiambu District Departments e.g department of physical planning, survey, etc

	Level of Dominance
Adequate Trained/ Technical Personnel	
Coordination among other Institutions	
Availability of Funds	
Public Participation	
Autonomy in Making Decisions	

ii) Municipal/County Council of Kiambu

	Level of Dominance
Adequate Trained/ Technical Personnel	
Coordination among other Institutions	
Availability of Funds	
Public Participation	
Autonomy in Making Decisions	

9. What process is followed by the council before development permission is given to convert agricultural land into other uses and/or grant or refuse development permission on agricultural land?.....

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10. What informs Council's decision on granting or refusing development permission on agricultural land?.....

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11. From your experience, what are the causes of the agricultural land use conversions in Kiambu-Nairobi interface?.....

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12. From your observation, what are the effects of agricultural land use conversions in Nairobi-Kiambu urban fringe?.....

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13. In a scale of 0 to 5, rate the following factors influencing agricultural land use conversions in Kiambu-Nairobi urban fringe:-

- Natural environmental changes ☐
- Economic factors, e.g poverty ☐
- Increase in urban population/expansion of urban centres ☐
- Poor national governance and corruption, e.g political influence ☐
- Weak and ineffective institutions regulating land use ☐
- Lack of public education and participation in land use management ☐
- Land scarcity, e.g due to population growth ☐
- Global forces, e.g international treaties ☐
- Cultural factors, e.g attitudes and values of land managers ☐
- Improvement in infrastructure, e.g construction of roads ☐

14. What is the Council doing to regulate agricultural land use conversions in this area?.....

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15. In your opinion, what should be done to regulate agricultural land use conversions in this area?.....

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Thank you for filling in the questionnaire.

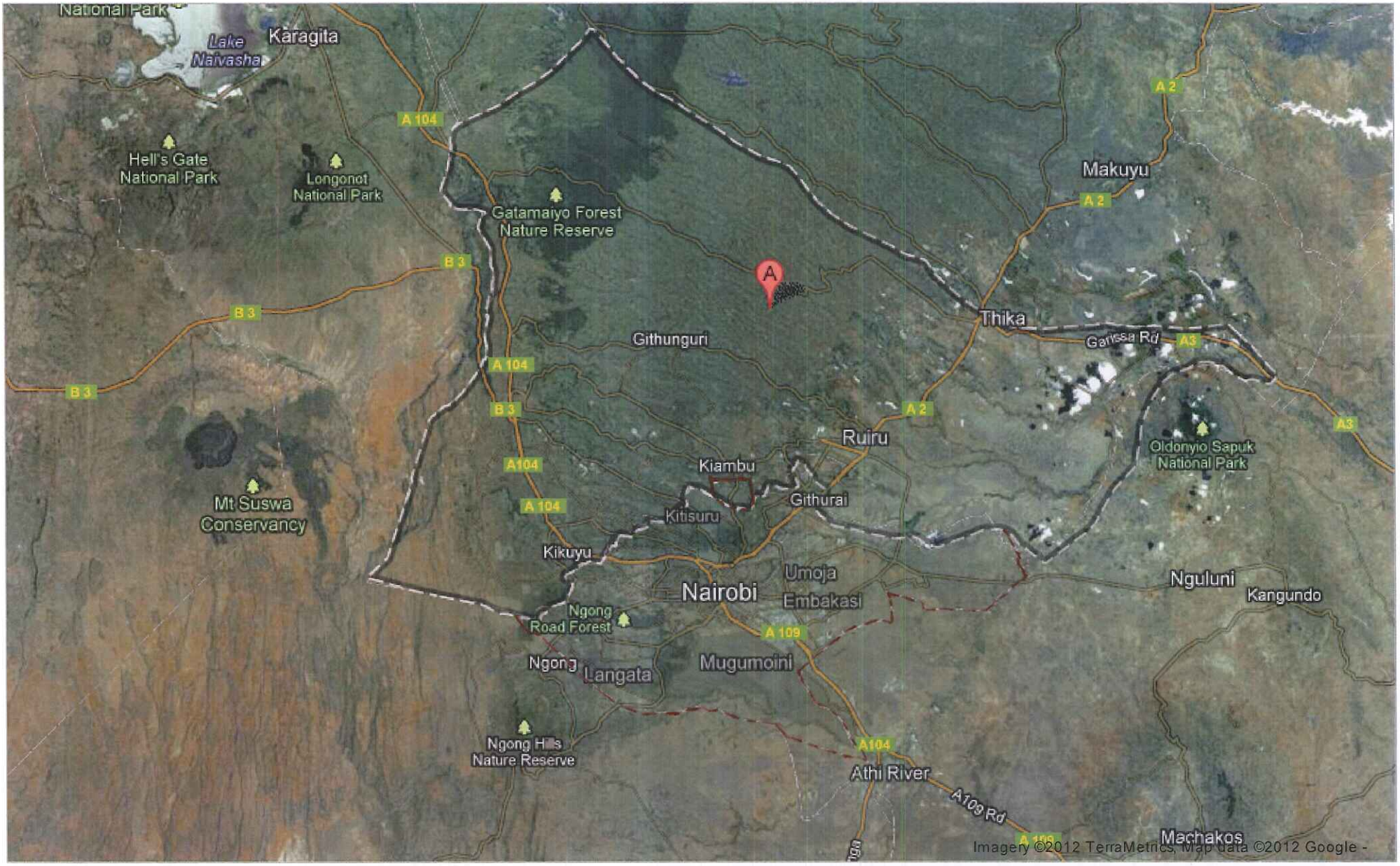
Erastus K. Museleku BA (Land Economics), GMISK

Map of Kiambu County - Google Maps

AND NAIROBI COUNTY

Google

To see all the details that are visible on the screen, use the Print link next to the map.



MAP OF CASE STUDY AREA SHOWING RESIDENTIAL ESTATES UNDER STUDY