EFFECTS OF RAPID URBANIZATION ON LAND USE IN THE NAIROBI URBAN FRINGE

A case Study of Ruaka, Kiambu

BY

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APRIL 2008
DECLARATION

This Planning Research Project is my original work and has not been presented for a degree in any other University.

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This Planning Research Project has been submitted for examination with my approval as University supervisor.

Signed....................................................       Date........................................................

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(Supervisor)
DEDICATION

To my dear mum Lucy and my loving sisters Sarah & Ann. You form an important component of my life.
ACKNOWLEDGEMENT

I am greatly indebted to several individuals whose contribution to this project cannot pass unnoticed.

My gratitude and special thanks goes to my supervisor Mr. Mairura Omwenga for his invaluable support, guidance, advice and positive criticism that have made this project a success. My thanks too go other lecturers from the Department of Urban and Regional Planning for their assistance in formulating the research proposal. To Muriithi, Njihia, Njinji, Thuo, Karue and the rest of my colleagues, your moral support and teamwork in our endeavour to accomplish the studies has seen me through, I will be forever grateful.

I also wish to record my thanks too to Mr. Muturi (the Assistant chief, Ruaka Sub-location), Mr. Mukuha (Planning Department, Town Council of Karuri) and Mrs. Njoroge (District Physical Planning Office Kiambu) for their unequaled generosity during the information gathering period.

My profound thanks go to my mother for the financial assistance and moral support accorded during my University life. I cannot forget to thank my sisters Sarah and Ann who have been a great source of inspiration to go on. To Milly, I also say thanks for your moral support.

To the almighty, God goes my most sincere and heartfelt gratitude for granting such a seldom opportunity.
ABSTRACT
Institutions vested with the mandate of managing land use in the fringe areas in Kenya are weak and inefficient which have led to widespread urban sprawl. Most of the legislations governing land use are often conflicting without clarity on very pertinent issues relating to land for example the minimum plot sizes in land that fall beyond the city and municipal council áreas of jurisdiction. Weak and poor implementation has also led to ignorance of such policies which is evidenced by subdivision of prime agricultural into small uneconomical sizes for agriculture production, clearing of forests for human settlements, lack adherence of the planning standards and in general proliferation of land use conflicts.

Ruaka sub-location being within the Nairobi rural urban transition zone, the study tries to document and make inventory of the existing land uses and building developments in attempt to find out how they conform to the local development policies. The rapid land use changes from agricultural to residential and massive subdivision of the land parcels into very small units puts into question the adherence of the same to the development policies of an area considered to be rural.

The study samples and critically looks into the existing developments in terms of user, shape and sizes of land parcels, interest held on the land, topography, and land prices and the general organization of the various structures in the individual plots. The buildings have been looked at in terms of plot ratios and coverages, heights, typologies, level of services and facilities, compliance to the health standards and the level of adherence to the building by-laws.

The research methodology used in the research study involves collection of both primary and secondary data. Primary data has been collected using structured questionnaires and interview schedules to various stakeholders e.g. land owners and the District Physical Planning Officer. Observation, photography and focus group discussions have also been used in the field during the research study. The secondary data comes from existing literature on the rural urban fringe. The data collected has been analyzed using Statistical Package for Social Sciences (SPSS) after which the output generated is used as an input in Microsoft excel to produce graphs and charts. Analyzed data is then presented using photographs, written descriptions, frequency tables, pie charts and bar graphs.
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CHAPTER ONE: INTRODUCTION

1-1 Background of the problem

Developing countries, especially those in Africa have the highest urbanization rates in the world. The average urbanization rate for Africa is 4.87% compared to 2.57% for the whole world. (Collins, 2006) According to the 1999 population census, the overall growth rate of Kenya’s urban population stands at 6% implying very rapid rural-urban migration pattern. The census estimates Kenya’s population to be 30.4 million with an annual growth rate of 2.9% and is expected to rise to 55 million by 2050.

Due to the explosive population growth in developing countries resulting from rural urban migration and the natural increase, the majority of them face tremendous challenges in the provision of decent living standard for their citizens. Countries in the sub Saharan Africa for example, are witnessing world’s fastest increase in population. Kenya's major cities for instance are even growing faster with a typical yearly increase of 10%. (UNCHS, Habitat, 1996 in Mwaura 2002)

According to the 1999 population census, the city of Nairobi had a population of 2,143,254 inhabitants. Since this population has to be accommodated, the housing demand has outstripped the supply in the city. This has resulted to urban sprawl whereby the neighbouring agricultural areas have slowly begun to provide housing to the city population. These areas often referred to as the rural urban fringe are meant to be agricultural and fall beyond the city councils area of jurisdiction. The haphazard commercial developments, intermixes of conforming and non-conforming uses of land coupled with inadequate services and facilities have become common features in the fringe.

The ever-growing difference between the demand and supply of housing plus high cost of land in the city has increases the development pressure on rural urban fringe tremendously which gives rise to proliferation of unauthorized developments of both land and buildings. Most of the fringe areas fall in the rural county councils which do not have financial resources and the technical expertise to plan and manage the rapid developing fringe. The urban authorities also ignore the
problems of fringe as it falls outside their area of concern. Thus the city and fringe, although, administratively fall in different areas, for the residents of the fringe there is hardly any difference between the two and their movement is unrestricted.

The property and service taxes are relatively higher in the city than in the fringe area and therefore attract developers who intensify development. Since land in the city is beyond the reach of middle/low income group people, they look for land outside the city limit. The speculator who holds the land for quick profit starts selling it by parceling it unauthorized without any services. The buyers who are in urgent need for housing build houses on subserviced plot whereas others hold the plot without use in anticipation of infrastructure development.

Unplanned development of fringe areas leads to the lack of public facilities—public open spaces, health facilities and schools and degradation of environment as the required sanitary and water disposal services are not provided. The agricultural land around the city is eaten away and the farmers and workers are forced to change their occupation.

Tendencies for spot developments are common place in the fringe areas. Such spot growth is wasteful and is often of a sub-standard nature. The scattering of small settlements necessitates the residents to commute for a longer distance besides stretching of public utility services.

1-2 Problem statement

The Nairobi urban fringe is faced by slow rate of infrastructure development since majority of these transition areas fall beyond the city councils area of jurisdiction. There lacks clear guidelines on land subdivision which has resulted to land parcels getting subdivided smaller pieces that are uneconomic for cultivation. Due to the housing demand, the land owners are building high rise blocks of apartments on these small pieces of land not taking into consideration the planning standards that ought to be observed in such an area for sustainable development. The settlements are characterized by good looking houses which largely ignore the set standards. The developments have extremely high plot ratios and coverage and do no observe the building lines. Conflict on land uses has become a common phenomenon whereby several plots subdivided from a large one are used for different purposes for example; residential, commercial, education and agricultural.
Sewer and storm water drains are not provided for. Waste water is directed to the earth access roads which make them muddy and difficult to drive or walk along. This area has been faced by slow rate of infrastructure development to cope with their increased needs. Capacities of the available facilities are overstretched where they happen to exist resulting to inefficiency. Effects of this menace are manifested by;

a) Subdivision of land into very small units.

b) Emergence of buildings that ignore the building by-laws.

c) Inaccessibility due to narrowness of the access roads that are rarely maintained.

d) Improper disposal of waste.

e) Inefficient water supply.

f) Lack of storm water drains.

This is in addition to increased pollution and deterioration of the environment (air, water and land).

1-3 Objectives of the study

The objectives of the research study include;

1. To identify the land use changes that are taking place in Ruaka.

2. To identify the causes and examine the effects of the land use changes.

3. To document and make inventory of the existing land development in Ruaka.

4. To identify and propose planning policies and strategies to enhance sustainable development in Ruaka.

1-4 Research Questions

a) What are the existing land use types and how have they changed over time in Ruaka?

b) Why are the people changing use of their land?

c) What are the effects the land use changes?
d) How much land exists for the various land use types and how has it been utilized?
e) What are the best planning approaches to enhance sustainable development?

1-5 Justification of the Study

Land use change is a growing problem confronting policy, planning and decision making in Ruaka. It links problems and opportunities in urban and metropolitan communities to the larger issues of economic growth, jobs, housing, and environmental quality.

These changes have become increasingly important issues confronting a range of stakeholders and policy makers at all levels of government. This urban sprawl problem, it is tightly coupled to positive benefits from economic growth and development. However, it is also related to negative impacts of poverty and social equity. It has involved the loss of farms, rural livelihoods, and open spaces. Sprawl is inherently a spatial phenomenon.

While the study area gives way to residential and commercial development, the city of Nairobi is experiencing declining employment opportunities, less moderate-income housing, and other social problems including increased concentration of poverty. Characterized by low-density development, the spatial construction of sprawl also leads to increased travel distances and more time spent on the road getting to and from the workplaces, retail centers and recreation sites. The Town Council of Karuri has not been able to manage and mitigate the pace, location and impact of the sprawl.

Land use has become a complex issue. Capabilities of the Town Council of Karuri to make land use plans to guide on the use of land are minimal due to resource constrain and lack of technical experts. Decisions are made in the dark in total disregard of the competing alternatives and interests.

Construction of permanent developments in an unplanned area jeopardizes service provision in future. There has been rampant and improper disposal of both solid and liquid waste mostly from domestic waste, waste chemicals, and oils. They pose a health hazard to human life since such waste collects together creating breeding grounds for disease vectors like mosquito and tsetse flies. In addition they make people susceptible to other water borne diseases like diarrhea and
bilharzia. Unharmonious land uses often create a nuisance hampering effectiveness and efficiency of these uses for example where a residential apartment borders a plot of land used for dairy production. The residents are forced to put up with the odors and noise from the cows.

Proprietors of land parcels in Ruaka are massively changing their uses from agricultural to residential which instigates queries on the capacities of the available infrastructure to provide the necessary services that go hand in hand with housing for example accessibility, sewerage facilities, drainage facilities, open spaces, security and other public social institutions like schools and religious places. The area is now characterized by expensive residential apartments with a skeleton of infrastructure. Construction of the same in the whole area is in top gear putting the future service provision into jeopardy.

Nonetheless there are several factors that suggest the importance of the urban fringe as deserving greater attention on the part of policy makers. In Nairobi, urbanization (increase in the urban population and shortage in housing), among other factors, translate into urban expansion on the urban fringe. Some of these factors are present in the urban expansion taking place in major towns as well. It is important to factor in rural-urban migration, whose impact on urban expansion will tend to increase in future years as a result of continuing urbanization linked to substantial declines in the overall rate of natural increase of the population. In addition, the urban fringe is frequently the dumping ground for industrial enterprises forced out from the city centers either through laws and regulations or due to economic factors such as rising land prices.

1-6 Scope of the Study

The scope of this study in terms of spatial dimension covers Ruaka sub-location which is in Ruaka location Kiambaa division In Kiambu district. The Study examines the development challenges affecting the area as one of the fast growing Nairobi cities urban fringe. The study area borders Karura forest and the affluent Runda Estate. The partners to be studied include the Town Council of Karuri, local provincial administration (Sub-chief), area residents and Community Based Organizations. In addition the study involves taking actual measurements of the plots and the buildings to find out their adherence to the standards and where they comply with the plans approved the council.
The study also pays attention to the level of infrastructure provision with special attention to the land reserved for the same in areas that are not yet serviced. It examines the various types of land uses and their harmony on each other with emphasis on the changing trend. Finally it settles down on some of the alternative planning intervention that can be adopted towards achieving a comprehensive planning approach for development challenges inhibiting development in the rural urban fringe.

1-7 Organization of the Study

The study is systematically organized into five chapters. Chapter one is made up of the introduction that consists of the background of the study, statement of the problem, research objective, the research questions, justification of the study, the scope, organization and limitations of the study, definition of terms and the research methodology. The second chapter looks at the literature review and the conceptual framework of this study. Articles written on the topic of study have been keenly reviewed with an aim of coming up with a conceptual framework intended to mitigate the challenges hindering development in the study area.

The third chapter focuses on the background of the study area through examination of the historical development, location, environmental and physical aspects of the study area in relation to development. Chapter four analyses the finding of the study. The underlying issues are critically analyzed and presented in form of photographs, charts, graphs, calculations and written reports. The fifth chapter tables conclusions and recommendations to the study based on the findings. It also contains possible planning strategies towards unlocking the development challenges facing the study area.

1-8 Definition of key terms

Rural urban fringe: The landscape interface between town and country, or the transition zone where urban and rural uses mix and often clash.

Development: The making of any material change in the use or density of any building or land or the subdivision of any land (Class A development). Class B development is the erection of building or works and the carrying out of such building operations as the minister in charge of the physical planning may from time to time determine (Kenya, (1996), Physical planning Act)
Infrastructure: The physical facilities (roads, airports, utility supply systems, communication systems, water and waste disposal systems etc.) that is supported by the public sector to enhance private sector production and to allow for household consumption through provision of services.

Building: Any structure or erection and any part of the structure or erection of any kind whatsoever whether permanent, temporary or movable and whether completed or uncompleted. (Kenya, (1996), Physical planning Act)

Pollution: Presence of contaminants in the environment in quantities, characteristics and duration such as to be injurious to human, animal and plant life or which unreasonably interferes with comfortable enjoyment of life. (Environment degradation and pollution paper by Prof. Ratemo Michieka).

Land: It means the soil and everything above or below it including any estate or interest in the land plus all permanent fixtures and buildings together with all paths, passages, ways, waters, water courses, liberties, privileges, easements, plantations and gardens thereon and thereunder. (Kenya, (1996), Land registered act-Cap 300).

Private land: Land held by an individual or other entity under freehold or leasehold tenure. (Draft National Land Policy, 2006)

Public Land: Land owned by the government and dedicated to a specified public use or made available for private use under the discretion of the government. (Draft National Land Policy, 2006).

Land Use Planning: A process that is concerned with the actualization of spatial frameworks for orderly management of human activities. (Draft National Land Policy, 2006)

1-9 Methodology of the Study

This outlines the process that has been followed in conducting this research to enhance its understanding to other researchers (Mugenda and Mugenda, 1999). It encompasses nature and sources of the data, preparation for data collection methods of data collection, sampling methods,
analysis of the data and presentation of the findings. It also highlights some of the limitation of the study.

1-9.1 Nature and sources of data

(a) Secondary Data

Secondary data was obtained through literature review of the works done by other researchers on problems of the urban fringe. The sources included; maps, scholarly publications, Karuri Town Council documents, internet and media reports.

(b) Primary Data

Primary data entailed facts and figures obtained directly from the field using the following methods;

(i) Observation

This employed systematic selecting, watching and recording of the observable characteristics related to the subject study. It helped to find out information on natural features as well as the built physical facilities such as the topography, vegetation, soils and the hydrological features.

(ii) Oral interviews

Individual or group interviews were conducted and the information obtained recorded in written form.

(iii) Written Questionnaires

Written questionnaires were administered to the residents (respondents) so as to obtain the social economic data. In addition the planning authorities in the Karuri Town Council also filled questionnaires so as to provide the planning information for the area.

(iv) Interview Schedules

Interview schedules were conducted with the sub-chief, the Town Clerk of the Karuri Town Council and some of the local village leaders. The responses were recorded in written form.
(v) Key informants

Questions and cases were presented to key informants within the study who area who included the elders and Foremen overseeing construction works in the area. Vital information on the standards of the building was obtained from the foremen while the latter provide very useful information on the historical background.

(vi) Taking Measurements

Tape measures were used to take measurements and dimensions of plots, building, road reserves and utility way leaves. The measurements were recorded in written form.

(vii) Mapping and photography:

Existing maps were used to spatially mark out the problems areas. Photographs were taken for analysis and presentation of the data obtained.

1-9.2 Preparation for data collection

(i) Obtaining permission

Written permission was obtained from the Department of Urban and Regional Planning of the University of Nairobi after which another one was granted by the Sub-chief of the Ruaka sub-location chief.

(ii) Data collection

A thorough reconnaissance survey was carried out on 4th and 5th January 2008 to familiarize myself with the study area. Questionnaires and interview schedules were formulated, units of observation and analysis identified and the sampling methods designed.

1-9.3 Sampling

(a) Sampling design

The study area (Ruaka sub-location) has seven villages which include; Rumenye, Gacharage, Miberethi, Gituamba, Ruaka rural, Ruaka urban and the Karura villages. Three villages were
targeted for the interview out of which ten built up plots were selected. Among the selected at least two had to be a near main road, two near a river, and two on a sloppy area and the rest on a gently slopping area with access to most of the available infrastructure services.

(b) Sampling Method

The study methodology used a cluster sampling bringing a total of thirty two properties for research. The random sampling was used to select at least ten plots form each of the three sampled villages. This procedure was found to be necessary due to the large number of units in the villages, wide geographical extension plus the limited time and resources. Apart from Ruaka urban village, the rest have nearly similar developments thus a small sample was required.

Systematic random sampling was applied to select the target villages. All the seven villages were listed. Since the desired sample size was three, a sampling interval was calculated by dividing the total population (villages) by the sample size;

\[ \frac{7}{3} = 3.5 \] Approximately 4

This brought an incremental value of 4. The first zone was selected by random to avoid bias and the other two determined using the incremental value.

Simple random sampling was used to sample the ten individual units in every of the three villages selected.

1-9.4 Analysis and presentation

After the collection of the primary data was completed, all the questionnaires and interview schedules were edited to correct errors and coded. Statistical Package for Social Sciences was used to compute frequencies and distribution curves. Maps and photographs were used to mark out the problem areas. Photographs also expressed the extent of the challenges that were found to be hampering development in the study area. Descriptive techniques were applied to make the final presentation of the findings which was in form of text composed of charts photographs and graphs. A content analysis of the FGD report was carried out to discuss the changing economic base of the communities as well as the response of households to impact of urban encroachment.
### 1-9.5 Data Needs

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<th>DATA MATRIX</th>
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<td><strong>OBJECTIVE</strong></td>
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<td>To identify various land uses and dynamics over time.</td>
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<td>To find out the causes and effects of land use changes</td>
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<td>Research Object</td>
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<tr>
<td>To examine the level of adherence for the existing developments to the building by-laws</td>
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<tr>
<td>To examine the use and adequacy of the existing infrastructure</td>
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1-10 Limitations of the study

The study takes note of some limitations that were experienced during the data collection that may have influence the outcome of the research study. Resources for carrying out the research both financial and human were inadequate. The duration of the study was also not enough for thorough study. In addition some of the respondents were suspicious bearing in mind that the study was being done at a time when escalating violence was being witnessed in all part of the country after the disputed presidential election results. This resulted to some residents being very economical with vital information concerning the study.

It was also very hard to be allowed entry in private property. This resulted to some of the outlined sampling procedures to be ignored in order to get the required sample size. This limited the degree of investigating some aspects of the study.
CHAPTER TWO: LITERATURE REVIEW

2-1 Overview
This chapter presents a detailed literature review. It is systematic identification, location and analysis of articles written by other scholars related to the topic of study. The knowledge acquired provides a diversification of lessons learnt and the possible intervention measures that can be used to mitigate the problem under investigation.

As the urbanization rate continues to increase day by day, the major cities especially those in Africa are faced by uncontrolled urban sprawl. The rate of rural urban migration in search of greener pastures is quite high. The multiplier effects of this is congestions in the roads, shortage of housing that leads to proliferation of informal settlements, poverty and the spreading of the town character beyond the predetermined boundaries. The capacities of the available infrastructure are overstretched forcing some residents to live without these services or paying exorbitant prices to acquire them.

2-2 Urbanization
2-2.1 The history of the urbanization process
In the early Neolithic days settlement towns were associated with improvements in agricultural productivity, in particular the introduction of hard grains which not only produced higher yields than the available traditional crops but also had the advantage of long storage life. Thus fewer farmers were able to feed more people. The population evolved from hamlet living towards higher population densities, to more city oriented living. City growth was limited by the capacity of the surrounding agricultural land to produce food, and an adequate water supply (Mumford, 1956).

The lack of transport for mass produce movement over long distances meant that the most intensive and productive agriculture took place just outside city walls, fertilized by urban waste. Urban growth could be seen as balanced with the surrounding agricultural community. At the dawn of the twentieth century large portions of the fruits, vegetables and other perishable
commodities consumed in New York and Paris were still grown nearby on soils fertilized by urban refuse (Kropotkin 1899).

The second stage of urbanization occurred with the development of river and sea transport and the building of roads. This enabled cities to expand beyond the agricultural capacity of the hinterland, and set up a pattern of trade and specialization in agricultural products between more distant areas. While the first stage of urbanization was marked by balance with the surrounding rural community, urban areas could now become more dominant as centers of trade. A more exploitative relationship of the local resource base was underway. Rural areas were seen as a source of both natural resources and labor.

### 2-2.2 World Urbanization trends

Half of the world's 6.7 billion people are expected to live in urban areas by the end of 2008. The world population is expected to increase by 2.5 billion by 2050, to 9.2 billion. By that time, urban population will be expected to rise from nearly 3.4 billion in 2008 to 6.4 billion in 2050. The urban regions thus will absorb most of the world's population increase in the next four decades while drawing on some of the rural population as well. There will be 600 million fewer inhabitants in rural areas by 2050.

As with the general population growth, most of urban increases will take place in developing and less developed countries as opposed to developed nations, in which 74 % of population already live in big cities and towns. (2007 Revision of World Urbanization Prospects report, UN).

Urban population globally grew 90% between 1975 and 2000 and is projected to grow at 73% between 2000-2025. The declining growth rate reflects both a decline in overall population growth rates and that the base to which growth in 2000 was applied was already very large. However the magnitude of the urbanization challenge in the developing countries is surely as much about the sheer magnitude of numbers as the growth rate. Urban population in developing countries increased 1.2 billion between 1975-2000 and is projected to increase by 2.0 billion in 2000-2025, doubling the developing country urban population in just 25 years. (The 1996 Revision of the Urbanization prospects, UN)
The report also indicated that in mid 1995, 2.6 billion people, or 46% of the world’s population were urban dwellers. This sector of the population is growing at a rate three times higher than the rural population such that just after the turn of the millennium over 50% of the world’s population will be urbanized. By 2025 this proportion will have increased to 61%.

**Figure 2-1: Urban & Rural projections 1975-2025-Less developed regions**

As the world population becomes increasingly urban, the balance of rural and urban populations between the developed and developing world is shifting. In 1950 just 20% of the population in less developed regions resided in urban areas compared to more than 50% of the developed world. In 2000, these proportions increased to more than 40% urbanized for the developing world and about 76% for the developed. By 2025 it is projected that about 57% of the developing world’s population will live in urban areas compared to around 84% of the developed world. By this point almost all new urban dwellers added to the world’s population will come from developing countries. These figures show that the underlying rate of urbanization is now faster in the developing world than the developed. *(Global Urbanization Trends: Implications for Food Systems and Food Security, Lynn Brown and Alex F. McCalla)*

**Source:** UNCHS (Habitat)’s *The State of the World’s Cities: 2001*
There has been a very rapid rate of growth in towns and cities in the 20th Century even though the absolute magnitude of that growth was relatively small by comparison to ongoing and future growth.

**Figure 2-2: Urban growth in world regions, selected periods**

Source: UNCHS (Habitat)’s The State of the World’s Cities: 2001

### 2-2.3 Urbanization process in Africa

The average urbanization rate for Africa is 4.87% compared to 2.57% for the whole world. (Mwaura, 2002). The population is growing rapidly-almost twice as fast as the other regions of the world. Although African fertility has started to fall, the total population of the region will continue to increase: from 794 million in 2000 to 1.489 billion by 2030. Approximately, 70 percent of this growth will take place in African cities and towns. By 2025, African society will become predominantly urban. Africa’s urban population is projected to more than double, from 295 million in 2000 to 748 million by 2030 so that within 25 years, Africa’s urban population will be larger than that in North America, Europe, or Latin America. (UNCHS (Habitat)’s ‘The State of the World’s Cities: 2001)
It is expected that by 2025 more than half of the world’s population will be urban. In addition, the urban population is expected to be growing at almost 2 times the general population in the next 50 years.

Due to the explosive population growth in developing countries, the majority of them face tremendous challenges to provide a decent living standard for all. Countries in the Sub Saharan Africa for example, are witnessing world’s fastest increase in population. Kenya for instance, needs only 17 years to double its population. Kenya’s major cities are even growing faster with a typical yearly increase of 10%. Nairobi city has about 5 million inhabitants.

2-3 Urbanization in Kenya

Although Kenya is predominantly rural, urbanization in Kenya has a long history with urban agglomeration in the form of trading centres being found along the Kenyan coast as early as the 9th Century AD (Obudho, 1988: 3). However, the growth of many urban centres can be traced to the pre-independence period when they were used as centres of administrative and political control by the colonial authorities (UNCHS-Habitat, 1985).

The proportion of Kenyans living in urban centres increased from 5.1 percent in 1948 to 15.1 percent in 1979, to 18.0 per cent in 1989 and 34.8 per cent in 2000. There are currently 194 urban centres, with 45 per cent of the urban population residing in Nairobi (GOK, 2001).

During the first population census in Kenya in 1948, there were 17 towns with a total population of 276,249 people. The urban population was small (5.1%) with 83% of this concentrated on Nairobi and Mombasa. By the 1962, the number of towns had doubled to 34 with a population increase of up to 670,950 people that represented a 6.6% urban growth rate per annum. The growth of towns increased after independence as Africans were allowed to move to urban areas without any restrictions. During the 1962-69 intercensal period, the urban population doubled from 670,950 to 1,082,437 representing 7.1% growth. This was 10% of the total population.

The level of urbanization more than doubled in the next10 years with an annual growth rate of 14.6 %. (Kenya, 1979). Nairobi and Mombasa accounted for only 50.7% of the urban population. This was due to other upcoming urban centres like Kisumu, Nyeri, Kericho, Nakuru and Eldoret.
The growth of the urban population, which has resulted from both natural population growth and rural urban migration, has led to an increased demand for resources required to meet the consequent demand for infrastructure services (Olima 2001). Statistical analysis shows that the rank size distribution of the urban places that comprise this urban population is and will be well distributed; corresponding to what regional geographers would consider as balanced. (GOK 1993:7)

Kenya has one of the highest urbanization rates in the world-7.05% (1996-2000). This has led to unsustainable urban growth, deteriorating urban environment and overstretching capacities of infrastructure and services leading to the majority living in slums. It is estimated that half of the urban residents live in poverty.

The process of urbanization operating in the fringe has given rise to typical land use associations. Contemporary and dynamic land use pattern is developing side by side in the contemporary context, the various land uses, Old villages, new residential extensions, commerce, industry, city service and farming are not nearly sorted out into homogenous areas but are intermingled in a random fashion which gives a distinctive quality to the land use pattern of rural urban fringe.

The haphazard development of slums, unauthorized colonies, piecemeal commercial development, intermixes of conforming and non-conforming uses of land coupled with inadequate services and facilities have become a common features in the rural urban fringes. The dynamic change from rural to urban land use is so fast that the resultant need and complex uses coupled with shortage of land have led to speculation and increase in land values. There is increased the pressure of fringe area that has given rise to proliferation of unauthorized development of land uses-residential and industries etc.

2-4 Urban Fringe Landscape in Developing Countries

The recent upsurge in urban growth and decentralization of economic activities has made urban fringe a topical issues in both local and international debates, however, the problem once visible in the city center has moved to the suburbs due to globalization forces that culminated into mega city development. There are lots of transformations in the urban fringe landscape in the last two
decades that makes it highly vulnerable to risks as much as expected of the city itself owing to large agglomeration of people and economic activities in this area. (Adedayo Adesina, 2007).

Lack of dependable institutions and absence of government has caused problems on jurisdictional administration of these urban hinterlands. Urban fringe is often a conflict zone with neither rural nor urban features, lying outside the corporate existence of the city. Because of proximity to the city, it experiences much of urbanization processes and serves as buffer for urban development. One-prominent force that shape urban fringe landscape in the developing countries is the informal sector activities, and these constitute about 65% of the urban economy.

Informal sector response to the failure of urban governance has various dimensions. Notable among them, are the uncoordinated residential development, emergent transition in demographic re-agglomeration different form the hitherto initial population and restructuring of economic activities at the fringe areas.

More than half of the world's population lives in areas classified as urban. In developing countries, a substantial and growing proportion lives in or around metropolitan areas and mega cities, including the urban fringe, where their livelihoods depend to some extent on natural resources such as land for food, water and fuel, and space for living (DFID, 1999). The population pressure means that resources in such zones are often overexploited.

Although heterogeneous in its social composition, the urban fringe constitutes the habitat of a diversity of populations, including lower income groups who are particularly vulnerable to negative externalities of both rural and urban systems. These include; risks to health, life and physical hazards related to the occupation of unsuitable sites, lack of access to clean water and basic sanitation and poor housing conditions. Environmental changes also impinge upon the livelihood strategies of these communities by decreasing or increasing their access to different types of capital.

Urban fringe is playing increasingly dominant role in the global economy, while international economic competition has mainly been indicated by the competition among regions. Meanwhile, growing environmental and social problems are also concentrated in urban suburbs with some of
the highest population densities in the world. Cities are seen as indicators of humankind's progress, but it remains to determine the ways in which this progress is beneficial and those in which it is detrimental. Concentration of the economic, social, political and administrative organs of a nation or region in mega cities have made them magnets for rich as well as poor households.

2-5 Conceptualizing Urban Fringe Vulnerability Issues

Most theoretical constructs on urban fringe structural patterns and urban growth have evolved primarily in the context of American cities. Burgess (1925) suggests a concentric settlement pattern in Chicago generally termed urban classical model. The economics and human ecological analysis of urban structure provides a number of elements explaining the locational behavior of household in the city. Model based on theories of Von Thunnen and Losch (1966) defined neighborhood by distance, showing how identical activities would emerge at similar location due to market forces leading to hierarchies of activities both within and amongst regions.

Ecological thought is evident in the concentric theory of Burgess (1925), the sectoral theory of Hoyt (1939) and the multiple nuclei theory of Harris and Ullman (1945). Park (1926), Wirth (1925), and McKenzie (1933) all conceptualized the form of a city in ecological term. Burgess (1925), concentric zone model initially analyzes the expansion of the city and then discusses the processes of urban metabolism and mobility which are closely related to expansion and succession.

Hoyt (1939), main argument was that different income groups tend to live in different areas, instead of occupying entire rings around the C.B.D, are sectored around it. Thus, there are well-defined sector shaped high-income areas adjoining on one or both side by middle-income areas. The theory is applicable to the urban fringe demographic structure. This leads more credence to the city segregation and factorial ecology.

Many cities in developing world follow a different pattern particularly in most Sub-Saharan Africa. The central area is the place of residence of the elite or upper class while the poor live on the periphery or city fringe zones. Unlike most cities in the developed countries, social class is invisibly related to distance from the center of the city. Hence the fashionable suburb is evident.
at the urban fringe areas in contrast to what is applicable in developing world. Urban fringe is emerging as a basic economic unit in regional development. *(Soja, 1990)*.

People create urban spaces, and they draw their character from the people that inhabit them. As people work and lived in urban space, they gradually impose themselves on the environment, modifying and adjusting it to suit their needs. The political economy perspective explain the growth of a city in terms of the dynamic of natural and economic force acting within an urban environment.

As land devoid of infrastructure still earn profit or rent, better quality land attract astronomical rent either because of monopoly, absolute rent, amenity rent or scarcity values. This approach situates urban fringe within both the regional and global economy system. *(Bryant 2000)*.

**Figure 2-3: The relationship between rural and urban areas.**
2-6 Case Study: Ibadan Metropolitan Fringe Area

2-6.1 Ibadan Metropolitan Fringe Area

Residential distribution appears to coincide with the trend of local population decentralization in the areas. This distribution pattern is not accidental as migrants are attracted to different parts of fringe for different reasons. Recent analysis showed that the best predictor of residents’ concentration was employment opportunities, including the number of economic activities and land market system in the fringe areas. A meaningful study of this area involved bringing people with different values and aspiration and place together may provide an in-depth search light to the science of social vulnerability and resilient building in the urban fringe.

2-6.2 Managing Transformations in Ibadan Metropolitan Fringe Areas

Nigeria has been experiencing a great transition from rural to urban oriented economy, which has been accompanied by the increasing mobility of production factors such as: capital, labour, technology and information to the urban fringe near cities. About 85% of these developments occur at the urban fringe. Because of proximity to the city, and urban bias nature of development policies in Nigeria, the zone experiences much of urbanization processes and serves as buffer for future urban development.

The growth of the fringe provides opportunities even as their spread eats into farmland and open space. Lack of dependable formal institution and absence of governance has caused problems on jurisdictional administration of the urban hinterlands.

These forces shape the urban fringe landscape. Informal sector response to the failure of urban governance has had various dimensions such as the informal residential developments, incongruous mixed land uses that inadvertently affected the quality of the environment in the area and the recent reagglomeration and restructuring of economic activities at the fringe areas.

Although, the effect of distance to the city center has been minimized by the advent of high technology development in information and transportation system and emergence of multi-nuclei city, over 55% of urban dwellers in Ibadan still commute daily to the city center for various activities. By virtue of all these, this zone is more susceptible to various risks, ranges from human, ecological, socio-political and economy.
The urban fringe in Nigeria has been undergoing substantial changes as housing and land markets develop and socioeconomic stratification rises. This zone for instance, is experiencing a revitalization of employment and economic activities. Many residents have moved to this area from the central city even though density there remains much lower than the city core. Accompanying such moves is industrial suburbanization that characterized the global economy aided by the development in information communication technology (ICTs) at the wake of twenty first century. As a result of selective real estate development, the urban fringe is often awkward juxtaposition of flashy commercial or residential high-rises mixes with aging neighborhoods and dilapidated rural dwellings. The recent influx of a large number of residents to the fringe zone added a new element of complexity to the ongoing spatial restructuring in Nigeria urbanization processes. Increasingly, new immigrants and minorities are either starting out in suburbs or moving to suburbs.

This change in the settlement pattern of minority groups is creating new social and political challenges for suburbs. In some cases, the suburban system is reflecting racial and income segregation mirroring urban socio-economic structures. There has been increase in number of non-native in the fringe area as employment decentralization from city center increase migration of labor forces.

Anchoring on this is the building of resilient amongst suburbanites, which largely depend on local social network mostly in informal settings. Ibadan a traditional urban center in southwestern Nigeria is an example of mega city development in sub-Saharan Africa.

2-6.3 Governance and Social Administration

Urban fringes are mimicking the city in many ways. In the central city the use of price and zoning creates exclusivity. In the Ibadan fringe zone, racial segregation, class and social orientations are manifested. Zoning and land use exclusions to new ways of attracting people of similar interests and discouraging others make the area vulnerable to many social vices.

A number of policy change and social forces have played a significance role in this direction. For example, most Nigerian policies on the informal sector have been targeted not so much at enhancing the access of those in the sector to urban opportunities through participation in
decision making rather at improving access to credit, thereby increasing the number in a geometrical proportion.

Sequel to these development, there are informal arrangement of maintaining social relation in the urban fringe, this is enhanced by bridging the social gap through local actors, such as resident and landlords association in the area. There has been gradual erosion of local social network.

Landlords and residents Association help in building resilience and reduction of risk in the absence of state. Side by side with the accelerating pace of suburbanization, the urban fringe has also experienced processes of socio-economic, cultural and political change, which bear directly as factor, arena and context on the challenges of governing the urban space and the urban experience.

Among the most significant socio-economic, cultural and political processes that shape and define the context for urbanization and governance in this area include the devolution and local-level administration, structure and quality of city governance, issues of taxation and representation in city administration and in the urban space; experiments in the creation of autonomous agencies of government as part of new public sector management approaches; the emergence of non-governmental organizations, community-based organizations, and neighborhood associations that have become an active part of city life and which play a role, either formally or informally, in the overall governance of the urban space.

2-7 The Urban Fringe Environment and Informal Sector Activities

The problems related to the growth of cities and the concentration of human population into large metropolitan areas represents huge challenges for modern societies. Economic growth drives urban expansion in the form of construction of businesses, dwellings, roads, leisure centers etc., and the metropolitan regions face the growing problems of urban sprawl, including a decline in natural vegetation, wildlife habitats and agricultural land. The replacement of undeveloped land by residential and commercial development continues at an unprecedented rate.
The urban fringe is subject to a wide range of ecological transformations and flows that originated within and outside its domain. Most of the changes are driven by the proximity of urban areas (land conversion and new developments, market opportunities, flows of people, waste, labour, goods, capital, etc.); nevertheless the sustainability of the natural resource base and quality of life in the fringe area also affected by the linkages these areas maintain with their rural hinterland and in general with the use and appropriation of natural resources and environmental services.

From an environmental perspective, urban fringe areas face two main challenges and the relationship between the two seems to be a key point for the design of strategic Environmental Planning and Management (EPM) that benefits the poor and enhances their quality of life for sustainable development of the area. The first set of challenges is related to the environmental conditions of the urban fringe as the living and working environment of a large number of people in developing countries.

Although heterogeneous in its composition, the area constitutes the habitat of lower income communities, which are particularly vulnerable to negative externalities of nearby rural and urban systems. This includes risks to health and life and physical hazards related to the occupation of unsuitable sites, lack of access to basic infrastructure and poor housing conditions.

The second challenges are linked to the sustainability of the regional extraction patterns of renewable and non-renewable resources of urban fringe ecosystems, and to the minimization of the transfer of environmental costs from rural and urban systems to the urban fringe. The area is subject to many competing interests without an adequate institutional framework to strike balances, which might contribute to relieve poverty, protect the environment, maximize the productivity of human and natural resources, or draw synergy from urban and rural relationships.

Therefore, the sustainability of both urban and rural areas can be dramatically affected by the dynamic and changing flows of commodities, capital, natural resources, people and pollution taking place in the urban fringe area. For example, Land is the main source of livelihood for many living in the area. Yet, as land prices rise, poor people are priced out of even the less desirable areas by middle-income earners. The poorest are often forced into temporary
settlements, as urban fringe land is lost to urban residential development. So too is the potential for subsistence farming and the cultivation of high value produce.

Disputes over access to and control over land often give rise to social conflict and spiraling violence. In Africa, land conflicts are compounded by clashes between formal and informal land right titles. The urban fringe poor depend to a greater extent on access to natural resources than do wealthier, urban-based groups. Consequently, they are adversely affected when these resources are lost or degraded by: influxes of people from expanding urban areas; and solid waste disposal and untreated liquid waste from residential and industrial areas. This could also lead to health risks. (Birley, 1999).

2-8 Theories of urban Land use

Land is the basic natural resource upon which all other kinds of development are laid. Basically it a source of income to the owners who hold as a capital asset for purposes of investment. It is heterogeneous in nature with varying characteristics in different places. Land values are influence by a number of factors including but not limited to; location, soil fertility, topography, climatic conditions etc. Land is fixed in supply hence sustainable use should be prioritized.

The demand for land by developers in the Nairobi urban fringe is on an upward trend due to the shortage and high prices in the city. Densification on the use of the available land is simultaneously going up in an attempt to increase the returns-rent (profit maximization). A household seeks to maximize the utility advantage of locality over cost of travelling.

Majority of the land use theories are based on the work of Von Thunen, Alonso (1964) and Muth (1969). In urban areas, land use patterns are determined by land values which are dependent on the transportation cost.

2-8.1 Agricultural Land Use Model (Von Thunen)

Von Thunen (1875) expressed an agricultural land use model that is believed to have derived the modern urban land use. The main assumption was that agricultural land uses conformed to general and predictable patterns around cities which were the market for farm goods. Those items in great demand or those with high transportation costs were grown closest to the market,
and those with lesser requirements occurred in more remote locations. He used land rent to explain the type of agriculture that would occur at any given location. He defined land rent as the monetary return a farmer received from producing a particular commodity after all cost of production were deducted. The farmer specializes in producing the crop or livestock that yielded the highest land rent at the particular location.

**Figure 2-4: Agricultural land use model**

![Agricultural land use model](image)

**Source:** Von Thunen (1875)

**Key**

1. Urban area
2. Market gardening
3. Dairying
4. Dairy products
5. Grain production
6. Livestock and general farming
2-8.2 Urban Land Market Theory (*William Alonso*)

The theory points out those activities that need to minimize transport costs typically cluster in the city center. High land prices manifest this advantage. Commercial activities located in high rise facilities normally bid the highest prices, while the space extensive industrial uses take up location from further from the city center.

Central area sites provide low transfer costs due to the high pedestrian flow rates and high access. This setting provides numerous activities. Central area activities have very steep bid rent curves and are restricted in their locations. Since locating away from high activity nodes would be disastrous, activities with flatter curves flexible in their location decision and provide high transfer costs.

![Figure 2-5: Urban land use gradient](image)

**Key**

1. Administrative, commercial & light manufacturing
2. Residential
3. Industrial

**Source:** Alonso (1964)
The curves slope downwards to the right showing lower rent per unit of land with increase in distance. Government and public institution facilities, offices, banks, hotels and others commercial establishments occupy the central locations. Warehousing and light manufacturing in most cases identify with zone of transition between the commercial and residential users.

Lower income residences ad public housing occurs highest on the curve i.e. closest to the center. The poor reside in this area to save cost on transportation and for close proximity to their work places. The middle and high income residential areas appear in succession with increasing with increasing distance from the city center. Typically, the higher income families are always ready to substitute more land for greater distances thus less accessibility. Transportation expenditures for this distance are not significant to this group.

Manufacturing and distribution facilities occupy the suburban areas near transportation routes. Beyond this, land is usually rural mostly used for agriculture with rural residences.

**Figure 2-3: Land Value Surface**

Source: Alonso (1964)
Land values are highest at the central Business District and then drop sharply outwards with higher values along transportation corridors. High values occur at high commercial nodes. Relatively uniform but declining values per unit area characterize residential areas with increasing distance from the city centre. Land values may rise again where transportation corridors intersects since such areas are desirable for commercial and industrial locations. They then fall in the surrounding rural areas.

2-8.3 Transportation Theory of Land Use (*Wingo*)

Wingo conceptualizes the urban structure from the equilibrium theory perspective, mainly applied to residential development. He establishes location equilibrium by substituting transportation cost for space costs. The central problem is to achieve an equilibrium distribution of household of particular rent paying abilities to sites of particular structures and levels of rent. Wingo perceived the journey to work as a technological link between labour and production process.

Drawing on the concept of accessibility which he uses as the unit of measurement, the cost of transportation based on the time spent in movement between points, and the actual out of pockets of these movements. He expressed the money equivalent s the aspects of distance and number of trips. Wingo’s theory is two way with demand on one side and supply on the other. He defines demand as the total employment of an urban area multiplied by the frequency of work trips required to support the production process. He recognizes the tendency of urban population to substitute communications for transportation. Holding all other factors competing for household income constant, the rents households are willing to pay conform to the traditional utility concept; the greater the unit rent, the fewer the units of space consumed.

The supply side is expressed in terms of the capacity of movement system as a measure of its ability to accommodate movements between home and work. He links supply to transportation costs that he uses to establish the distribution of households sites at varying position rents. He defines position rent as the annual savings in transportation costs compared to the highest cost location in use.
2-8.4 Transportation Land Use Cycle
Transportation and land use are highly related. When transportation access to a parcel of and is improved, the land becomes more attractive and is often developed for use. As land is developed, the greater amount of activity leads to an increase in travel demands. This increased demand in turn causes an overloading of the transportation facilities, responded to with an increase in supply. The cycle is repeated again as increased accessibility affects the pattern of land uses.

Figure 2-7: The Transportation Land Use Cycle

The fact that urban land uses are highly sensitive to land values, which depend on accessibility makes transportation a primary urban land shaper. Transportation based investments not only tamper the form and extent of the city but also they help explain the allocation of uses internally. Transportation has transformed structure of towns from mono-centric to poly-centric.
CHAPTER THREE: BACKGROUND OF THE STUDY AREA

3-1 Overview
This chapter focuses on the background of the study area in terms of physical setting, historical development, climatic and natural characteristics, demographic dynamics, infrastructure facilities and services, community facilities, and economic activities. These aspects in different ways influence development of a place. Location enables one to determine the distance of the area from a known point for example it makes known how far from the CBD of the Nairobi city. Through history the decision makers are able to compute the growth trends and patterns thus able to formulate appropriate decisions on how to promote the growth positively in controlled manner without putting into jeopardy future service provision.

Topography determines the cost of construction. Steep land requires expensive leveling before construction can commence thus discouraging development. Water being a building component and a basic human requirement is vital. The fact that the study area host human being whose livelihoods the recommendation of the study are meant to improve forms a vital component of this study. Planning strives to better the living standards of the human being therefore making population and demographic characteristic imperative as they assist in predicting the future population trends. Characteristics like size, sex ratio, dependency ratio, fertility rate and mortality rate helps to determine the supply and demand of infrastructure services and community facilities. Using these characteristics, one is able to predict and project the likely future so as to take the necessary actions.

For any positive development to take place infrastructure facilities and services are paramount. They include roads, power supply line water supply lines, and communication facilities.

3-2 Nairobi city
3-2.1 History of Nairobi
The City of Nairobi owes its birth and growth to the Kenya Uganda Railway (KUR). The railhead reached Nairobi in May 1899 "enroute" to the present day Kisumu part of what is now Uganda. The moving of the railway headquarters from Mombasa to Nairobi by its chief engineer,
Sir George Whitehouse resulted in the subsequent growth of Nairobi as a commercial and business hub of the then British East Africa protectorate (Situma 1992:167). By 1900, Nairobi had already become a large and flourishing place with the settlement consisting mainly of the railway buildings and separate areas for Europeans and Indians, the latter being mainly the labourers employed on the construction of the railway. There was practically no African Settlement. In the same year, 1900 Nairobi assumed the function it was to perform as the capital of Kenya, with the boundary of the urban centre being defined.

In 1907, Nairobi became the capital of Kenya. In 1950, it became a city. The population density in Nairobi has shown an increasing trend.

3-2.2 The Physical location of the city
Nairobi lies at the southern end of Kenya’s agricultural heartland, 1.19º South of the Equator and 36.59º East. Its altitude varies between 1,600 and 1,850 metres above sea level. The climate is generally a temperate tropical climate, with cool evenings and mornings becoming distinctly cold during the rainy seasons.

There are long rainy periods between April and June, while the short rains come in November and early December. There is a constant of 12 hours of daylight. Average daily temperatures range from 29º C in the dry season to 24º C during the rest of the year.

3-2.3 Spatial Development of Nairobi
From its earliest times, emerging spatial patterns in Nairobi showed segregation between the Central Business District (CBD) and European, Asian and African residential areas. By 1909 much of the internal structure especially the road network was developed. The boundary of Nairobi was extended in 1927 to cover 30 square miles (77 km2) as a result mainly of the rapid growth of the urban centre in terms of both population and infrastructure.

From 1928 to 1963, this boundary remained the same with only minor additions and excisions taking place. In 1963, the boundary of Nairobi was extended to cover an area of approximately 266 square miles (686 km2). There have not been any boundary changes since then. From this early growth, the city’s functions have developed and expanded such that today it has achieved
an overwhelming dominance in the political, social, cultural and economic life of the people of Kenya and the whole of the Eastern Africa region.

The Nairobi Municipal Committee Regulations of 1960 defined the initial boundaries for the then Nairobi town as: “The area within a radius of one and a half miles [about 2.25 km] from the offices of the sub-commissioner of the then Ukambani Province” (Morgan, 1967:102 in Obudho and Aduwo, 1992: 51).

The population of the town has also changed significantly. Its main sources of growth have been immigration especially from Central Province. The long distance sources have been mainly the Eastern, Nyanza and Western Provinces of Kenya (Obudho and Aduwo 1992:58). Other sources of population growth have been the boundary changes and natural growth factors.

By 1963 the Africans, who formed a major part of the population, lived in the eastern parts, while the Europeans and Asians lived in the western suburbs with access to better services. This position is reflected today not so much in terms of race, but rather in terms of incomes as well as population densities. The people living in the western suburbs are generally the more affluent while the lower and middle-income elements of society dominate the eastern suburbs. Nairobi displays a complex surface structure, making it difficult to decipher the distinct land uses of the city surface.

Due to rapid urbanization, the city has been expanding in terms of space to the neighboring areas not necessarily within the city council’s area of jurisdiction. This sprawl involves economic, demographic, social, and environmental elements and hence a comprehensive decision support system is needed which considers all of these facets. Lastly, sprawl is a spatial problem which links issues in the central city to the rural landscape.
Several forces have combined in recent years to bring rapid changes in land use and the political systems at the rural-urban interface. These forces include: the movement of urban and suburban dwellers into "rural areas"; the transition of agriculture into big business and the squeezing out of small, family-owned farms and the increasing concern for preserving a safe environment. These changes have brought conflict between farmers and new residents and confusion about which level of government has the authority and is best suited to deal with land use issues.

3-3 The Study Area
3-3.1 Location of the study Area
The study area is Ruaka sub location which is in Ruaka location, Kiambaa division under the Town Council of Karuri in Kiambu district. It is located 12 km north of Nairobi city along Limuru road at 1°12'0"S and 36°47'0"E. The area has an altitude of 1746m a.s.l and covers a
radius of approximately 7 km with a population of about 129,944 people. It is one of the Nairobi city’s urban fringes.

Kiambu District is one of the seven districts in Central Province. The District is divided into 7 divisions namely Kiambaa, Limuru, Ndeiya, Githunguri, Kikuyu, Lari and Kiambu Municipality, thirty-seven locations and one hundred and twelve sub-locations. The district covers an area of 1,323.9 sq Km² and is the smallest district in Central Province. It borders Nairobi City and Kajiado District to the south, Nakuru District to the west, Nyandarua District to the northwest and Thika to the east. The district lies between latitudes 0°75′N and 1° 20′N south of Equator and longitudes 36° 54′E and 36° 85′E.

The largest Division is Lari with an area of 444.1 km². However, a large portion of the division is covered by forest. The smallest division is Kiambaa with an area of 91.1 km². There are five local authorities in the district namely County Council of Kiambu, Municipal Council of Kiambu, Town Council of Kikuyu, Municipal Council of Limuru and Town Council of Karuri. The district has five constituencies; Kiambaa Constituency embraces Kiambu Municipality and Kiambaa Divisions whereas Limuru Constituency comprises Limuru and Ndeiya Divisions. Kikuyu constituency covers Kikuyu Division while Githunguri and Lari Divisions are constituencies themselves.

The Population of Kiambu District is estimated to be 936,785 people with a growth rate of 3.4% per annum. Clearly, the high population growth rate has serious effect on social and economic development. This is manifested in increased unemployment, high dependency ratio, increased demand for health services, increased demand for agricultural land, more need for fuel and forest products, over-crowding in educational and other social facilities, more demand for better housing, high levels in poverty indices.
Effect of Rapid Urbanization on Land Use in the Nairobi Urban Fringe
3-3.2 Historical Development of Ruaka

The name Ruaka comes from aka a kikuyu word that denotes female. The area is named Ruaka after River Ruaka that flows across the area where it is believed that women used to bath. In the beginning of the 18\textsuperscript{th} century, a group of people from Muranga called Mbari ya muya came and settled in the area. The place was renamed Ruaka kwa mbari ya muya. The land was owned communally, and the people began building huts and the land was cultivated by the community. When colonization began, the people were regrouped into villages. The first village was in Ruaka shopping centre. The people in those villages and their children worked in the white settler\textsuperscript{\*} coffee farms.

In 1956, land demarcation was done depending on individual efforts. The common men received one acre while the influential people were given between 10 and 30 acres. The village was then shifted from Ruaka to Ndenderu under the influence of the then powerful mbari ya muchiri to allow large cultivation area. Muchiri Mungai the then chief who belonged to the royal family took up the land. The plots in the village were a quarter acre. Those in the villages were referred as ahoi and could only be adopted with sheep.

Some shops were built at the current Ruaka shopping centre and a market established at Ndenderu where it still remains. Gacharage primary school was founded in 1958 to cater for the ahoi in the village. Land owners remained with the land even after independence though the parcels have become smaller due to subdivision as result of population pressure.

3-4 Physical Characteristics

3-4.1 Climate

The climate of the Ruaka area compares well with that of the greater Kiambu District. The area lies at an average altitude of 1800m above sea level. The climate is mostly determined by altitude and physical features mostly the Aberdare ringes. Kiambu district lies within the range of inter-tropical convergence zone with altitudes between 1520m-1890m a.s.l. It receives an average of 900mm of rainfall annually with a mean monthly average temperature of 22\textdegree c with a maximum of 27\textdegree c.
The precipitation is concentrated in two rainfall seasons i.e. bimodal between March and May and October to with two intervening dry seasons. The rainfall is influenced by relief. Winds are generally weak with the strongest occurring during October and August (5-10m/s) and blowing from varying directions. The annual precipitation rate is 1883 exceeding the precipitation rate. The hottest and coldest months are December to March (27°C) and July (22°C) respectively. The maximum precipitation happens in February to March and October to November.

3-4.2 Topography and Slope Analysis.

Ruaka area rises to a mean height of 1800m a.s.l and slope gently eastwards towards the city of Nairobi. It is characterized by rugged and deeply incised landscape with numerous hills. River valleys form the administrative boundaries in the area. River Ruaka the main hydrological feature in the area forms the boundary between Ruaka and Kiambaa location on the Eastern side while River Rueru forms the boundary between the study area and Kihara Location to the West. Ruaka has favorable environment for agriculture. Some food crops like sweet potatoes, tomatoes, cabbages, arrow roots, bananas and sugarcane are grown. In addition nappier grass for the livestock is also a common crop cultivated these areas.

3-4.3 Geology and Soil Characteristics.

Soils within the area of study are derived mainly from weathered volcanic and basement rock system. The area is divided into two topographical regions; upper highland and lower highland with well-drained tertiary volcanic and basic igneous rocks and lower highland with a well drained shallow dark reddish brown though in some places they are imperfectly drained, very deep dark grey to black with calcareous saline deeper subsoil. They are moderately fertile. This has implications considering aspects like the use of pit latrines and septic tanks for human waste disposal that are largely used in the area.

3-4.4 Hydrology and Drainage Systems.

Main hydrological feature in the study area is of the Ruaka River which is a perennial river that drains its waters into the Nairobi River. Other rivers include Kagondo and Karura rivers. Kagondo drains its waters to Karura and later to Nairobi River. The rivers originate from the Aberdares. All the three rivers form the boundaries of Ruaka sub-location.
Other hydrological features include the ground waters sources which mainly constitute man made boreholes. Groundwater plays an important role in transporting pollutants. The natural water quality is hampered by use of pit latrines and cultivation along the river banks. Individual peoples boreholes that have been sank in the area do not observe the spelled out standard.

Since the area is characterized by steep slopes, water drains into River Ruaka. During the rainy season there is a problem of drainage due to lack of storm water drains.

3-4.5 Vegetation characteristics

Vegetation in the area varies from huge natural and exotic trees to small shrubs and grass. The exotic ones include; Eucalyptus, cypress, Grivellia, *Mikunduri*, Pine trees. The natural ones are mainly acacia and cider trees. Grivellia is very dominant in the farms due to its harmonious relationship with soil fertility. The natural vegetation have been replaced due to over cultivation that has resulted from population pressure that has seen land parcels become smaller and smaller for crop growing.

Other factors influencing vegetation in the area are soil characteristics, climate and human activities like quarrying and construction. Land is the main natural resource in the area. It forms the basis where the other economic activities are done. Despite the fact that it has been cultivated for a long time, agriculture is a source of livelihood to most of the locals. Subsistence farming is done though the crops grown are not enough to feed the population which largely depends on food from other neighboring districts like Nyandarua.

3-5 Population and demographic characteristics

Population growth in Ruaka sub-location is very high due to in migration of people from the city since it's within the city’s commuter zone. People working in the city have been moving into Ruaka as a result of the areas proximity to their working places and the availability of residential houses. This influx has overstretched capacities of the available infrastructure services and other community facilities.

The districts 3.4% growth rate quite high compared 3.8 % for the whole country. The district is quite densely populated except for some semi arid areas of Ndeiya and Kikuyu Divisions. These areas also have the highest poverty levels in the district. Kiambaa has the highest population
density of 1,375 persons per km² whereas Ndeiya Division has only 204 persons per km². Other divisions with high population densities include Kikuyu, Githunguri and Kiambu Municipality. Due to the high population density in most parts of the district, land has been fragmented into small pieces resulting in a decline in productivity.

3-5.1 Population structure and composition
The female population in the reproductive age group makes up 26.4% of the total district population. In Kiambu District Females of reproductive age group (15-49) rose from 211,887 in 2002 and is projected to increase to 247,304 by year 2008.

Table 3-1 Population composition

<table>
<thead>
<tr>
<th>Age group</th>
<th>1999</th>
<th>2006</th>
<th>2008</th>
<th>2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-4 (Pre-primary)</td>
<td>12,863</td>
<td>13,892</td>
<td>14,201</td>
<td>14,677</td>
</tr>
<tr>
<td>5-14 (Primary)</td>
<td>21,888</td>
<td>23,639</td>
<td>24,164</td>
<td>24,974</td>
</tr>
<tr>
<td>15-19 (Secondary)</td>
<td>10,551</td>
<td>11,395</td>
<td>11,648</td>
<td>12,039</td>
</tr>
<tr>
<td>15-49 (Reproduction)</td>
<td>25,315</td>
<td>27,340</td>
<td>27,948</td>
<td>28,884</td>
</tr>
<tr>
<td>15-59 (Labour force)</td>
<td>53,563</td>
<td>57,847</td>
<td>59,134</td>
<td>61,113</td>
</tr>
<tr>
<td>60-80+ Dependence</td>
<td>5,072</td>
<td>5,478</td>
<td>5,600</td>
<td>5,787</td>
</tr>
</tbody>
</table>

Source: Town Council of Karuri Strategic Plan 2007-2012
Effect of Rapid Urbanization on Land Use in the Nairobi Urban Fringe

The female in the age group 15-49 constitute the reproductive age. According to the 1999 population census there were 25,315 female that is projected to hit 28,884 by 2011. Due to proximity of the town to Nairobi City, there has been an influx of working population looking for cheaper accommodation as a result of the improved transport network thus the trend is likely to continue.

3-5.2 Migration Trends
The high population has resulted from the high rate of immigration. People who work in the Nairobi city have been seeking for residential houses in the area. This has increased the demand for housing prompting the land owners to construct residential houses for rental purposes. This is more so in the recent year due housing shortages in the city.

3-6 Health
One of the problems that have continued to affect a large population of Kenyans in their reproductive ages is HIV/AIDS. It has impacts on all aspects of development. Poverty has been the greatest contributor. The most affected age group in Karuri between 15 and 45 despite the fact that it the most active population that provides the labour force. (Town Council of Karuri Strategic Plan 2007-2012)

**Figure 3-2**

Source: Town Council of Karuri Strategic Plan 2007-2012

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In Kiambu District HIV prevalence is of great concern. In year 2001, HIV prevalence rate was reported to be 348% way above the national prevalence of 14% recorded in 2001. The impact of the scourge has been felt at all levels of the district’s economic and social circles. An increase in the number of HIV/AIDS orphans has been noted. This is one of the major challenges facing Kiambu District. *(Kiambu District Strategic Plan 2005-2010)*

Life expectancy rate in Kenya is 47-59 for the males and 48-63 for the females. According to the 1998 report by the Ministry of Planning and National Development, the average life expectancy for both sexes is 57 years.

### 3-7 Infrastructure Services and community facilities

#### 3-7.1 Water

Water resources in the country are managed by the sessional paper No. 1 1999 on water Resource Management and Development. The policy aims at facilitating the provision of water to all the competing users in a sustainable manner. Water sources in the study area include rivers, boreholes, springs and dams. The rivers are Ruaka, Karura, Rueru and Kagondo. Some of the parts in the area are served with piped water from the Ruiru dam.

#### 3-7.2 Waste water disposal.

Most of the people in the area use pit latrine due to the rural nature though this is rapidly changing as result of the urban sprawl. In the upcoming flats, the residents use septic tanks. This creates the need for exhausters in the area.

#### 3-7.3 Solid waste Management

Solid waste management is concerned with the handling, storage, collection, processing and disposal of solid waste. Due to the upcoming residential developments, generation of solid waste is on the increase raising queries on the capacity of the Karuri Town Council to handle the waste.

#### 3-7.4 Transport facilities

The Town council has a road network of 230 kilometers out of which 41 km are tarmaced, 16 km murramed and 68 km earth roads mostly comprising rural access roads. The earth roads are mostly not passable during rainy seasons. *(Town Council of Karuri Strategic Plan 2007-2012)*
3-7.5 Education facilities
The population of primary school going children was 21,888 in 1999 and is projected to rise to 24,974 by 2011. The current facilities are over utilized calling for concerted efforts from the stakeholders. The secondary school going age is expected to increase from 11,395 in 2006 to 12,039 in 2011. Some of the students do no proceed to secondary schools due to economic hardships. *(Town Council of Karuri Strategic Plan 2007-2012).*

3-8 Critical Emerging Issues.

The population of the area is growing very fast. The high population provides market for the agricultural and some of the light industrial goods produced in the area.

Immigration brings in people with skills as well as potential private investors who direct their resources in place contributing development. Increasing population has led to increased land subdivision that has led to clearance of large chunks of land as well as encroachment into the natural vegetation.

High population without increasing services and available facilities has led to overstretched capacities of the available infrastructure facilities like housing, roads, and social facilities. A proper land use budget is of great necessity to ensure that all land use activities are accommodated.

**Population and development.** The issue here is weak integration of population concerns into development planning.

**Population and environment.** Environment conservation has been a major problem facing Kiambu district. The effects of population and environment in the district include massive felling of trees leaving the land at risk of soil erosion and desertification, pollution from tea and coffee factories and wide spread of insecticide.
CHAPTER FOUR: POLICY AND INSTITUTIONAL FRAMEWORK FOR THE MANAGEMENT OF LAND IN THE URBAN FRINGE

4-1 Introduction
There exist numerous legislations that govern the use of land in the country. Some of the main statutes include those touching on land tenure and land use, environment, forestry, public health, water and the constitution. These statutes include;

(i) The Constitution
(ii) Registered Land Act (Cap 300), 1963
(iii) The Land Acquisition Act Cap 295
(iv) The Trust Lands Act Cap 288
(v) The Water Act of 2002
(vi) The Wildlife (Conservation and Management) Act Cap 376
(vii) The Local Government Act Cap 265
(viii) The Physical Planning Act Cap 296
(ix) The Land Control Act Cap 302
(x) The Antiquities and Monument Act Cap 215
(xi) The Forest Act
(xii) The Protected Areas Act Cap 204
(xiii) The Way leaves Act Cap 292
(xiv) The Petroleum (Exploration and Production) Act 291
(xv) Environment Management and Coordination Act, 1999 (EMCA)
(xvi) The Survey Act (Cap 299), 1961

In spite of all these statutes regarding the use of land, there has been poor and conflictual utilization of land. Land use conflicts, environmental degradation, inequalities and general loss
of diversity have characterized the use of land as a resource in this country. Commissions of enquiries have been formed in the past to review some of these injustices and recommend on the possible way forward but their findings have remained a mystery to Kenyans. They include the Njonjo and Ndung’u in 1999 and 2004 respectively. However the government is in the process of formulating a national land policy which aimed harmonizing all these land issues.

4-2 Legal Framework

4-2.1 The Physical Planning Act (Cap 296)

This is the main statute that governing spatial planning in Kenya. It provides the legal basis for the preparation and enforcement of various kinds of physical development plans. The Act establishes the office of the Director of Physical Planning, who is the chief government advisor on all matters pertaining to physical planning. The Act vests responsibilities of the preparation of all Physical Development Plans in the Director’s office.

The Act also outlines development control measures that can be taken in order to ensure compliance with the plans proposals and requirements. It empowers local authorities to regulate and exercise control over physical development decisions and activities. The Act also creates national, district and municipal physical planning liaison committees. In addition to being the planning related dispute arbitrating bodies they as avenues through which the public can influence the outcome of key decisions as they affect them. The act vests the local authorities with the responsibility of controlling and guiding development in their areas of jurisdiction.

*Physical Planning Act (Cap 286) Section 29 – Subject to the provisions of this Act, each local authority shall have power –*

a) To prohibit or control the use and development of land and buildings in the interests of proper and orderly development of its area

b) To consider and approve all development applications and grant all development permissions.

*Section 30(1) – No person shall carry out development within the area of a local authority without a development permission granted by the local authority under Section 33.*
4-2.2 Environment Management and Coordination Act, 1999 (EMCA)

This statute was enacted in 1999 to provide guidance on environment conservation and preservation. The Act touches various issues including environmental protection and conservation, conflict resolution, environmental quality standards, environmental planning and policy formulation. It advocates for sustainable development.

It covers the protection and management environmentally sensitive area like wetlands, hilly and mountainous areas, forests, environmentally significant areas, the ozone layer and the costal zone.

This Act provides for the establishment of an appropriate legal and institutional framework for the management of the environment and for matters connected therewith and incidental thereto. Its aim is to promote a safe, clean and healthy environment. Section (4) and (7) of this Act provides for establishment of environmental conflict and the National Environment Management Authority as the institution responsible for execution of the requirements stipulated in this Act in relation to policies relating to the environment.

According to Section 58 every development project that is likely to have impact on the environment must undergo an environmental assessment before commencement of any works. All land-uses affect the environment hence should undergo environmental impact assessment. These include transportation, water sources, natural conservation and recreational areas, energy sources for example electricity and firewood, economic activities and industrial development, housing development and development of community facilities.

Section 44 provides for protection of hillsides, hilltops and mountain areas and forests. Section 54 provides for protection of environment and significant areas, with any area of natural beauty or species of indigenous wildlife or the preservation of biological diversity as part of environment sensitive areas. Ruaka sub-location has some of the tributaries of Nairobi River. Adding this to the fertile agricultural soils, the area demands an environmental management to conserve these natural features.
4-2.3 Water Act, 2002

The act provides for the sustainable management, conservation, use, control of water resources for the acquisition and regulation rights to the use of water. It is the prime legislation managing the use of water resources in the country in conjunction with the National Water Conservation and Pipeline Corporation Act (Legal notice No. 270 of 1998), Forests Act (Cap 385), The Irrigation Act (Cap 347), The Agriculture Act, Lakes and Rivers Act (Cap 409) and the River Basins Development Act (Cap 443).

Water is life as is said but its distribution in space and in time varies. As a result of population pressure which has led to pressure on land, water resources are no longer given the attention they deserve. Cultivation is now taking place along the river banks in total disregard of the accelerated levels of soil erosion and reduction in water levels. Those depending on the water down stream are the ones who suffer most. Permanent residential apartments fronts these rivers but the developers do not pay attention to them. Such vulnerable areas need to be properly managed in order to achieve sustainable development.

4-2.4 The Local Government Act (Cap 265).

The act provides for the establishment of local authorities. It also clearly defines their composition, roles functions and jurisdiction. They are also vested with powers to formulate by-laws in respect to such matters as of health, safety and well being of the inhabitants of its area or any part thereof and for the good rule and governance of such an area.

The Act stipulates the key role of the Local authorities in Physical Planning which is to implement Local Physical Development Plans. According to section 166 of the Local Government Act, every municipal council, county council or town council subject to any other written law relating thereto prohibits and controls development and use of land and buildings in the interest of proper and orderly development of their areas of jurisdiction.

Section 162(g) mandates the local authorities to control or prohibit sub-division of land into excessively smaller areas. Section 168 empowers local authorities to establish and maintain sewerage and drainage works within its area of jurisdiction.
It also empowers local authorities to make by-laws desirable for maintenance of a safe and healthy environment for human habitation in their areas of jurisdiction. It also mandates local authorities to supply electric power subject to the electric power Act, maintain roads within the area and promote development of housing.

4-2.5 Registered Lands Act (Cap 300)
This act deals with the issuance of land titles to freehold and leasehold agricultural and urban land. It also provides for registration of reserves or land that was previously registered under land registration (special areas act of 1959).

4-2.6 Trust Lands Act (Cap 288).
This act empowers the local authorities to be the custodians of the land (trust land) in their areas of jurisdiction on behalf and for the benefit of the locals or the residents of that specific area. This then means that local authorities have command over the usage of such land. The act also provides the mechanism of setting apart trust land for both private and public purposes.

4-2.7 Public Health Act (Cap 242)
This Act provides for securing and maintaining health. It empowers local authorities to establish officers of health from whom they make necessary inquiries and inspection regarding matters incidental to public health in development activities. Section 32(1) empowers local authorities to provide hospitals and places for reception of the sick to their residents. Section 124 empowers local authorities to make by-laws as regarding development of buildings and sanitation. It also mandates local authorities to demolish buildings which are unfit for human habitation.

Section 29 gives local authorities powers to protect water supplies including purification of any such water supply that has become polluted. Section 144 provides for establishment of authorized buildings over sewer or under streets. It again empowers local authorities to collaborate with residents in carrying out of any private drainage works.

4-2.8 Agriculture Act (Cap 318), 1955
This is an Act of parliament that provides for the promotion and maintenance of a stable agriculture to provide for conservation of soils and their fertility; to stimulate development of
agricultural land in accordance with the accepted practices of good land management and good husbandry.

Section 65 of this Act provides for the making of a land development order in the interest development of the land management for agriculture purposes. The Minister has under this Act been mandated to declare agricultural use and empower local authorities to make by-laws related to use of agricultural land. He also has been given power to acquire and occupy land for production of particular agricultural industry etc.

The Act also provides for protection of land with high slopes from soil erosion, protection of water courses and protection against erosion by run-off water.

4-2.9 Land Control Act (Cap 302)
This Act provides for controlling transactions in agricultural land. It defines agricultural land as any land not within a municipality or a township or any land in Nairobi area or any other municipality declared by the Minister to be agricultural land. Application for sub-division of land is to be accompanied by a proposed sub-division plan prepared by a registered Physical Planner before consent is granted.

4-2.10 Land Acquisition Act (Cap 295), 1968
The commissioner of lands normally administers this Act. It empowers the government and local authorities to acquire land compulsorily for public interests. These refer to interests of defense, public safety, and development and utilization of any property in such a manner as to promote the public benefit.

4-2.11 Registered Land Act (Cap 300), 1963
This Act provides the legal basis for private ownership of land, land control and sub-division. It establishes the chief land registrar's office where all interests in land are registered after the settlement process. It also deals with placement and maintenance of boundaries and transfer of land interest. This legislation on the other hand, is applicable in areas where land adjudication has been done.
4-2.12 The Mining Act (Cap 306), 1940
This Act classifies land excluded from prospecting and mining such as; land designated for public use or burial site, land situated within the municipality, township, trading centre except with the consent of council, land held under lease/grant within 100m of railway line, within 100m of any dam, canal, building, any site of public road, salt licks, and within 500m of aerodrome or on private land.

4-2.13 The Survey Act (Cap 299), 1961
This Act makes provisions relating to surveys and geographical names and in the registration of land surveyors and for connected purposes. Blasting of rocks within sites reserved for fundamental benchmark has been prohibited under this Act. It also provides for coastal foreshore reservations and river reservations.

4-2.14 The Building By-Laws (Grade I and II), 1968
The government in 1968 to regulate the character and nature of building and associated works formulated these by-laws. Grade I by-laws are applicable in urban settlements, while Grade II by-laws set building standards that cannot meet the needs or conditions of special areas, for example low income settlements. Amendment of these by-laws is therefore essential in promoting housing development in Kenya.

4-3 Institutional Framework
4-3.1 Ministry of Lands and Settlements.
The Ministry Lands house the Physical Planning Department, the department under the Director of Physical Planning is charged with the responsibility of preparation of physical development plans in the country. The District Physical Planning Department in Kiambu Should offer any necessary support and guidance on developmental issues in the study area. The Director of Physical Planning is vested with the responsibility of approving all physical development plans.
4-3.2 The Town Council of Karuri

The Town council of Karuri is organized into two braches; the political and the executive. The political part is headed by the Town council chairman who is elected by the councilors. He chairs the council meetings. This body of the town in council is responsible for making policies to guide development within the town council’s jurisdictional area.

The town clerk who is appointed by the Public Service Commission heads the executive arm of the Town Council. He is the executive administration officer of Town council. The management of the council is split into various departments each headed by a technical staff employed the Town council which include; the planning, inspectorate, Engineer, Inspectorate and the Town Clerks departments. However, majority of them are not equipped with qualified professionals.
Others players include the Provincial Administration which is represented by the office of the Sub-Chief. The office of the assistant chief is organized in such a way that community participation is enhanced. Various community groups pursuing different interests are involved in the day to day management of the sub-location affairs. Community participation in planning and development control is more effective than the top down approach.

Figure 4-2: Local Provincial administration

![Diagram of Local Provincial administration]

- Assistant Chief
- Village elders
- Council of Welfare Committees
- Plot owners committee
- Development Committee
- Youth Committee
- Ruaka Market Committee
- Ruaka Witeithie HIV/AIDS Committee
- Gacharage/Lirumwe Water Project Committee
- Ruaka Community of Faith
- Ruaka Electric Project Committee
CHAPTER FIVE: RESEARCH FINDINGS AND ANALYSIS

5-1 Overview
The purpose of the study was to examine the effects of urbanization on land use in the Nairobi urban fringe and propose planning strategies and approaches that can be adopted for sustainable development in the study area. Using Ruaka as a case study, the study aimed at investigating the land use dynamics that have occurred in Ruaka with time, documenting and making inventory of the existing land and building development, identifying and examining planning and development policies, strategies and targets in and come up with a planning proposal to improve development.

5-2 Demographic Characteristics
Planning aims at improving the people’s living standards in a sustainable manner. This underscores the importance of studying population characteristics when carrying out any planning research since it is that population that is set to benefit from the proposed programmes or projects. The study found out that the population was mainly composed of the youths between 15-35 years who formed 43.68% of the total population. The dependent population formed 34.48% which indicates a dependence ratio of 5:6 i.e every 5 people are depended upon by 6 others.

Table 5-1: Age structure

<table>
<thead>
<tr>
<th>Age group</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-14</td>
<td>19</td>
<td>21.84</td>
</tr>
<tr>
<td>15-35</td>
<td>38</td>
<td>43.68</td>
</tr>
<tr>
<td>36-55</td>
<td>16</td>
<td>18.40</td>
</tr>
<tr>
<td>55+</td>
<td>11</td>
<td>12.64</td>
</tr>
<tr>
<td>No response</td>
<td>3</td>
<td>3.44</td>
</tr>
<tr>
<td>Total</td>
<td>87</td>
<td>100</td>
</tr>
</tbody>
</table>

Source: Field Survey, 2008
The study found out male female ratio of 1:1 with 41 of the people interviewed being male and 46 females.

Table 5-2: Respondent Level of Education

<table>
<thead>
<tr>
<th>Level of education</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary</td>
<td>9</td>
<td>10.34</td>
</tr>
<tr>
<td>Secondary</td>
<td>29</td>
<td>33.33</td>
</tr>
<tr>
<td>Tertiary</td>
<td>42</td>
<td>48.28</td>
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<tr>
<td>None</td>
<td>3</td>
<td>3.44</td>
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<tr>
<td>No response</td>
<td>4</td>
<td>4.60</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>87</strong></td>
<td><strong>100.00</strong></td>
</tr>
</tbody>
</table>

Source: Field Survey, 2008

Figure 5-2

Source: Field Survey, 2008

Effect of Rapid Urbanization on Land Use in the Nairobi Urban Fringe
The level of education in the area was found to be quite high with 48.28% of the people having attained tertiary education. It was only 3.44% which had never had education at all as indicated by the table above.

**5-3 Land Ownership and Tenure**

This is the manner in which the rights to the use of land are held. Most of land parcels are privately owned on freehold. The study found out that 87% of the land is held on freehold ownership while 10% was on leasehold with only 3% as tenants with a 5 years lease. Exclusive ownership rights have encouraged subdivision of the plots to the current average size of ¼ acre. This has encouraged private investors in residential housing development. This is evidence by the mushromming of residential apartments in the area as indicated by Plate 5-1 below.

***Plate 5-1: Apartments under construction***

Source: Field Survey, 2008
Once a title deed is acquired the owner is at liberty to subdivide the parcel into plots for sale to the highly demanding market. Legislation that guide the subdivision of land for example the Land control Act are unclear on he minimum sizes that should be observed hence giving room for proprietor to subdivide them to as small as the market demands.

### 5-4 Land use changes over time

Land uses change with time due to demand brought about by its limited (fixed) supply. Initially the land was communally owned and predominantly used for agriculture that crops growing and livestock rearing. When the white settlers came into the country at the beginning of the 19th century, the local people were regrouped into villages to allow enough land for commercial farming. Coffee plantations characterized the place. Land demarcation was done in 1957. The common people got one acre while the influential ones received from 10-30 acres. This land status remained after independence.

Due to the proximity of the area to the city of Nairobi, land has been on high demand as the urban sprawl continues. For the last five years plot owner have massively changed their use from agricultural to residential aiming to provide housing that is rapidly outstripping the demand in the city. However the majority of the parcels remain agricultural with coffee plantations, bananas, maize, fruits and other crops grown in the area.

### Table 5-3: Methods of land acquisition

<table>
<thead>
<tr>
<th>Method of Land acquisition</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bought</td>
<td>20</td>
<td>67</td>
</tr>
<tr>
<td>Inherited</td>
<td>8</td>
<td>27</td>
</tr>
<tr>
<td>Gift</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Others</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>30</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

**Source:** Field Survey, 2008
Few parcels with coffee bushes still exist though residential developments are rapidly encroaching into them as shown by the Plate 5-2 below. Expensive apartments earning a monthly rent of up to Kshs. 20,000 for a two bedroom house have come up more along the Limuru road. This has been facilitated by the Planning department of Town council of Karuri which works in conjunction with the District Physical planning office for development plans approval due to lack of professionals. However, developers have violated the set standards during construction. None of the residential apartment looked at during the study had observed a building line of 4 metres to the front and 1.5 to the back as shown in the architectural drawings and required by the approving authorities.

**Plate 5-2: Agricultural plots bordering residential and commercial houses**

![Plate 5-2: Agricultural plots bordering residential and commercial houses](image)

**Source:** Field Survey, 2008

Increase in population has also boosted businesses and other service provision. Some of the residential apartments offer commercial services the ground floors as shown in Plate 5-3. Private schools are coming to service the high demand.
Plate 5-3: Residential cum commercial building.


5-5: Land Subdivision

This the process of subdividing a land parcel into two or more individual parcels. Before 1956 land in the study area was communally owned. The land sizes averaged 400 hectares. In 1956, land demarcation was done depending on individual efforts. They received between 10 and 30 acres. A squatters’ village that was then existing in Ruaka was shifted to Ndenderu under the influence of the then powerful mbari ya muchiri to allow large area for cultivation. The plots in the village were a quarter acre.

Between independence and 1980 most of the plots had been subdivided into smaller parcels and the average land sizes ranged from 4 to 7 hectares. This went further and by 2000 the average sizes had gone further down into 0.2 hectares. The current average plot size is 0.1 hectares /1/4 an acre. For the last 8 years human settlements have spread widely replacing agricultural land. Aerial photos (Plate 5-8) and field data shows how the built up area (the settlements) has become nucleated and spread due to land subdivision. The government move in 2005 to declare minimum size of agricultural land to be 2.5 hectares would be hard to implement in this area where have gone even less the 0.1 hectares.
A 20 acres plot of land that had a single household in the 1950s is now owned by about a hundred different people thus contains 100 households.

**Figure 5-4: Plots Layouts**
Reasons for land subdivisions

Population pressure: The population in the study area is quite high. This has been contributed mostly by immigration. Original land owners (parents) have subdivided the parcels amongst their sons. In addition, many people working in the city have moved to the area as a result of the housing shortages in the city. Ruaka is currently more metropolitan than rural with majority of the numerically strong communities in the country residing in the area that was purely occupied by the kikuyu community.

Demand for housing: As the urbanization rate continues to rise, housing is becoming a major impediment to development. Supply has now outstripped the demand creating a huge shortage for the same. Proximity of the area to the city makes the study area strategic due to the convenience of getting to the working places in time. Victims of this circumstance in an effort to fulfill their dreams of owning a home have turned to the fringe to purchase plot for building homes. This has created high demand for the plots which has seen land prices going as high as 4 million for quarter an acre in a well serviced plot especially those ones along the Limuru road. This huge sum of money has attracted the local land owners to subdivide their land for sale. This is evidence by the large number of individuals more so the apartment and the magnificent homeowners who have acquired their land through buying.

This demand is also occasioned by congestion and high land prices in the city that pushes out people from residing in the city in search for spacious and environmentally sound residences.

Lack of institutional capacity to enforce subdivision rules and guidelines: Local Authorities are empowered under the Local Government Act and the physical planning Act, 1996 (CAP 286) -Section 29 to control subdivision within their areas of jurisdiction. The Act says:

Physical Planning Act (Cap 286) Section 29 – Subject to the provisions of this Act, each local authority shall have power –

c) To prohibit or control the use and development of land and buildings in the interests of proper and orderly development of its area

d) To consider and approve all development applications and grant all development permissions.
Section 30(1) – No person shall carry out development within the area of a local authority without a development permission granted by the local authority under Section 33.

Section 31(a) – Any person requiring development permission shall make an application in the form prescribed in the Fourth Schedule, to the Clerk of the local authority responsible for the area in which the land concerned is situated.

Section 33 (1) – Subject to such comments as the Director may make on a development application referred to him under Section 32, a local authority may in respect of such development application –

a) Grant the applicant a development permission in the form prescribed in the Fifth Schedule, with or without conditions;

Refuse to grant the applicant such development permission stating the grounds of refusal.

However the Town Council of Karuri within which the study area lies has no capacity to perform such a function due to lack of professional. The Council does not have a qualified physical planner and relies on the services Kiambu District Physical Planning Office whose area of jurisdiction is too large to meet the demand. This incapacity has resulted into bureaucracy that has discouraged landowners from following the right procedures during land subdivision. For example a change of use application from agricultural to residential for land parcel L.R Number Kiambaa/ Ruaka/ 2529 that was submitted on August 2007 was approved on March 2008 taking a period of almost 6 months. As a result illegal developments characterize the area. The Kiambu District Physical Planning Liaison Committee whose establishment is provided for in the Physical Planning Act and which can salvage the situation is non existent thus worsening an already terrible situation.

Some of the land shapes resulting from the subdivisions pose a challenge to develop. The Plate 5-4 below shows a parcel of land that is 6 meters wide and 48m long.
Plate 5-4: A narrow elongated plot resulting from uncontrolled subdivision.

Source: Field Survey, 2008

5-5 Level of Adherence to the Building By-Laws.
All the residential apartments studied during the research had building plans designed by professional architect. Some of what is contained in the drawings especially the plot ratios, plot coverage and the building lines have been ignored during the construction. The council by-laws requires that a building line of 4meters to the front and 1.5 to the sides and back be observed. Contrarily to this apartment in Plate 5-5 (a) whose walls serves also as the fence.
Plate 5-5: Apartments constructed in total disregard of the building line

In Plate 5-5 (b) above, the approved architectural drawing (appended) indicates that a building line of 1 meter is to be observed sharply contrasting with what actually being done. An apartment under construction that was approved to go 2 storeys high has been built up to four storeys with plot coverage of 84% contrary to 64% on approved drawings.

Source: Field Survey, 2008
Effect of Rapid Urbanization on Land Use in the Nairobi Urban Fringe

5-6 Infrastructure Facilities and Services

5-6.1 Roads

Ruaka is served by a major road (Limuru Road) that cuts across the whole sub-location. The others are dry weather roads which branch from this road to serve as access roads. However these access roads are narrow and poorly maintained. They lack provisions for utility lines.
putting the future provision of services like sewer and water at stake. Electricity lines are found at the middle of the roads in some place putting into question their safety.

**Table 5-4: Road network in the Town Council of Karuri**

<table>
<thead>
<tr>
<th>Type of Road</th>
<th>Length(km)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tarmacked</td>
<td>41</td>
</tr>
<tr>
<td>Murramed</td>
<td>16</td>
</tr>
<tr>
<td>Earth</td>
<td>173</td>
</tr>
<tr>
<td><strong>Total Road Network</strong></td>
<td><strong>230</strong></td>
</tr>
</tbody>
</table>

*Source: Town Council Karuri Strategic Plan 2007-2012*

**Plate 5-7: (a) A muddy narrow access road. (b) A utility line in the middle of a Road**

*Source: Field Survey, 2008.*
5-6.2 Waste Management
The TCK collects the solid waste but improper disposal of the same indicates that the service is inadequate. Liquid waste is also a problem since majority of the people middle class residential area direct such waste in the access roads. There are no storm water drains along the roads which worsens the situation. Those apartments near the rivers direct such water into the river despite the fact that the river is used by other people downstream.

Plate 5-8: (a) Waste water directed into the road. (b) Improper disposal of solid waste in an open space.

Source: Field Survey, 2008

5-7 Emerging Issues on Land Use

While the study area gives way to residential and commercial development, the city of Nairobi is experiencing declining employment opportunities, less moderate-income housing, and other social problems including increased concentration of poverty. Characterized by low-density development, the spatial construction of sprawl also leads to increased travel distances and more time spent on the road getting to and from the workplace. The Town council of Karuri is incapacitated to manage and mitigate the pace, location and impact of sprawl.

Land use has become a complex issue. Understanding, documenting and managing it in this area suffers from the lack of quantitative and analytical tools for assessment, planning, or evaluation of policy alternatives. Feeble, capabilities exist in Town Council Karuri to make credible
forecasts of land use change in order to evaluate the efficacy of various options as they play out into the future. Lack of good data and analytical tools to plan future scenarios has resulted to decisions being made in the dark in total disregard of the competing alternatives and interests. The emerging issues concerning the use of land include;

1. **Changes in settlement patterns.**

In the study area, the changes threaten the viability of farming. Huge acreage of farmland has been converted to residential development. As a result of urban to rural migration, farmers increasingly have non-farming neighbors unaccustomed to the sights, sounds, and smells of modern agriculture. These demographic shifts, combined with strong public preferences for protecting the environment, are a clear indication that friction between farmers and neighboring residents and communities will continue and even worsen. The result will be increased costs for farmers and the potential loss of profitable agricultural land and the amenities associated with certain farm types in this area as shown by the Plate5-8 below.

2. **Changing demographics, administration and politics.**

The make-up of the community in this area is changing and this has ramifications for administration and governance. As fewer people are actively engaged in agriculture and as more non-farmers migrate into the area, the political balance is shifting from traditional agricultural farm-level production interests to non-farm residents.

3. **Changing knowledge, values and attitudes toward the environment and property rights.**

National Environment Management Authority (NEMA) has been implementing legislations and public policies aimed at the conservation and restoration of the natural environment and ecosystems in the in the area of study. The regulations pertaining to environmental quality still cause disputes and legal challenges. However, by and large, the Town council of Karuri has accepted the need for environmental conservation to restrict certain aspects of the use of private property and interference of the natural features like rivers in the area whose responsibility to conserve is nobodyâ€™s.
As these conflicts increase due to further population shifts and urbanization, peoples' trust that public institutions, can resolve these issues is declining.

Plate 5-9: An aerial View of Karura, Ruaka Urban and Ruaka Rural Villages

Source: www.Wikimapia.com
4. Changes in philosophies and operating procedures of governments.

The idea that people are better equipped to solve problems than government bureaucracies or experts has increased. Increased initiative at the local level creates situations where land use conflicts relating to agricultural operations in the area have become difficult to resolve. It has become a common scene where household damp their waste in the neighboring agricultural farms. Significant issues of public policy include not only whether farm operations and other land uses are compatible, but also which governmental institutions are suitable to resolve the conflicts and how regulations play a role in this resolution. Unclear policy approaches on land are leading to questions about whose preferences count in policy-making, as well as the outcomes for farm and non-farm groups.

As change gives rise to new fears about potential personal, environmental, or economic loss, people and organizations have attempted to learn more about the issues and voice their concerns through the existing institutions and policy processes. In many cases, the state and local authorities and procedures used for dealing with such concerns (e.g., public hearings) are found wanting. Local authority is deemed as unresponsive, biased, and unwilling or unable to respond to the concerns. Often seemingly small disputes between neighbors escalate into broader debates and, in some cases, costly litigation.

Rural institutions for guiding land use, public participation, education and managing conflict for example the District Physical Planning Liaison committee seem ill-equipped to resolve the complex conflicts brought about by rapid change.

The central factor affecting the degree of interrelatedness (and conflict) among people is the amount of space between them. Obviously, the more densely people and businesses are, the greater the chance for conflict about land uses.

5. Land use Conflicts

The process of urbanization has brought about typical land use associations where the contemporary and dynamic land use pattern is developing side by side in the contemporary
context. Old houses, new residential apartments, commercial and farming are not nearly sorted out into homogenous areas but are intermingled in a random manner which gives a distinctive quality to the land use pattern of the area.

The haphazard development of houses for rental purposes, piecemeal commercial developments, intermix of conforming and non-conforming uses of land combined with inadequate services and facilities have become a common features in the study area. The dynamic change from rural to urban land use is so fast that the resultant need and complex uses coupled with shortage of land have led to speculation and increase in land values.
CHAPTER SIX: CONCLUSION AND RECOMMENDATIONS

6-1 Overview

This chapter contains the conclusion and recommendations arrived at after analysis of the data obtained from the field survey. The conclusions are made, based on the literature reviewed and the actual findings of the field study. It also contains recommendations on how development can be guided more so on land use to ensure sustainably utilization of the existing resources.

6-2 Conclusion

The study reveals that Ruaka is now becoming urban with the economic base of communities i.e. household’s occupation shifting from farming to basically trading economy. There has been a gradual erosion of social networks. Tracks of agricultural land with coffee and other crops has been subdivided changed user from agricultural to residential. Complete and upcoming residential developments characterize the area which indicates that the area is experiencing rapid land use changes from agricultural to residential. Land sizes have decreased to agriculturally uneconomical sizes due to the population pressure and the high demand. Change in land uses in the area has brought with it intense and divisive conflicts between and among farmers, rural residents, neighborhoods, community and the interest groups due to lack of a Local Physical Development Plan to guide new developments.

The native local residents and policy-makers are concerned that their economic security and quality of life and personal freedoms, is at risk. They are worried that they have lost the ability to determine their future to forces and people outside of the traditional community whom they feel that they do not have their community’s best interest in mind. The main cause of population pressure is immigration of people from the city who move to reside in the area due to its proximity to city where they work.

The change and unmanaged growth upsets has wasted and destroyed natural resources and the environment in total disregard of the local community’s preferences and values about natural resources and related amenities that may be in limited supply, integral to a larger ecosystem, or unique in some way. Some see additional growth as needed for progress and keeping living
standards high, while others see much waste and inefficiency in certain patterns of growth that repeatedly occur.

The Town Council of Karuri is unable to respond to the concerns due to lack of development policies and strategies. Small disputes between neighbors more so on land escalate leading to costly litigation. The Town council of Karuri being the institution mandated guiding land use and managing conflict is ill-equipped to resolve the complex conflicts brought about by rapid change. Encroachment on land that is better left undeveloped mostly on the hill top and near the river courses puts environment conservation hanging in the balance.

6-3 Recommendations

The study area does not have a Physical Development Plan thus the development approvals are based on Part Development Plans that covers only a small area. This underscores the need for a comprehensive Physical Development Plan to guide development. It should address among other things the level of plots subdivision and infrastructure.

The local planning institutions also need to be strengthened more so the Town Council of Karuri which is mandated to oversee and guide development despite not having the technical capacity to do so. Other institutions to be strengthened include the local Community Based Organizations, The Non Governmental Organizations, The Ministry of Lands and Settlements, The Ministry of Environment and Natural Resources and the Ministry of Local Government.

There bureaucratic processes during development approval should be ironed out to prevent developers from starting the development process before the approval as well as encourage them to seek development approval. Such approval should not take more than the prescribed 30 days. Political interference from the Local Authority should be suppressed and wiped out to ensure quick development approval.

Harmonization of policies for managing land use at the rural urban fringe would provide a solution to the problems affecting land in the rural urban fringe. The policy should focus on the reduction of the uncertainty and unpredictability of land use changes at the rural-urban interface. The policy should among other things pay special attention to the following;
a) Establishing planning units in the Local Authorities with professional planners and equipment to facilitate planning to the development control.

b) Harmonizing the office of the Director of Physical Planning with the Development Control Department of the Local Authorities to enhance preparation and implementation of Physical Development Plans for effective developments control.

c) Protecting the farmland base to serve the broad societal interest in maintaining a stable and sustainable use of land.

d) Providing guidelines for building and land developments that are rapidly taking place as a result of urban encroachment to harmonize such developments so as to avoid incongruous use of plots that border each other and put together the harmonious ones so as to prevent negative land use impacts.

e) Providing orderly growth and land use change in particular areas, including community emphasis placed on re-development instead of new development.

f) Protecting the environmentally sensitive areas such as the forests, dams, the existing swamp and the rivers.

g) Protecting the few existing open spaces and if possible repossess the ones that have been illegally subdivided to individuals for the local community.

h) Resolving farm-urban neighbor conflicts through disclosure requirements for land use changes transactions, buffer zones, residential subdivision design, and sensitive urban planning.

i) Avoiding inefficient use of land in urban development through such techniques annexation control, planning for phased growth, infill development, and higher density projects.

j) Restricting scattered development in agricultural areas through agricultural zoning with large minimum parcel sizes, limiting home sites on farm parcels, limiting the extension of urban infrastructure, and requiring environmental or Land Evaluation and Site Assessment (LESA) review of proposed building.
k) Seeking cooperation in land use matters through revenue sharing, inter-local agreements on the direction of future urbanization, joint planning, and common development standards.

In addition municipal finances should be improved to create funds for the provision of infrastructure. Imposition of development impact fees should also be imposed to developers so they can contribute for the offsite infrastructure.

Land use planning and environmental controls, Regulatory measures, including standards for pollution discharges and market-based instruments should be enhanced for sustainable development. An effective monitoring and enforcement system is paramount in order to ensure that the recommendations are implemented.
REFERENCE


4. Hoyt Homer, (1986), Where the Rich and the Poor Live; The Location of residential areas occupied by the highest and the lowest income families in the American Cities, Washington Urban Land Institute.


BIBLIOGRAPHY


APPENDICES

UNIVERSITY OF NAIROBI

SCHOOL OF BUILT ENVIRONMENT

DEPARTMENT OF URBAN AND REGIONAL PLANNING

Planning Research Project

**Topic:** Examining the development challenges facing the Nairobi urban fringe.

(A case study of Ruaka, Kiambu)

**Declaration:** This information is confidential and will be used for academic purposes only.

Date of interview

Name of interviewer

Questionnaire number

---

TOWN COUNCIL OF KARURI

1) As the authority charged with the responsibility of guiding and controlling development within the Town Council of Karuri, to what extent do you exercise this mandate?

2) (a) Do developers submit their development plans for approval?

    Yes

    No

    (b) If so, what is the procedure from the time they are submitted to the time the developer is given permitted to move on?

    (c) What issues do you pay attention to?
3) Does the council have a standard guideline for the kind of developments that are allowed in various areas within the town council?

<table>
<thead>
<tr>
<th>Yes</th>
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4) What services does the council offer to the residents and how efficient are they?

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5) (a) Ruaka area is slowly turning urban, are there any plans to construct a sewer network?

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<tr>
<th>Yes</th>
<th>No</th>
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(b) If so, how will this be possible putting into consideration the narrow access roads leading to the residential areas?

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6) What is the take of the council on the wastewater disposal in the residential areas of Ruaka?

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7) (a) Are there existing land use conflicts within the town council?

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<thead>
<tr>
<th>Yes</th>
<th>No</th>
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(b) If so, what kind of conflicts and what are the possible solutions?

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8) What is your view on the current development trend in relation to the natural environment more so on the Ruaka River?

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9) Is there any land reserved for future public purposes or for the expansion of the existing services like bus parks?

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10) How do you see Ruaka in 20 years time?

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Thank you
UNIVERSITY OF NAIROBI

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Declaration: This information is confidential and will be used for academic purposes only.

Date of interview .................................................................

Name of interviewer ...........................................................

Questionnaire number .........................................................

HOUSEHOLD QUESTIONNAIRE

Background information

Name of the correspondent (Optional)..................................................

Age of the respondent.............................................................

Sex:          Male                Female

Level of Education:

(i) No Education         (ii) Informal       (iii) Pre-primary     (iv) Primary           (v) Secondary    (vi) Tertiary    (vii) Other (Specify)...........................

Ethnic background........................................................................

1. (a) Were you born in Ruaka? Yes       No

         (b) If not where were you born

         (c) Which is the main reason for migrating to Ruaka?
2. (a) Do you own this land?

   Yes               No

(b) If yes what is the size of your land? .................

(c) Type of tenure

   (i) Freehold   (ii) Leasehold   (iii) Trust land   (iv) Other (specify).................

(d) Tenancy

   (i) Owner occupied

   (ii) Rental- What is the monthly rent? ............

   (iii) Company House

   (iv) Squatter settlements

   (v) Other (Specify)..............................

3. How many rooms does your house contain? ..................

4. How many people live in your house? ........................

5. How long have you been living in this house? ..............

6. What type building materials have been used to construct this house?

<table>
<thead>
<tr>
<th></th>
<th>Timber</th>
<th>Stones</th>
<th>Mud</th>
<th>Iron sheets</th>
<th>Concrete</th>
<th>Others</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wall</td>
<td></td>
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<td></td>
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<tr>
<th></th>
<th>Tiles</th>
<th>Iron sheets</th>
<th>Grass</th>
<th>Asbestos</th>
<th>Others</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roof</td>
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<tr>
<th></th>
<th>Cemented</th>
<th>Earthen</th>
<th>Wooden</th>
<th>Others</th>
</tr>
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<tbody>
<tr>
<td>Floor</td>
<td></td>
<td></td>
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<td></td>
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</tbody>
</table>
7. How do you find the condition of this house?

Bad        Fair        Good        Excellent

8. What is your monthly income?

< 1,000
1,000 - 5,000
5,000 - 10,000
10,000 - 20,000
20,000>

9. Level of services

<table>
<thead>
<tr>
<th>Level of services</th>
<th>Distance</th>
<th>Provider</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Energy</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electricity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Waste disposal</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>ICT</td>
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UNIVERSITY OF NAIROBI

SCHOOL OF THE BUILT ENVIRONMENT

DEPARTMENT OF URBAN AND REGIONAL PLANNING

Planning Research Project

**Topic:** Examining the development challenges facing the Nairobi urban fringe.

(A case study of Ruaka, Kiambu)

**CHECK LIST OF RESEARCH ITEMS**

1. **Land**
   (i) The land sizes -, acreage, Length of the plots and widths.
   (ii) Shape of the land parcels.
   (iii) Land uses - Residential (single, multifamily dwellings e.t.c )
         - Agricultural (Crops grown, animals reared e.t.c)
   (iv) Changes of user.
   (v) Interests on land- (freehold, leasehold or trust land)
   (vi) Land use conflicts.
   (vii) Sketches of the plots.
   (viii) Topography of the plots.
   (ix) Soils and vegetation types.
   (x) Land prices and speculation.
   (xi) Land subdivision rules and guidelines.
   (xii) Development approval procedures.

2. **Buildings**
   (i) Plot ratios and coverages.
   (ii) Building heights.
   (iii) Plot usage conflicts ṭ congestion of structures, inhabitants e.t.c
   (iv) Description of the building ṭ size in the relationship to the occupants.
   (v) Harmonization of tall and short building that borders one another.
   (vi) Building materials.
   (vii) Compliance to health standards (occupational certificates)
   (viii) Aspect (relationship sun and wind direction)
   (ix) How buildings are constructed in the rugged topography.
   (x) Cost of the buildings materials.
   (xi) Adherence to the building by-laws for both commercial and residential buildings.
   (xii) House Typologies.
   (xiii) Housing densities.
   (xiv) Household sizes.
   (xv) Ventilation and lighting.
(xvi) Level of services and facilities.
(xvii) Sewerage and waste disposal
(xviii) Security
(xix) Energy
(xx) Accessibility

3. Infrastructure
   (a) Roads
      (i) Width of the access roads in relation to the services it offers.
      (ii) Conditions of the roads.
      (iii) Provisions for walkways and NMT.
      (iv) Steepness of the roads.

   (b) Drainage Facilities
      (i) Presence of storm water drains.
      (ii) Domestic waste water disposal infrastructure
      (iii) Adequacy of the infrastructure.
      (iv) Their conditions.
      (v) Their efficiency and effectiveness.

   (c) Power and water facilities
      (i) Passage of the water and power lines – presence of way leaves.
      (ii) Their effectiveness and reliability.
      (iii) Legality of the connections.