

What are the Drivers of Growth on the Rural-Urban Fringes? A Case Study of the Nairobi-Kiambu Corridor

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Abstract

The development of the urban fringes is an inevitable consequence of urbanization given that as cities continue to grow, urban activities spread outwards in waves towards the rural areas. The rural-urban fringes of cities thus, are the exit points for residents relocating from major urban built areas, and entry points for rural migrants into the towns. Firstly, rural-urban fringes are determined by two major factors; that is, administrative boundaries and the differences in the intensity of built up areas and the farmland. Secondly, policy and legal guidelines exhibit inadequacies in handling the dynamism of the fringes and thus the failure by planning agencies in managing the impending growth, resulting in the development of land in an un-sustainable manner. Thirdly, prospective land developers, businesses and communities fail to anticipate the results of development because they lack information on potential or approved development plans. This research paper applies urban development theories to explain the drivers of growth at the rural-urban fringes. In this regard, this study draws heavily from a paper by Alonso and Wingo's explanations on the spatial structure in terms of how the market allocates space to users according to supply and demand; von Thunen's agricultural land use model whose building blocks are economic rent, distance from the centre and individual decision making explains how the urban structure is influenced by the locational behavior of households in the city. A sample of 134 respondents, drawn from the five (5) neighborhoods located within the Nairobi-Kiambu development corridor informed the research. This was further informed by the rather heterogeneous nature of the neighborhoods in terms of physical characteristics, livelihoods and historical evolution. Observation, questionnaires, focus group discussions and interviews were the main methods applied in the collection of primary data. A synopsis of the findings reveals that, contrary to conclusions in studies carried out elsewhere in Africa that periphery development accommodates low income residents, the Nairobi-Kiambu corridor presents an area interspersed with low and high income households; households locate at the fringes so as to take advantage of relaxed regulations and therefore engage in land use practices that are allowable

Keywords: rural-urban fringe, drivers of growth, land, planning

INTRODUCTION

Africa is the fastest urbanizing continent in the world. In 1980, only 28 percent of the African population lived in cities. Today, the population in African cities has risen to about 37 percent. The annual urban growth rate in Africa is 4.87 percent, twice that of Latin America and Asia. Cities and towns in Africa are also growing at twice the 2.5 percent growth rate of the rural population in Africa (Tibaijuka, 2006). The United Nations projects that the urban population will double in the next 30 years, from just fewer than 2 billion people, to nearly 4 billion. There are three causal factors for this phenomenon namely: migration from rural areas and other urban areas, which is a dominant factor in Kenya and other developing countries. Urban areas continue to attract people due to real or imagined opportunities; natural population increase in urban areas; and the reclassification of previously rural areas as urban areas, thus precipitating densification and thereby changing their physical landscapes. There is a clear link between

national economic development or a nation's wealth and the growth of cities; a scenario evident in the simple fact that the world's largest cities are also located in countries with the largest economies. Secondly, cities globally are centers of artistic, scientific and technological innovations of culture and education (United Nations, 1996).

In Kenya, the urban population generates over 65 per cent of the national GDP. Nairobi alone, contributes 60 per cent of the GDP of the country's economy thus contributing to overall economic growth and poverty reduction. Notwithstanding the importance of Nairobi in national development, the city has not been immune from the negative impacts of urbanization namely: strained capacity of cities in the provision of requisite infrastructure and basic urban services to residents. This has resulted in an urban sprawl, with the middle social classes seeking more comfortable accommodation in

outlying areas, (poor households also locate in distant city fringes), as overcrowded and impoverished informal settlements continue to flourish.

Rapid population growth in large cities usually promotes the densification of less developed areas and expansion at the urban fringe, largely following either price constraints or the preferences of households acting within the housing market. Since housing prices and rents are lower on the periphery areas of cities than at the centre, richer households are more decentralized than poorer households. The formation of vast and ever-expanding metropolitan regions seems to be an inevitable feature of very large populous countries in the developing world.

The tremendous growth of towns into their hinterlands, and the consequent spatial, social and land use transformations provide for a case that it is not enough to classify urban and rural areas or their communities and territories, merely on the basis of physical boundaries. The fringes of the city as spaces are the product of the interaction of state intervention and policies on one hand, and the action and practices of the inhabitants on the other as evident in the everyday use and appropriation of spaces, land, housing strategies and self-building practices. In Kenya specifically, there is an obvious ambiguity in the locus of responsibility for fringe planning; the responsibility seems to lie somewhere between the state and the local government. There are varied dimensions which define the rural-urban fringes, with the key ones being, location, land use and population densities and characteristics. Alternatively, the fringe is viewed as a landscape type in its own right; one forged from the interaction of urban and rural land uses

In studies carried out in England, the rural-urban fringe is referred to as 'no man's land, and lies between the town and country side. Gallent (2002), argues that the rural-urban fringe is an area with a distinct entity and also one that possess special characteristics that differentiate it from rural and urban areas. In 2003, the Department of Communities and Local Government (previously under the Office of the Deputy Prime Minister), the agency in charge of local government in England, delineated the fringe as a 500 meters girdle, surrounding any metropolitan or small town area. However, current research indicates that fringes are not uniform girdles, but rather, that they stretch and contract depending on factors such as topography, economy and politics.

The term, rural-urban fringe, is sometimes defined in terms of a city sprawl. Although there are many

definitions of sprawl, a central component of most definitions is that sprawl is the spreading out of a city and its suburbs over more and more rural land, on the periphery of an urban area. This involves the conversion of open space (rural land) into built-up, developed land over time. From the standpoint of urban planning institutions, the style of that conversion can sometimes be more important than the amount of the conversion and hence the emphasis on the qualitative attributes of sprawl such as attractiveness, pedestrian-friendliness and compactness. Land conversion is best reflected by the land use and existence of livelihoods.

Secondly, a gradual shift in thinking about social change has led to a greater emphasis on peoples' perceptions of how to change their lives through individual and collective action and the structures of society. The research explores how these perceptions are reflected in the land uses at the rural-urban fringe on Nairobi-Kiambu development corridor.

THE PROBLEM

The rural-urban fringe, presents a landscape where the formerly distinctive attributes of "rural" and "urban" become increasingly blurred. In terms of the physical fabric, this is evident from the expansion of metropolitan areas; while at a functional level, it is seen in the spatial intrusion of urban activities into rural areas; while in family and household terms it is seen in the dynamics of land use.

It is in no doubt that urban residents locate at the fringes in search of more space reduced congestion either at the plot or neighbourhood level. In most instances planning takes place before development, thus property owners' expectations for higher land values exacerbate property rights, conflicts and complicates the subsequent growth-control efforts.

Thirdly, prospective land developers, businesses and communities fail to anticipate the results of development because they lack information on potential or approved development plans (where they exist) for the surrounding developments. Where property owners intend to plan or to seek planning guidance, the development control frameworks within which development can proceed are lacking and there exists little or no information on which to anticipate growth.

This research paper therefore sought answers to the issues stated above: what are the driving forces for this growth, what are the spatial implications, and how can the ensuing growth be managed for the benefit of the people caught up in the maelstrom of this change. On the one hand, use of land is closely connected to these

changes, as people seek to consolidate and diversify these into coherent and synergetic activities and contribute to their wellbeing on their own mode.

RESEARCH OBJECTIVES

- (i) To establish the driving forces of the growth and development of the Nairobi- Kiambu corridor
- (ii) To investigate the process of growth and the reasons for settlement in the Nairobi- Kiambu corridor

STUDY PROPOSITION

That land remains the most fundamental natural asset in the rural-urban fringes. Residents and households regard land as an investment and a value. Therefore, the rural-urban fringes will continue to be contested areas as different actors seek to meet these ideals.

SIGNIFICANCE OF THE RESEARCH

Rarely are rural-urban fringes recognized as entities in planning and policy documents. Yet, these zones have significance for both the understanding and planning of cities; as, for one, they have distinct characteristics and two, they provide a frame of reference that articulates the physical make up of an urban area in relation to its hinterland. In reference to the Nairobi-Kiambu corridor, the significance of this belt underlies a conceptual thinking about the nature of the urban physical growth and the city’s transformation.

It is therefore important that fringe residents, landowners, policy makers and development practitioners have adequate and useful information on the growth dynamics of the fringe and moreover, the people settled within this corridor reap maximum benefits from their land and assets.

The Nairobi/Kiambu corridor presents a situation where the rural-urban fringe is an active zone in land use changes; basically due to the proximity of both zones, historical factors that encouraged private land ownership and the subsequent possibilities of enhanced economic returns from land. More importantly, the belt is not just viewed as a marker of the city edge but rather, as a translation of the significant demographic changes and economic structuring occurs. The dovetailing of the rural-urban fringes, that is already taking place, should be managed more effectively, basically in order to ensure a balance between land uses and to guarantee access and realize the integration of social, economic and ecological uses, that is, optimize on the multi-functionality of the fringe. This is what Hoggart (2005), refers to as ‘mutations’, that is, planning that recognizes the interplay between existing uses and functions, and which therefore deals with the integration

between ‘rural’ and ‘urban’. This phenomenon requires to be guided through spatial planning and this thus was the essence of this study

SCOPE OF THE RESEARCH

The study was carried out in the residential neighbourhoods of Kiamumbi and Thindigwa (in Kiambu county) and Roysambu, Njathaini and Kamuthi (in Nairobi city county). These neighbourhoods are located approximately 15 kilometers from Nairobi City and Kiambu town, respectively. It focuses on the drivers of growth of thie development corridor and the process that this growth exhibits.

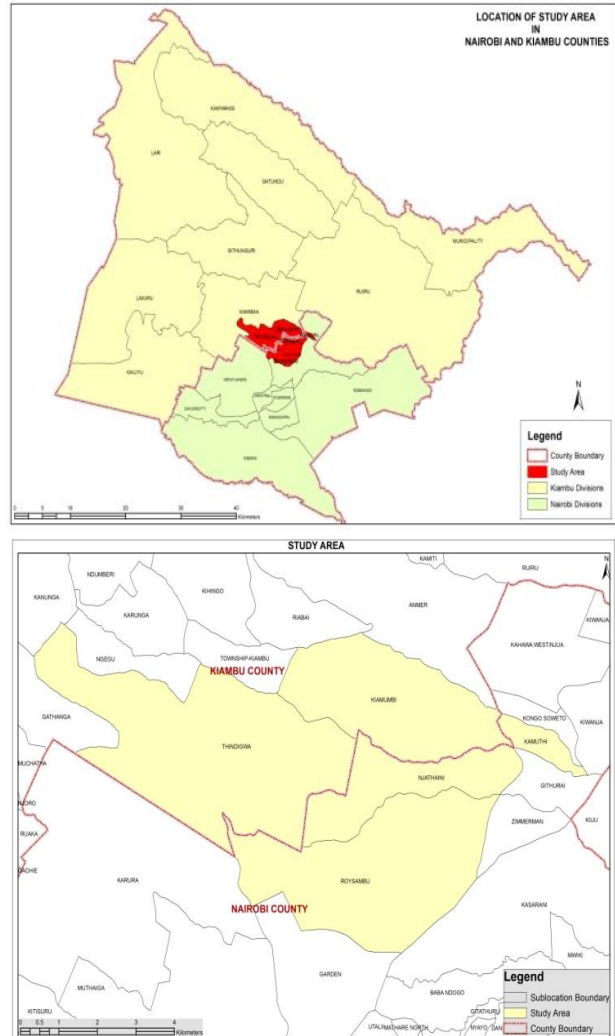


Figure 1.1: The county and local context of the study area

Source: Survey of Kenya, 2012

The study applied the concept of neighborhoods (as clusters) to delineate the area for data collection purposes. The physical limits and scope of the study area is indicated in Figure 1-1, giving the two counties of Kiambu and Nairobi. The neighborhood is an

important structuring element as it has social functions including the development of significant social primary relationships, socialization of children and the development of informal social control; provision of personal support networks; and the facilitation of social integration into the larger society.

Household decisions are categorized into three facets namely: developmental or economic aspects since neighbourhoods are formed as a result of decisions made by many households including the reasons to locate at the fringes.

CONCEPTUAL AND THEORETICAL FRAMEWORK

Urban Development Theories

The economic and ecological analysis of urban structures provides a number of explanations on the location behaviour of households in the city. These concepts are based on von Thunen's agricultural land use model, the building blocks for which are economic rent, distance from the centre and individual decision making (Alonso, 1964 as quoted by Mbiba & Huchzmeyer, 2002). With some variations, the assumption in the economic model is that land use reflects the value and profitability of a particular location or area. This thinking was followed later by those of such as Von Thunen and Losch (1966 as quoted by Mbiba & Huchzmeyer, 2002), which define neighbourhood by distance, revealing how identical activities would emerge within cities. They continue to say that different income groups occupy entire rings around the centre and where well-defined sectors shape high income areas adjoining on one or both the middle income areas. In Africa however, historical and religious rather than geographical factors, determine the urban structure of many cities with the most dominant feature being the presence of old and dilapidated residential areas within the centre, while low income settlements are usually located on the outskirts of the cities. The mixed land use and income structure of residents in the rural-urban fringes pose new challenges for planning in many of these cities; as opposed to predetermined planning models, here people create the spaces they inhabit and draw their character from them, thus the need for understanding the livelihoods.

Walter Christaller (1933) demonstrated how under certain conditions, a hierarchy of central places would result, as determined by the rarity of a service, the population needed to support it and the size of the central place itself. Colby (1933), identified the centrifugal and centripetal forces at work in cities, which have the effect of concentrating certain activities and dispersing others (McLaughlin 1969). Two major

factors run through the theories analyzed above, one is the idea of an equilibrium condition in which any change is explained as an outside disturbance after which a fresh equilibrium would be reached; and, two, that location decisions made by residents were rational, based on the need to select an optimal location for their activities. Thus, fringe belts are products of large numbers of separate decisions about individual and household spaces. These two factors are vital to any analysis of the urban fringe, and both are applicable for establishing the dynamism of the fringes.

Urban change content theories are also relevant to this research paper. Again here, many such theories abound. These land market theories also describe the relationship between land owners, purchasers and developers. The classical economic theorists such as Alonso and Wingo, explain the spatial structure in terms of how the market allocates space to users, according to supply and demand; while human ecology theories explain urban development through market-driven economic competition for urban space, and the Marxist theories explain urban development as the result of the exploitation of workers by capitalists (Kaiser *et al*, 1995). The study's main focus is the process of land use changes of the rural-urban fringe, the exogenous and endogenous forces that determine this change.

According to Kaiser *et al* (1995), human ecology assumes that as market changes, resulting from, for example, construction of new highways, they produce both demographic changes and changes in the land regulations over time. Rudel (1989), as quoted by Kaiser *et al* 1995). confirms the above statement, thus; 'as land use changes, repeated dozens of times on different parcels of land, it gradually alters the configuration of interest in a community and this change in interest causes a change in policy'.

KEY CONCEPTS IN THE RESEARCH PAPER

Planning

Historically, town planning was concerned with the orderly, aesthetic and healthy layout of buildings and land uses. According to Keeble (1964: as quoted by Ahmed and Bagwa, 2005)

"...planning is the art and science of ordering the use of land, character and siting of buildings and communication routes in-order to secure and maximize the practicable degree of economy, convenience and beauty."

Franklin, in his definition of planning introduces the concept of 'balance' of objectives or (in a sense) needs when he states that, physical planning is concerned with the design, growth and management of the physical

environment, in accordance with predetermined and agreed policies, whereby balanced social and economic objectives may be achieved (Franklin 1979). Taylor and Williams echo the same idea and define planning as a mechanism to provide an environment for living which all may desire but which would not be attained through the fragmented decisions of individuals. It is a means to organize the public goods of society, (Taylor and Williams (1982).

For the purposes of this research paper however, the author applied extensively, the definition by Rakodi and Devas (1993), that is, town planning has evolved and today incorporates broader social and political aspects, from the primary concern of the preparation of plan documents to concern with implementation and forces which influence and determine patterns of development, for example, systems of municipal management. Municipal management as a practice has its roots in the traditions of public administration, and in particular, the Weberian ideals of 'legal, rational and authority' (basically in regard to maintenance of public order and interests of those in power). With democratic influences over time, the concerns of public administration have widened to take into account the interests and needs of ordinary citizens.

However, in many developing countries, public administration is dominated by interpretation and enforcement of legislation with regulation and control of activities of the private sector and routine procedures about the provision of services and this is the realm that urban planning finds itself. Therefore, the integration of urban planning and management in developing countries is pertinent in the pursuit of developing innovative approaches towards resolving urban problems and improving urban conditions. The urgency for planning of the urban fringes is pertinent as it presents a rather presumptive situation of urban development in developing countries. This research paper further builds upon Riggs (1997) notion that the formerly distinctive attributes of "rural" and "urban" are becoming increasingly blurred. According to him, in terms of the physical fabric, this is evident in the expansion of Southeast Asia's metropolitan regions; at a functional level it is observable in the spatial intrusion of industry into rural areas; and in human and household terms in the diversification of livelihoods and the increasing movement of people between regions and jobs. It is in interpreting these changes that the real challenge lies: thus this paper seeks for the interpretation of these changes by exploring the factors responsible for driving the processes and the implications, for the development of the rural-urban fringes

On the other hand planning should act as a change indicator. The term "change indicators" has been used to describe the changes on land and also as a measurement of the quality and quantity of land resources. Indicators of change or sustainability indicators are necessary to guide land users in their decisions to manage land and water resources and inputs. Land qualities as used by FAO for many years in the context of land evaluation (FAO, 1976), was on one hand a complex attribute (for example, nutrient availability), that affects the suitability of the land for a specified use and in a distinct way. Land qualities care is also defined in negative terms, as "land limitations" (FAO, 1995).

Planning is an important tool that the actors interested in peri urban growth and development could utilize to address issues of un-sustainability. Innovative planning mechanisms that accommodate aspects such as coordination, consensus-building and negotiation have the ability to resolve conflicts arising from the exploitation of resources. This is because, most conflicts associated with resource exploitation, arise over the need to ensure social equity, sound physical environment and economic development.

From a more conceptual and to an extent practical perspective, land use planning is a decision-making process that facilitates the allocation of land to the uses that provide the highest sustainable benefits. It is based on the socio-economic conditions and expected developments of the population in and around a natural land unit (asset). The result is an indication of a preferred future land use, or combination of uses. Land use planning in the peri-urban areas is crucial as these areas directly impinge on rural areas, through expansion of buildings onto valuable agricultural land and the consequent modification of land uses in the adjoining rural areas. The function of planning therefore requires a redefinition that accommodates the land use dynamics existing in the peri-urban areas of cities.

Land

The concept of land, from a natural resource perspective, can be defined as: those components of land units that are of direct economic use for human population groups living in the area, or expected to move into the area: near-surface climatic conditions; soil and terrain conditions; freshwater conditions; and vegetation and animal conditions in so far as they provide produce. A key function of land is that it provides the physical basis for human settlements, industrial plants and social activities such as sports and recreation (the living space function). Land acts as a key natural asset for people living in the peri-urban fringes

in Kenya and many developing countries. Due to the high land prices within city centers, majority of the urban residents have settled at the fringes where land is cheaper.

In Kenya, land is a central category of property in the lives of the citizens. It is the principal source of livelihood and material wealth, and invariably carries cultural significance. Primarily, land is critical to the economic, social and political development of the country. Its importance is recognized by various Government economic policies including the Poverty Reduction Strategy Paper (PRSP), Economic Recovery Strategy for Wealth and Employment Creation (2003-2007), the Constitution 2010 and political party manifestos. Land was a key reason for the independence struggle and land issues remain politically sensitive and culturally complex. The enactment of the National Land Policy, leading to the formation of the National Land Commission, articulates the government and national ideals on land and addresses issues including constitutional reform, land tenure, land use management and administration.

Any discussion on land in Kenya may not be relevant and/or useful without reference to ownership. There are different forms of landownership but the pertinent concern is access and use. That is, whether communal, leasehold or freehold, what is important is the individual's right to utilize the land for private benefits. The land ownership systems were inherited from the feudal, English common-law system, with its differentiated property rights. Private land-ownership was defined as the right to possess, use, manage, benefit from, have secure title to and dispose of land. The composite rights represent *exclusive* rather than *absolute rights*, the latter, disregarding the interests of the public in the exercise of ownership. The only rights retained by government are sovereign rights, taxation rights, rights to acquire the land by eminent domain (public taking) with just compensation, and the right to regulate the use of land. Therefore, private land ownership is perceived as a bundle of rights that include the right to use or dispose of the land and any of its associated rights.

In Kenya, land ownership influences the system of use and to an extent determines its suitability. For instance, landscape units, as natural resource units have a dynamism of their own (the environment function), but human influences affect this dynamism to a great extent, in space and time. In the absence of an effective land use planning system, land degradation may be exacerbated. Broader perspectives in land ownership and use therefore, should be replaced by a technique for the planning and management of land resources that is

integrated and holistic and where land users are the central players. This will ensure the long-term quality of the land for land users, the prevention or resolution of social conflicts related to land use, and the conservation of ecosystems of high biodiversity value.

Rural – Urban Fringes

There are many definitions of an urban sprawl, and a central component of most of these definitions is that sprawl is unguided and unregulated development without regard to the desired future states of rural areas or cities. This situation results in the spreading out of a city and its suburbs over more and more rural land at the periphery of an urban area. This involves the conversion of rural land into built-up, developed land, over time. From the standpoint of urban planning institutions, the style of that conversion can sometimes be more important than the amount of the conversion and therefore the emphasis on qualitative attributes of sprawl such as attractiveness, pedestrian-friendliness and compactness. But for those who are most concerned about the effect of a sprawl on the natural environment and agricultural resources, the more important overall measure of sprawl is the actual amount of land that has been urbanized.

Even in the developed world, urban sprawl is one of the most important types of land-use changes. It increasingly creates major impacts on the environment in terms of surface sealing, emissions by transport-based activities and ecosystem fragmentation. On the social structure, the effects include segregation, lifestyle changes and neglect of urban centres; while on the economic structures, it creates changes including aspects of levels of production and land prices. Drawing on the example of rural-urban development in the Brussels metropolitan area, Belgium's capital city Brussels, and its periphery, Vanempten, refer to the RUF as "rurbanity" in reference to the interface between the urban and the rural. He further indicates that this "rurbanity" materialises in a fragmented and dispersed way, creating diffuse heterogeneous tissue that is neither urban nor rural but rather both simultaneously (Vanempten, 2009).

According to Unwin and Porter, many regions in Asia have witnessed the emergence of functionally integrated (1995) structures where agricultural and non-agricultural activities are increasingly found in complex, spatial mixes. Evidence from other regions, particularly, in the Third World, may suggest that in physical terms the distinction between rural and urban landscapes is still relevant. Nevertheless in functional terms, the increasing and sustained integration is recognised (Potter and Unwin, 1995).

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

Urban fringe development can be triggered by the development of traditional towns in former rural areas that over time have been assimilated by expanding (metropolis) cities. In the United States of America context, there is obvious lack of urban and regional planning and intergovernmental collaboration between central city governments and surrounding jurisdictions, principally adjacent townships (Heimlich & Anderson, 2006). This has resulted in a decline in re-investment and renewal of key functions of the central city, financed largely by local taxes, and this has contributed to an urban exodus. Frequently, competition among adjacent units of government, such as cities and surrounding townships, extends beyond efforts to develop land and increase local property values, thereby raising local tax revenues. It increasingly includes efforts by the rapidly developing jurisdictions to annex land from its less-developed neighbours.

One of the major impacts of the urban sprawl is the increased tax burden. The costs of providing community services increase as homes and businesses spread farther and farther apart and local governments are forced to provide for widely spaced services. The owners of these dispersed developments seldom pay the full government costs of serving them, forcing the rest of the settlements to subsidize them through higher taxes at the local and national level. A study carried out in the State of New Jersey (Heimlich & Anderson, 2006) evaluated the conventional sprawl growth patterns against a mix of "infill" development, higher density concentrated new developments and the traditional sprawl. This study came up with large projected differences; for example, that infill and higher density growth would result in a savings of \$1.18 billion in roads, water and sanitary sewer construction (or more than \$12,000 per new

home) and \$400 million in direct annual savings to local governments. Over 15 years, it amounts to \$7.8 billion. (Ibid)

In Asia, as a result of the influence of the expanding city, the rural character of the fringe is gradually or sometimes very abruptly replaced by a more urban profile in terms of land use, employment and income, and culture. During this process of transformation, pressure on land is rising because of migration from the core city and rural areas and natural population growth. The pressure on land is characterized by building construction, garbage disposal and construction of highways. The result of this pressure on fringe villages is not only changing the land-use character, but also the degradation of natural resources. Households adapt their socio-economic behaviour by intensifying agriculture or leaving it, by seeking local non-agricultural employment and/or by out-migration. In their research work in the cities of Bangkok (Thailand), Jakarta (Indonesia) and Santiago (Chile), Browder et al, selected study samples in peri-urban areas, working with a definition of the metropolitan fringe characterized by temporal and location features. They defined the outer boundary of the urban fringe as the margin of the built-up area of the metropolitan centre. The fringe was defined from the boundary inwards, including all contiguous residential areas no older than 15 years (Browder, 1995).

In both William's and Rakodi's definitions, the idea of "shifts" or evolution of the edge of the cities moving "outwards" is clear. In a way a peri-urban area is thus considered a pre-urban area, as with time it will be put inside the city proper. This assumption seems to underpin the conception of the city as a central place, dense and growing continuously over a static countryside. The peri-urban interface thus seems to be considered the result of urban driven processes, rather than, the territorial processes where rural and urban forces interact. This argument seems to agree with Ribeiro and Correa that, the periphery has ceased to be an open space, and in this sense it ceased to be a frontier, whose growth logic led to the spread of urban land ownership. This trend has thus coexisted with a diametrically opposing one: the production of privileged residential neighbourhoods whose target owners belong to higher-income groups, territorially separated from the rest of the city (Ribeiro & Correa, 1995). An influx of population into these peripheral areas, mainly middle-income groups, has boosted land speculation and a strong and dynamic activity of developers, not always under the regulation of the state in terms of planning or development control. This is a common phenomenon

even in less developed nations like Kenya’s rural-urban interface. However, other researchers reflect peri-urban growth as composed of poor and marginalized households. For example, Simon et al , states that many fast growing large cities across the global south are surrounded by dense and generally impoverished shanty towns or other forms of informal and /or irregular housing, characterised by inadequate infrastructure, service provision and security of shelter.

Many researchers contend that it is important to consider the peri-urban fringe as an extension of the city rather than as an entirely separate area for the reason that the city/region functions in a more or less integrated way in terms of ecological footprints, economic and demographical processes (Simon *et al*, 2006). In certain cities in Africa, there is a clear link between the growth of the fringes and global systems where investment or intervention decisions are increasingly driven by globalized concerns rather than local conditions. Kombe (1999), attributes the growth of peri-urban Dar es Salaam to unfair international trade arrangements, decline in the prices of traditional cash crops such as coffee, cotton, cashew nuts, and escalating unemployment, which has led to unprecedented rural-urban migration and therefore informal urbanization. In the case of Mombasa, investments continue to be made in elevating tourist facilities on the urban periphery, while the city itself deteriorates. Apart from the tourism facilities at scenic beaches, Mombasa’s urban periphery is characterized by informal settlements, with a third of the city’s population living below the poverty line (Rakodi *et al.*, 2000).

In Nairobi, rapid land use/cover changes have taken place over the last 40 years (Mundia, 2006). Urbanization has resulted in the loss of a significant amount of forest and other natural vegetation cover and has led to other land use changes. Because of the lack of appropriate land-use planning, in form zoning and uncoordinated subdivision schemes, poor enforcement mechanisms including limited political will, there is evidently a rampant urban growth sprawl and the massive disappearance of natural vegetation cover leading to environmental degradation within the city and its environs. The process of urbanization has been characterized not only by population growth, but also by industrial expansion, increasing economic and social activities and intensified use of land. Changes in land use/cover have accelerated, driven by a host of factors including population and economic growth. Urban sprawl, characterized by random and unplanned growth, has led to loss of forested and fertile agricultural land and has caused fragmentation, degradation and isolation of the remaining natural areas (Mundia, 2006).

The intensity of land uses can be appropriately illustrated by the concept of peri-urban gradient. Simon et al 2004, expressed the gradient in terms of a peri-urban continuum, as presented by factors such as land conversion from farming to residential uses, inhabitants’ occupations, infrastructure and complexity of markets for goods and services in respect to distance from the area. This study makes reference to these factors to explain land uses existing on the Nairobi-Kiambu corridors and at the same time conceptualise the study area. Figure 2:2 depicts the study area given the intensity of land uses.

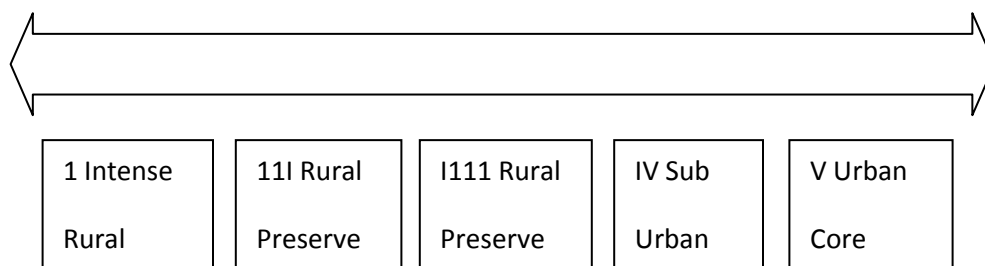


Figure 2-2: A conceptual presentation of the study area
Source: Author, 2009

Broadly speaking, the Roysambu neighbourhood (V) presents the core or complete built-up area with very high densities of residential development, while Kiu River, and areas along Kiambu road, represent a rural character (evident from the large scale coffee farming and subsistence farming).

a) Administratively, this area is situated within Kiambu County. Kiu River, Ndumberi, Coffee estates - Kamaki, Sasini (on the Kiambu – Ruiru Road). This zone is characterised by large open spaces, natural habitats, sparse settlements, and subsistence and large-scale farming.

- b) Thindigwa (Kiambu); an area characterized by medium residential densities, larger lots of land and rural-urban character. The densities are however increasing on properties located along Kiambu Road.
- c) Njathaini (Nairobi) forms the boundary between Nairobi and Kiambu. The area presents diverse livelihoods of farming, high income and low income residential developments.
- d) Kiamumbi (Kiambu) and Kamuthi (Nairobi city county), These two zones are separated by Kamiti Road but exhibit similar residential developments of single family units, a large number of original owners and urban agriculture practices.
- e) Roysambu areas, USIU neighbourhood (more urban, smaller lots) and high residential and commercial densities.

The above illustration resonates throughout the research and is the baseline for the analysis and discussions. The illustration agrees with the theoretical framework that: fringes are a zone of mixed land uses, blurred conceptual descriptions of areas into urban and rural and an area where rural and urban activities juxtapose.

Rural-Urban Fringes

The transitory landscapes characteristic of the rural-urban fringe covers substantial areas on the outskirts of large cities all around the world. Even though these areas are regarded as representative landscapes of contemporary society, they are often overlooked. Their character is often perceived as provisional and ambiguous, as they do not fit into established categories such as urban and rural, nature and culture (Qviström & Saltzman, 2006). Indeed, this contention agrees with Swensen, (quoting from Olshammar, 2002), who looked at rural-urban fringes in rather stable terms and studied them as “permanent provisional states” under the research project, “Threatened Landscapes”, on the urban fringes of Stavanger and Oslo, focusing on spatial planning at the edge of the city (Swensen, 2002).

Theories of modernity (urban) and utopian planning were used to analyse the ways in which the rural-urban is treated and understood within spatial planning and brings to the fore the concepts and categories suitable for characterizing these rural-urban landscapes. The utopian (i.e. place-based) approach is part of a long tradition in research that questions modern dichotomies and insist in pursuing new thinking while modernity theories are based on clear dividing lines between, for instance, nature–culture, and city–country. The urban fringe is viewed as something in between, and it is therefore treated as wasteland simply because its character and qualities are very difficult to grasp and

analyse using modern dichotomies such as urban–rural (Qviström, 2005b, 2005c). The deficiencies of spatial planning based on modern thinking are often highlighted when one focuses on landscapes that are no longer rural but rather, are in the process of being urban. Planning decisions about the spatial arrangement, intensity and functionality of land uses in any one context are influenced by the way in which people connect with their resources and subsequently to the natural environment.

Research has consistently emphasized the fact that the rural-urban fringe is an area characterized by a mixture of urban and rural features or landscape. As a result of the influence of the expanding city, the rural character of the fringe is gradually or sometimes very abruptly replaced by a more urban profile in terms of land use, employment, income and culture. During this process of rural-urban transformation, the pressure on land is rising because of migration from the core of the city and the rural areas and also due to natural population growth. The result of increasing pressure on land in the fringes is not only changing the land-use character, but also causing the degradation of natural resources of the rural area. Since the key resource or asset in the rural-urban fringe is land, exploring and understanding the factors influencing the growth is pertinent

Landowners exert significant control over the property they own and interactions between sellers and buyers of land create the market for land. Land bought and sold in the ‘marketplace’ creates a set of land uses such as housing, agriculture, roads, schools and other services. Supply-and-demand factors such as location, soil types, climate, availability of water, transportation systems in place or potential, and other services, heavily influence the buying, selling, and use of land. These factors relate to both land use and land value. In general, the desire of both the seller and buyer is for land to have the highest valuable use.

The government however, plays a major role in the control of land use, not only in planning but also in its administration and legislation. Administrative and legislative rules are often put into place to make certain that the land market works in an orderly manner. These rules include laws related to contracts, recording deeds, and land use development regulations that include zoning laws, pollution control, water-use allocation, and land taxes. A rather fragmented legal land framework compounds this situation, for example, land acquisition, land ownership and sanctity of the land title, access and user rights on natural resources such as water and forests. Therefore, what has been described as the land market is actually a system of three distinct decision

groups: individual landowners, governmental bodies that control the administrative and legislative laws/rules, and judicial bodies that oversee and interpret constitutional controls at the state and national level. (Clouser & Mulkey 2009). It is known with a degree of certainty that landowners react to changing rules and regulations, governments react to changing political pressures and societal needs, and constitutional changes result from amendments and judicial interpretations. Change at any of these three levels can influence the actions of any or all three groups. This implies that a framework for planning and development for the fringes must of necessity incorporate the interests and ideals of collaborative planning, strategic planning and sustainable development.

The importance of farming at the fringes for social, economic and ecological purposes cannot be overstated. Sinclair (2011), while researching on the food security potential of the Sydney fringes contends that traditionally, food has been grown on the fringe of cities and towns but that planning for food security has not been high on the agenda of planners or governments. Emphasis has been given to water, housing, environmental awareness and social issues but planning for the land that grows the food has been mostly ignored.

The Setting

This section of the paper provides a detailed account of the geographical, historical and social processes of the study area from the pre-colonial period to the present. The proximity of the study area to Nairobi is pertinent as the area has served as a satellite residential area for the excess population from the city. The geo-history of the area is therefore fundamental in the analysis and interpretation of the pattern and characteristics of land use and development in the area.

The study area falls astride the City of Nairobi (areas of Kamuthi and Roysambu) and Kiambu County (areas of Njathaini, Kiamumbi and Thindigwa). The latter is primarily inhabited by the Kikuyu, a branch of the eastern Bantu communities that inhabit the Mount Kenya region. According to Muriuki, proto-Bantu migrants settled in the Mount Kenya region during the eighteenth and the nineteenth centuries. By the latter half of the 19th century, the Kikuyu had effectively occupied the area between south Chania and Nairobi areas (as quoted by Kinyanjui, 2007). The former has a

majority of residents being Kikuyu but with a sizeable population from other tribes thus presenting a more cosmopolitan characteristic.

The study area forms part of the Kenya Highlands, a geo-climatic zone endowed with well-drained, deeply weathered and fertile soils suitable for a wide spectrum of agricultural activities. In physical geographical terms the area forms part of the larger southwards and south-eastwards part of the Aberdare ranges, giving way to the deeply dissected ridges and valleys of Gikuyu land. The climatic factor of greatest economic and social significance in Kenya is rainfall. Evaporation, radiation, temperature, wind speed, sunshine hours and humidity add detail to our understanding of the impact of climate on society. The study area is one of the most humid areas, being part of the Kenya Highlands and rainfall is concentrated into definite seasons in a year, giving rise to the popular terminology of the “long rains” and the “short rains”.

The genesis of land tenure in Gikuyu land and the impacts of the same on the land use patterns is important for our understanding of the Nairobi-Kiambu corridor. Land as a resource, plays a major role in the development of Gikuyu families and has been a source of major conflicts at community, family and individual levels. Those without land are considered poor and deprived.

RESEARCH METHODOLOGY

The research methodology comprised of a number of components, all complementary and building upon each one. The review of literature review was done to orientate the researcher on concepts such as land use changes, status of planning at the urban –rural fringes and to put the current study into the context of drivers of peri-urban growth. The review also provided in-depth background knowledge in regard to the historical evolution, trends, reasons and drivers for growth.

The primary data was collected at different stages, levels and from different respondents. Structured questionnaires were administered to household heads and business owners, while interview schedules were used to collect information from key informants and focus groups. The questionnaire administration and the respondents were identified based on the following aspects: population, sample, sampling size, sampling process and procedures.

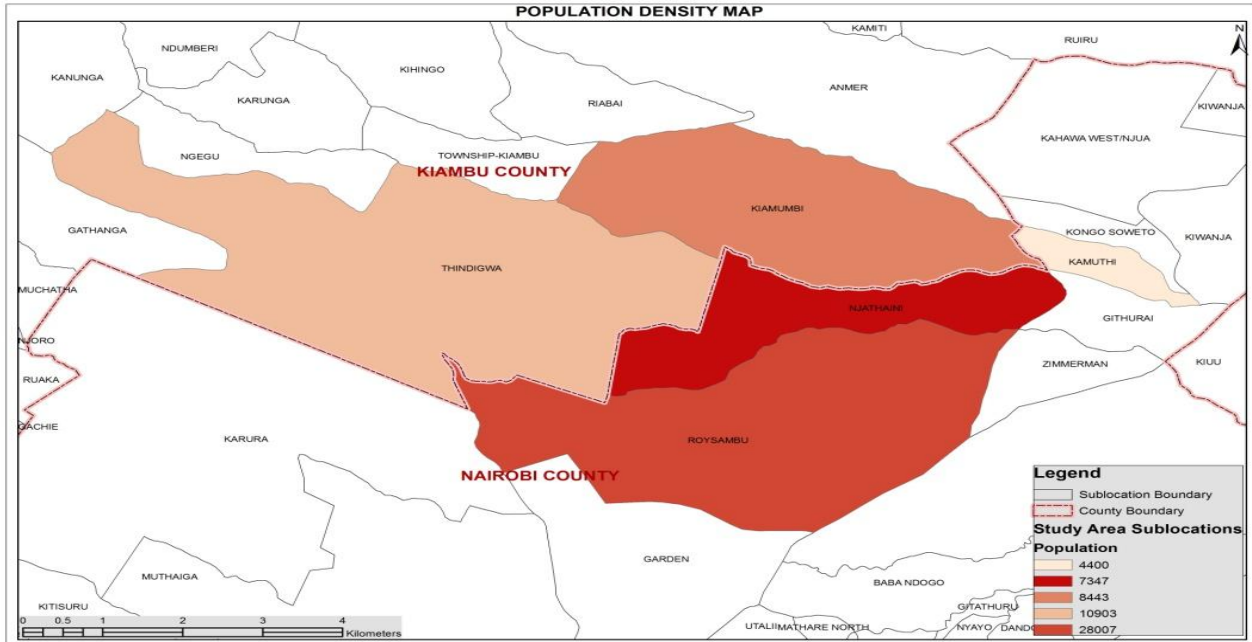


Figure 4.1 Administrative locations of Kiambu and Nairobi
Source; KNBS, 1999

The criteria for inclusion in this study were: i) land owners and residents in the prescribed corridor, ii) Institutions responsible for land administration, management, and planning and iii) business owners residing in the corridor. Fig 5-3 indicates the enumeration areas for the neighbourhoods, and was used to calculate the population of the household's existing within the settlements.

The research sample was established at two stages, namely: five neighborhoods were selected, that is, two (2) from Kiambu county and three (3) from Nairobi county. The reason for this was due i, to the limitation of time and finances and ii, the age of the neighborhoods. Therefore Njathaini, Roysambu and Kamuthi neighborhoods in Nairobi county while Kiamumbi and Thindigwa neighborhoods in Kiambu county were selected, to suit the sample The researcher was convinced that the selected sample of neighborhoods provided data representative of the population from which it is drawn. The second stage of sampling was the actual respondents drawn from each neighborhood. The sample was chosen from landowners and residents in the enclave of Kamiti and Kiambu Roads, from the junction with the eastern bypass and business owners.

A sample of the field survey, 134 households had been interviewed, representing 89.3 per cent of the sample

and 1.50 per cent of the total number of all households within the EAs. The 11.7 per cent variance was mainly due to refusal and/ or the non-availability of the household head to answer questions.

The researcher used an interpretive approach to continually interpret the information and to understand the meaning and implications. Narrative and performance analysis was used to discover and reveal repeated similarities in people's stories, and particularly in historical reviews of the facts.

Although numerals are typically associated with quantitative means of data collection and analysis, numbers and figures were used to provide frequency counts to generate meaning, and as a tool for identifying the patterns in the data, and to test the study's interpretations and conclusions. The unit of analysis for the quantitative general survey data was the household.

RESULTS AND FINDINGS

Access to Land

A historical perspective of the land tenure and land use changes on the Nairobi-Kiambu development corridor depicts a rather predictable picture. With the onset of colonization, the land changed hands from local African owners to white British settlers, and this reflected the form of livelihoods on the land. The pattern is rather cyclical in that, when ownership reverted to Africans in the 1980's, not only did the calibre of owners change, from elitist- urban, as opposed to communally-inclined

owners, but also, the livelihoods on land changed from subsistence farmers to home owners. Every neighbourhood provides similar but unique pattern of evolution in terms of land ownership and use. Figure 4.1 indicates the graphical presentation of these land ownership and land use shifts. Historical records indicate that white settlers first settled in the area around the 1930-50s; majority left in the 1970s and 1980s and therefore there was a dramatic change in the land use and ownership. At present, the land use exhibits traditional/subsistence livelihoods of farming and residential uses. The 1970s presents the intermediate period when land buying companies took over possession of the land with the beginning of a process of subdivision and allocation to shareholders and limited settlement. According to one respondent, the members desired to have the farm subdivided so that; “each

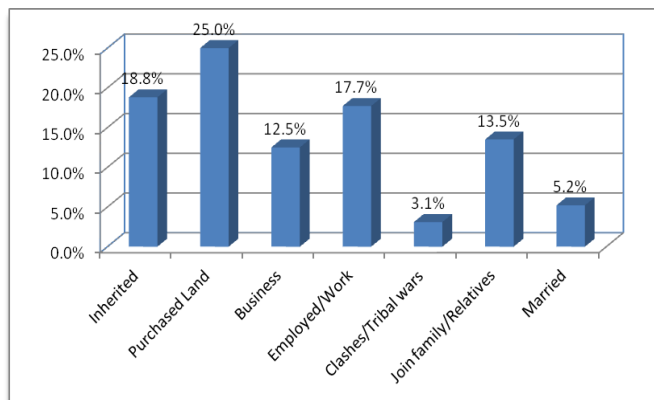
member could have their own parcel of land and also out of fear of land disputes, so reminiscent of the era of land buying companies. At the moment, the company has no assets and members are awaiting dissolution by the Registrar of Companies.” (Response by Mr. E. Kibe, Former Chairman, Kamuthi Farmers’ Company).

Certain zones of the study area such as Roysambu, Kiamumbi and Kamuthi (especially the areas close to Kamiti Road) exhibited high-rise residential developments with no presence of any agricultural or farming characteristic, nor residents of the calibre of the original owners. This was evident in the changes of land ownership, use and livelihoods. Figure 4.1 indicates the transformations of land ownership and use over time.

←	1950's	1960's	1970's	1980's	1990's	→
African customary system	Settler ownership (squatters)					Land Tenure
			African ownership (land-buying companies)			
					African ownership (new/ old owners)	
African subsistence farming						Land Use
	Settler commercial farming (coffee)					
			African subsistence farming/ settlements			
				Peri-urban agriculture and settlements		

Figure 4,1 Land tenure/ use shifts in the study area
Source: Author (2011)

According to the respondents, the original African residents preferred living in the neighbourhoods because the parcels of land were large, they could practice urban agriculture and the restrictions on building development were few. However, in the recent past, the County Government of Kiambu requires building approvals and payment of plot rates at Kshs 300.00 per plot per year. The socio-economic setting is presented in the diverse residential landscape, exemplified by single family dwelling units, multiple family/apartment structures, semi-permanent housing; urban farming, social services such as schools, clinics and shops.



How land was acquired
Source: Field work, March –May 2009

The respondents provide varied reasons ways of how they accessed the land on which they reside. According to Fig 4.6, the majority (25 per cent) bought the land, 18.8 per cent inherited land, while 13.5 per cent indicated that they accessed their land through resources provided by family members. The desire to maintain strong familial and social networks may support the contention that land is a major asset and therefore there is the possibility of greater responsibility to ensure sustainable use. This fact also gives an indication that land ownership in the study area had changed over time. The difference in terms of percentages for those who bought and/or inherited is not higher (11.6 points). This parity is explained by the fact that members of land buying companies were allocated more than one parcel of land, particularly those who could afford to buy more shares. Land in the study area however, has over time been bought by the new migrants who have moved into the area. As indicated in in this paper, land ownership and use in the study area transformed from indigenous Africans, practicing subsistence farming, to white settler ownership under coffee and dairy farming, and reverting back to Africans.

The “second stage” under African ownership and use has experienced tremendous subdivisions of land and myriad uses and transfers to new owners. On the question of why respondents settled in the area, 62.8 per cent of the respondents indicated that they bought land in the study area, 16.8 per were in employment, 16.1 per cent had inherited land while 2.9 per cent had settled to do business. This is presented in Figure 4.7.

Varied interests and aspirations on use of the land has resulted in conflicts. This was reported in Thindigwa where conflict over land use has arisen between the new landowners who prefer to invest in single family controlled residential developments, and the older settlers who refer multi-family residential developments (GOK, 2008). The latter’s preferences are driven by the need to cash in on the rents expected from the influx of people into the fringes of Nairobi, while the former’s interests are influenced by a desire to own homes away, but, in close proximity to the city.

Market value sets has more to do with the commodity values of land, which are responsible for driving the business side of urbanization. In this respect, land is put to its highest and best use as determined by the operations of the market. Market value considerations

offer two pertinent views; the market as an effective way for organizing transactions; and the view that public intervention is necessary for redistributing wealth and opportunities. In a study carried on Nigerian cities, Adesina (2007) contends that as a result of selective real estate development, the urban fringe is often an awkward juxtaposition of flashy commercial or residential high-rise mixes with aging neighbourhoods and dilapidated rural dwellings.

Although the Nairobi suburbs do not resemble the affluence found in America or Europe, in the study area, one may not really speak of aging or dilapidated rural dwellings because African settlements are relatively new (since the 1980s). However, there is a clear distinction between original shareholders and the recent migrants.

As indicated in the previous sections of the study, land in the rural–urban fringes is the most important asset for the residents. Land buying companies and cooperative societies took over the management and ownership of the land from the European settlers. This included the processes of land subdivision and allocation. The role of these companies has declined over time, although they are partly responsible for the subsequent transfers, including the sale of spaces reserved for public use and its negative implication on sustainable land use.

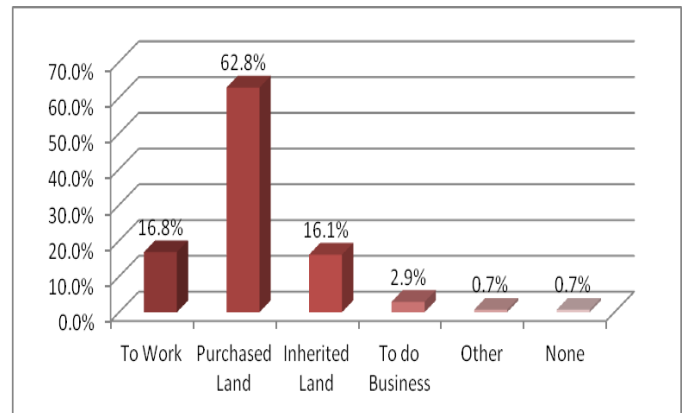


Figure 4.2: Reasons for settling in the area
Source: Field work: March-April 2009

As the figure 4.2 indicates, the selling and buying of plots continues through brokers and agents, whose advertisements dot the neighbourhoods.

a



(a,b,): Signposts indicate informal adverts (left) and formal land-buying companies in Kiamumbi and Kamuthi, respectively

Source: Fieldwork, March-May 2009

Proximity to Nairobi City

As indicated, the two spatial landscapes of Kiambu and Nairobi have always had a symbiotic relationship, due to their proximity to each other; this relationship is even more apparent in recent years. Birley & Lock (1998) define the peri-urban zone broadly as one characterized as a mosaic of different land uses, inhabited by communities of different economic status, in a state of rapid change, with a lack of infrastructure and a deteriorating environment. In reference to the challenges in the definition and therefore planning, Scott, *et al.*, (2013), distinguishes two sets of values, that is, urban-centric values that portrays the fringes as a transition zone; and rural-centric perspective that denotes an area with new opportunities for natural-based assets including food growing and bio-energy.

Urban households have had to contend with declining purchasing power prompting the majority to diversify their sources of livelihoods and income (Ellis 2000). Agriculture in the urban and peri-urban areas is an important aspect of this diversification process. Despite its importance as a livelihood source, farming within the cities' built areas is illegal in many African countries (Foeken, 2005). By-laws, dating from the colonial era, forbid agricultural activities within the boundaries of urban centres, possibly because it does not fit within the western perception of what constitutes 'urban' (e.g. the city-is-beautiful idea) and apparently it results in all kinds of environmental hazards. (Ibid). As peri-urban land is lost to residential development, the potential for peri-urban subsistence farming and the cultivation of high value produce is also lost. The peri-urban poor depend to a greater extent on access to natural resources than do the wealthier, urban-based groups. Consequently, the peri-urban poor are adversely affected when these resources are lost or degraded by the influxes of people from the expanding urban area.

Despite this, crop and dairy farming form a substantial portion of the livelihood portfolio of the residents in the study area. These activities range from highly intensive

dairy farming, to sheep, pig and poultry rearing. Some residents engage in these activities in order to supplement incomes from paid or business engagements.

Other residents solely depend on animal husbandry for their livelihoods. Dairy farming is popular in this peri-urban area due to the ready market for milk in the City of Nairobi and other adjacent urban areas. The residents' ability to supplement their incomes is an important consideration for settling in the peri-urban areas, so much so because, by-laws against agriculture, waste management and pollution are either relaxed or not enforced at all.

Regulations against urban agriculture normally cite the poor management of waste and its potential as a source of unhygienic surroundings and breeding grounds for disease carrying vectors, as a key factor in outlawing the practice. Since parcels of land in the fringes are generally small and also because land on the urban fringes is expected to be used for residential purposes, the waste from domestic animals is often considered a nuisance by both the farmer and the adjacent properties. There is need therefore to develop mechanisms for solid waste management in the planning processes; ensuring the sustainability of land use in the fringes cannot be overstated.

Liquid waste from domestic sewage as a valuable commodity in the peri-urban environment has been reported in a number of Nairobi fringes where it is mainly used for irrigation. Liquid waste is also used to generate biogas and fertilizer for field crops and fishponds. However, the health hazards associated with such waste include many communicable diseases. Composting organic waste for use as manure has the positive health benefit of sanitising the heat destruction of pathogens. However, this is only successful if high temperature composting is used or waste is stored for periods, of about one year, but there is a risk of introducing unacceptable concentrations of heavy metals into the food chain.



Plate 4.1 (a, b, c): Dairy farming in Roysambu (Behind Pan Africa Christian University) and animal waste at Kiamumbi (right)

Source: Fieldwork, March-May 2009

Figure 4.10 reveals discarded waste either ready for use or waste that has reached its final destination. Note how close the door is to the rear, depicted in the plate on the left.

It is evident that urban agriculture is a major source of income to supplement livelihood at the fringes and therefore it becomes a major issue in sustainable land use from the perspective of the natural and built environment. Therefore, there is need to design innovative approaches to enable farmers to reap more benefits from the same. This includes better mechanisms to intensify the agricultural activities and at the same time address waste products deposit and recycling of waste.

A dominant feature found on the peri-urban landscape is mixed land use and mixed densities. Whereas some residents move to the urban fringes in order to optimize their land use through home ownership, others move in order to diversify their incomes through the construction of rental houses. Non-farm activities take various forms as indicated by data from the study area. These include residential developments, small service industries, shopping activities and community services (including schools, clinics and pharmacies). Thus, the inhabitants of the fringes derive their living from multiple livelihood strategies and they not therefore a homogeneous group in terms of capital asset ownership (McGregor et al, 2006)



(a,b,c): Residential development in Roysambu (a) and Thindigwa (b) and Kamuthi (c) neighbourhoods

Source: Field work March- May 2009

Livelihoods

These multiple livelihood strategies are necessary for analysis as they provide a good glimpse of sustainable land use. Multi-family residential/ commercial developments have been a common sight in Roysambu area. This phenomenon is evident in all the other neighbourhoods, except for Njathai-ini. illustrates some types of the residential development found in these at Roysambu, Thindigwa and Kamuthi neighbourhoods. At Roysambu, most of such developments are found along Lumumba Drive. Indeed, a major shopping mall, Thika Road Mall, has been constructed near the Thika Highway and Kamiti road intersection; this landmark has drastically transformed the neighbourhood and its environs. Although not with the same intensity and

density, major residential developments are also prevalent along Kiambu and Kamiti roads.

Residential development is the major land use competing for space at the fringes. Due to reduced incomes from agriculture, land owners have converted their land into residential uses. In response to the question why respondents settled in the area, 62.8 per cent of the respondents indicated that they bought land in the study area, 16.8 per cent indicated that they were employed around the area, 16.1 per cent had inherited land, while 2.9 per cent had settled to run business.

Other non-farm activities are determined by the skills level of the actors as well as the available opportunities. As indicated, Ngomongo is famous for its huge quarries,

the mining of which commenced in the 1940s. Initially, quarrying was carried out by large scale mining companies who served the insatiable construction industry in the city with building stone, murrum and hardcore. This has continued to date, with the entry of non-skilled residents, eking out a living by collecting pellets of stone and dust for sale. From an environmental perspective, quarrying is not sustainable. However with the high levels of poverty in the study area, the low skilled residents have few options for earning an income.

Other small scale business activities, which include open air motor vehicle garages, are common at Roysambu, which is located on the major road intersections of Kamiti Road and Thika-Nairobi Highway, Hawking of all sorts of wares is common in all the neighbourhoods in the study area, indeed small business operators are common along the access roads, especially in Ngomongo area,

Planning for these activities is needed because they represent important sources of livelihoods for the residents inhabiting the study area.



Plate 4.12: (a,b,c): quarrying and hawking in Ngomongo neighbourhood.

Source: Field work March- May 2009

At the moment, the only superficially planned areas in form of zoning plans are the commercial zones of Roysambu, Kiambu Road and Thindigwa area.

DISCUSSION AND CONCLUSIONS

Peri-urban development on the Nairobi-Kiambu corridor, can be associated with the access to land proximity to the city of Nairobi and ability of residents to ensure their livelihoods. This therefore has resulted to intensity of development, changes in the composition of the population and an increase in urban-related economic activities. These changes have moreover led increased land values, particularly along the main transport corridors of Kiambu Road, Kamiti road and the northern by-pass.

Land is the main source of livelihood for the inhabitants of the peri-urban areas. As peri-urban land is lost to residential development, even the potential for peri-urban subsistence farming and the cultivation of high value produce is lost. The peri-urban poor depend to a greater extent on access to natural resources than do the wealthier, urban-based groups. Consequently, the peri-urban poor are adversely affected when these resources are lost or degraded by influxes of people from expanding urban areas. This study sought to explore the possibilities of protecting the most precious asset for residents, namely, land; by generating information necessary to plan and develop policies for sustainable land use.

Secondly, there evidently are positive impacts on the peri-urban land use changes. These include increased

opportunities for those who are able to draw simultaneously on the comparative advantages of the rural and urban areas. As rural-urban linkages intensify through improved infrastructure and the movement of people, the importance of commodities, information and money increases. Cheap, efficient transport encourages peri-urban workers to commute to the nearest city. However, transport is not cheap in Nairobi, and only the urban residents who can afford transport costs reside on the periphery of the city.

Thirdly, urban expansion can substantially improve access to basic services such as health and education for peri-urban dwellers. Better transport to the peri-urban areas increases people's access to information and political decision-making structures, which are often better established in the cities. Increased flows of people and information can also help widen access to important knowledge on issues such as current market prices, allowing peri-rural households to respond more effectively to consumer preferences and urban labor market needs. At the same time, the demand from urban consumers can stimulate agricultural and horticultural production, especially high-value, perishable fresh vegetables and fruits, which can be rapidly transported to urban markets. To be able to respond to urban demands producers will need access to natural resources, especially land and water.

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