Peri-Urban Development in Africa:
A Kenyan Case Study

by

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ABSTRACT

Studies of African urban development have used the term "peri-urban" to refer to residential development at a city's edge. No one, however, has developed a precise definition of peri-urban areas which guides this research. This study attempts to define peri-urban areas using an urban economic model, and analyzes the African peri-urban literature in the context of this model. This review of the literature, produces several hypotheses, which are then tested using data from a housing survey done in thirty-two Kenyan cities by the Kenyan government.

The first set of hypotheses examined ways in which peri-urban areas differed from central city areas in their physical development. Houses in peri-urban areas were found to be newer, lower quality, built on land held informally, and with lower levels of urban services. The second set of hypotheses concerned the development of rental housing in peri-urban areas. Home ownership rates were higher in peri-urban areas than in central city areas, although a person renting a home in a peri-urban area was likely to have better accommodations than a peri-urban homeowner. Finally, the cities in the survey were grouped according to city size and growth rate, and the effects of these variables on the development of peri-urban areas was tested. The results of this section were somewhat inconclusive, as other factors, such as

environment and politics, influence urban development.

The conclusion of this research is that peri-urban areas are different from central city areas due primarily to the fact of their recent urban development on formerly agricultural land. This study was just a small step in understanding patterns of peri-urban development. The peri-urban zone can provide a valuable unit of analysis for studying the process of urban development, provided it is rigorously defined.

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1. Introduction

One of the most dramatic changes in developing countries in the past three decades is the rapid rate of urbanization they have experienced, as rural inhabitants migrated to the cities in search of greater social and economic opportunities. This phenomenon has been subjected to much study, looking at both its causes and effects, in an attempt to enable governments to cope with their growing urban populations. African countries in particular have seen high rates of urban growth in the time period since gaining independence from colonial rule. A body of literature has emerged dealing specifically with African urban issues[1]. The social and economic conditions characteristic of African nations make this process different from the urbanization occurring in Asia or South America.

As cities expand in space, land at the periphery is converted from agricultural uses to urban uses. A part of the African urban literature examines communities at the urban periphery or fringe. This zone of urban development has been defined in different ways by various researchers since the 1950s, but most recently the term peri-urban has been used to describe the residential developments located on the urban periphery. Peri-urban areas are dynamic areas, ones in the process of changing from rural to urban. In rapidly growing African cities, longtime residents and recent migrants alike

[1]For a review of the literature on pre-colonial African urbanization, see Coquery-Vidrovitch, 1991. Mabogunje, 1990, reviews post-colonial urban research.

are finding land on which to build housing at the city edge, and these vast shanty town developments have become the dominant feature of the major African cities (Mabogunje, 1990).

Significance of Peri-Urban Areas

Since urban growth in developing countries seems an inevitable part of their economic development, it is important to understand the patterns of this growth and resulting urban expansion. For effective land use planning to occur, it is necessary to understand the sequence of events by which agricultural land is converted to urban uses (Lee, 1979). Peri-urban areas are important in this context because they are where new urban expansion is occurring. They are ideal for studying the urban growth process, since it is happening so rapidly in these areas, particularly in African cities. Sada (1970) found that from 1952 to 1963 the average annual population growth rate for Lagos was 8.6% in the city while it was 19% in the fringe. These statistics are somewhat dated and growth rates have since accelerated, but they provide an example of both the high rate of urban growth in African cities and the relatively much greater rate of growth at the periphery.

Thus the concept of a peri-urban zone in a growing city can be a useful tool for a researcher studying urban growth and expansion, by providing a discrete area with an identifiable set of forces acting upon it. The term peri-urban, however, has been used

with increasing frequency not as a noun to describe a zone of urban expansion, but as an adjective for certain communities found within this zone. For those who use it as an adjective it is becoming value laden, and used to imply the negative characteristics of growth. Its meaning has been narrowing so that it does not describe fully the scope of development occurring in these areas.

An example of how the term has come to be used adjectivally is found in Stren's (1992) review of African urban research in the late 1980s. To illustrate what he calls the problems of urbanization he describes the prevalence of parasitic infestation in the "peri-urban population" of Dakar as being significantly greater than the rate among rural Senegalese residents. Without providing an explicit definition, he implies that peri-urban areas are populated by the city's poor, who live in squalid conditions and are generally worse off than rural residents. He treats peri-urban residents as an homogenous group, unified in their poverty.

This study sets out to contribute to the African urban literature in two significant ways. First, while the term peri-urban is being used with increasing frequency in academic circles, there is no commonly accepted definition of the term for either developed or developing countries. This paper will propose a definition of peri-urban areas based on urban economic principles and set this definition in the context of the literature on African urban development.

Second, research on peri-urban areas has typically focused on one or more peri-urban communities within a single metropolitan area. The rare studies of more than one city have used qualitative rather than quantitative data. I found no studies analyzing peri-urban areas at a national scale, looking at data for either all or a large number of urban areas in a country.

This research will use a unique data set from Kenya, where the Kenyan Ministry of Economic Planning and Development surveyed residential structures and their owners in 32 Kenyan cities and towns. The data from this survey allow us to identify characteristics of residential structures and their owners in peri-urban areas and to compare them with residential structures and their owners in more central locations. The sample includes structures located in cities of different sizes and rates of growth, and permits cross city comparisons within a single country.

Country Context

Kenya's estimated population in 1988 was over 22 million, growing at an annual rate of 3.8%. The World Bank classified it as a low income country, based on a per capita GNP of US$370. During the 1970s, Kenya experienced explosive growth in its urban populations, particularly in the secondary towns. In 1965, only 9% of its population lived in urban areas, but by 1988 this figure had grown to 22%, a rate of urban population growth of over 8% annually (World Bank, 1990).

In Africa, a commonly used definition of an urban area is one with a concentration of 2000 or more people (Ominde, 1984). As shown in Table 1.1, the number of urban

Table 1.1: Kenyan Cities Grouped by Population

City Size	1969	1979
100,000+	2	3
20,000 to 99,999	2	13
10,000 to 19,999	7	11
5000 to 9999	11	22
2000 to 4999	25	41
All Cities	47	90

Source: Ominde, 1984

areas in Kenya almost doubled between 1969 and 1979. In 1969, Kenya's 47 urban areas held 9.9% of it's population, but by 1979 the 90 urban areas held 14.6% of the country's total population.

The African City as a Colonial Construct

There were very few permanent cities in sub-Saharan Africa, particularly in East Africa, before European colonization in the 19th century. The European colonial powers developed cities for purposes of administration and aiding resource extraction. In many African countries there was no natural evolution of urban places, and their establishment had its origins in western modes of thought. This has carried over into their development today and is particularly true of Kenya.

The history of urban growth in Kenya can be broken into three periods: pre-colonial, colonial, and post-colonial. During the pre-colonial period, there were virtually no places which could be classified as urban centers in Kenya. The few which developed were located on the coast, and were settled by Arabs and functioned as trade towns. African central places were simply periodic markets, sites where people occasionally gathered to buy and sell goods. Towards the end of this period, in the mid to late 1800s, small caravan towns began to emerge as the riches of the interior began to be exploited.

The colonial period, which began about the turn of the century, saw the development of towns, which were set up as administrative centers for governing and facilitating the flow of goods for export by the British. These were developed from the existing

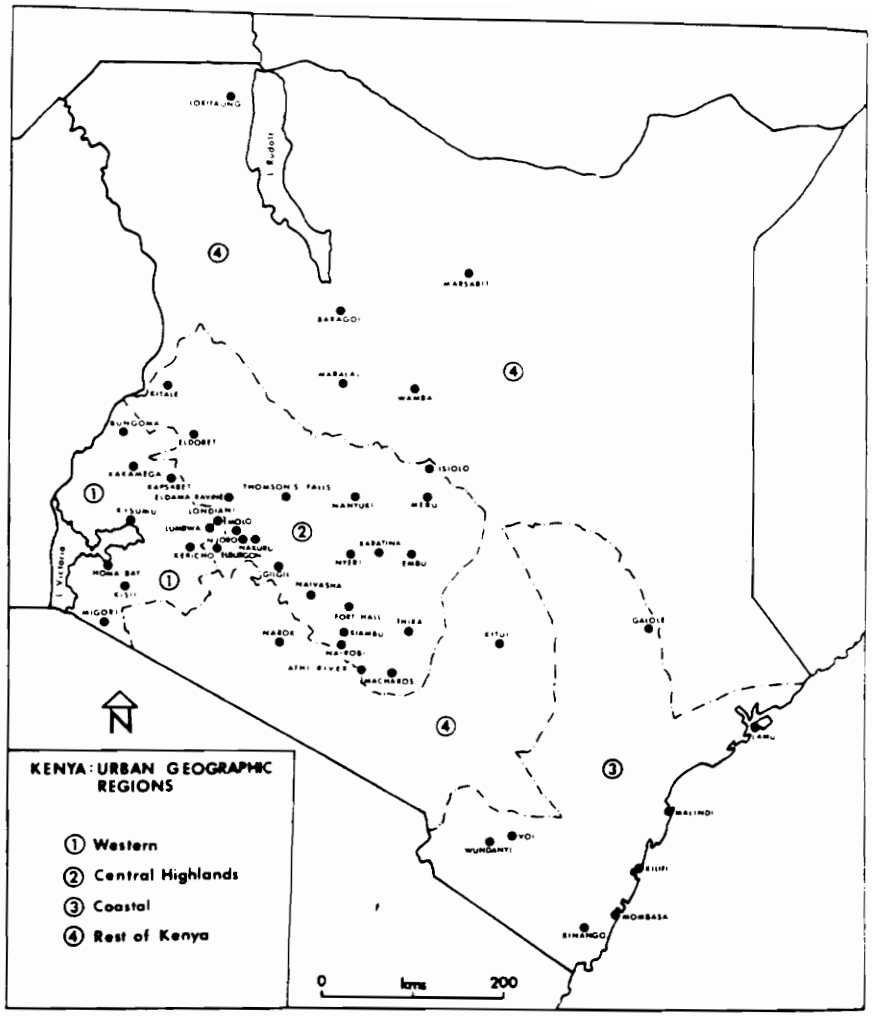

Figure 1.1: Map of Kenya (Source: Obudho, 1979a: p.244)

caravan towns and on the major trade routes, most notably the Uganda Mombasa route. These urban centers served principally as instruments for management of the colonial economy (Soja, 1979).

The character of these towns was influenced by the colonial policies of the time. The British colonial government was committed to a policy of non-African settlement in Kenya, and between 1902 and 1945, over 300,000 non-Africans migrated to Kenya, mainly from the United Kingdom (Obudho, 1979a). At the same time, the colonial law restricted Africans from living in the towns. The result of this was that the town proper was inhabited by the non-African Europeans, while the native Kenyans, who came to the towns in search of jobs, were forced to live on the periphery outside of the town. The colonial towns have been characterized as "European islands" and the native dwellings surrounding them as shanty towns (Taylor, 1979)

The subsequent development of the colonial towns also reflected regional differences. Urbanization varied nationally according to the natural resource endowments of an area and its access to transportation networks. The fertile land in Kenya is located in what is called the central highlands. Towns, established as markets supporting the settlers' farms, developed mostly in this region. Areas in the east and north of Kenya were left largely unsettled.

The town planning policies established by the British in Kenya were ostensibly

concerned primarily with promoting the health and hygiene of urban residents. They separated towns into different areas based on land use. Since its independence in 1960, the Kenyan government has maintained the same system of towns established by the British. Policies have concentrated on developing Nairobi and Mombasa, the two largest towns, since they already have a substantial infrastructure base and population, and could support new industries and other growth much more easily. The Kenya government also has recently pursued policies intended to stimulate the growth of small and intermediate urban centers throughout the country (Obudho, 1984).

Thesis Outline

My interest in studying African development stems from the two years I lived and worked in Gabon as a Peace Corps volunteer. From 1988 to 1990 I had first hand experience living in small towns; I could see the influence of African culture on urban development and vice versa. I also travelled in Kenya, which was an invaluable asset to this research. Although I did not collect the data used in this study myself, my African experiences allowed me to approach the literature on Africa from a more educated perspective than someone who has not spent extensive time living there, and to use my personal experiences in both framing the questions asked and interpreting the results of the analysis.

The topics of urban growth and urban expansion are central to this work. At this point it will be helpful to clarify what is meant by each of these terms. Urban growth results from an increase in the population of an urban area. Urban expansion is an increase in the physical space a city occupies. Urban growth can encourage urban expansion, as the increased urban population demands more land in the city for housing or economic activities. These two terms are distinct from urbanization, which refers to a general shift in population from rural to urban areas on a national level.

This thesis sets out to identify the characteristics of peri-urban areas under conditions of urban growth and expansion within an urban economic context. In Chapter 2, I use models developed by von Thunen and Alonso to construct a model which defines the location of peri-urban areas and provides a rationale for identifying the peri-urban area as a discrete unit in analyzing urban growth. Chapter 3 uses this spatial model to analyze the literature on peri-urban development in African cities. That analysis is then used to develop a set of hypotheses about peri-urban areas which are tested in Chapter 5. Chapter 4 describes the data used in the empirical study. Chapter 6 summarizes the conclusions and discusses the policy implications of this work.

The von Thunen-Alonso model and the African peri-urban literature raise three main questions concerning how the periphery differs from the center. First, how do peri-urban areas differ from central city areas in physical development characteristics?

The spatial model supposes that these areas will be distinct due to their recent development. In examining this question, a descriptive analysis of residential structure characteristics is done for all the observations in the data, looking at variables such as urban services provided, patterns of land and structure ownership, structure types, and access to transportation. All observations are aggregated and classified by the zone in which they lie, either central city or peri-urban.

Second, do peri-urban areas have different patterns of home ownership than central city areas? Specifically, what is the distribution and characteristics of absentee ownership of residential structures? One hypothesis is that peri-urban areas are where speculators invest in land, seeking high returns by building poorly serviced houses for rent (Muwonge, 1982). Characteristics of structures held by both absentee owners and owner occupants are compared in both the central city and peri-urban areas.

Third, what effects do a city's size and past rate of growth have on the development of its peri-urban areas? The spatial model proposes that distance is the independent variable and urban expansion the dynamic variable affecting peri-urban areas. Cities in the survey are grouped both in terms of rate of growth and population size, and these structure characteristics for central city and peri-urban locations are compared between groups.

The final section will outline the conclusions which are drawn from this study

concerning both characteristics of peri-urban areas and the effects of city characteristics on peripheral residential growth. Conclusions drawn by other researchers concerning peri-urban development are reviewed in light of the findings of this study. The ability to generalize the results to other African countries, and to countries in other areas of the world is discussed. An assessment is made of the applicability of the Kenya data for analyzing peri-urban development, and suggestions made concerning further research. Finally, the implications of the findings for the developing-country planner will be reviewed.

2. The Urban Spatial Structure

A city is a unique phenomenon, its growth shaped by a variety of forces, political, social, economic, technical, and environmental. How these forces interacted in the past, how they currently interact, and what expectations are for the future determine the rate and character of urban growth and expansion. In some ways, it is helpful to think of a city as an organism, growing and adapting in response to its environment. While this makes it difficult to develop a model which can explain the growth of all cities, several general models have been proposed which attempt to explain the underlying economic principles influencing growth.

The purpose of this section is to show that much of the theoretical work on urban economics done in the past has implied the existence of a zone of transition at the urban periphery, but has not explicitly defined it. Agricultural economists tended to focus only on the agricultural sector, and urban economists on the built environment. The peri-urban zone, a combination of both sectors, was not fully considered until recently, and there emerged often conflicting views concerning both its function and importance. By examining some of the basic theoretical work on urban and rural growth, a justification can be developed for considering peri-urban areas as a discrete unit in the spatial development process.

Von Thunen and *The Isolated State*

In the 19th century, J.H. von Thunen, in his book The Isolated State, developed a simple model to describe the pattern of agricultural land uses which he observed had evolved around a city. David Ricardo had earlier hypothesized that the price of agricultural land was determined by its fertility. Von Thunen argued that it was accessibility to city markets rather than fertility which was the primary determinant of the value of agricultural land.

In his model, von Thunen assumes that a city lies on a flat plain, and is surrounded by land of uniform fertility. The hypothetical city is the center of all market activity for the region, so all agricultural goods produced need to be brought into the city to be sold. Different agricultural land uses compete for the land surrounding the city. The key factor influencing where different types of agricultural goods are produced is economic rent, defined as return from investment in the land. The variable determining how much economic rent is earned from a plot of land in von Thunen's model is the cost involved in transporting the goods produced on it to the market. The further land is from the city, the greater the transportation costs incurred. At some point distant from the city, it is impractical to produce for the urban market, as transport costs absorb all the economic rent produced on the land.

The relationship between rent and distance is shown in Figure 2.1. Agricultural land

uses begin at point E, the city boundary. The downward slope of the curve represents the decline of rent derived from the land as distance from the city increases. At the point where the curve intersects the X axis, rent falls to zero. While the curve is shown here as a straight line, it is more accurately represented with a concave line, as the relationship between rent and distance is most likely non-linear. However, in this simplified presentation, straight lines will be used to represent this relationship.

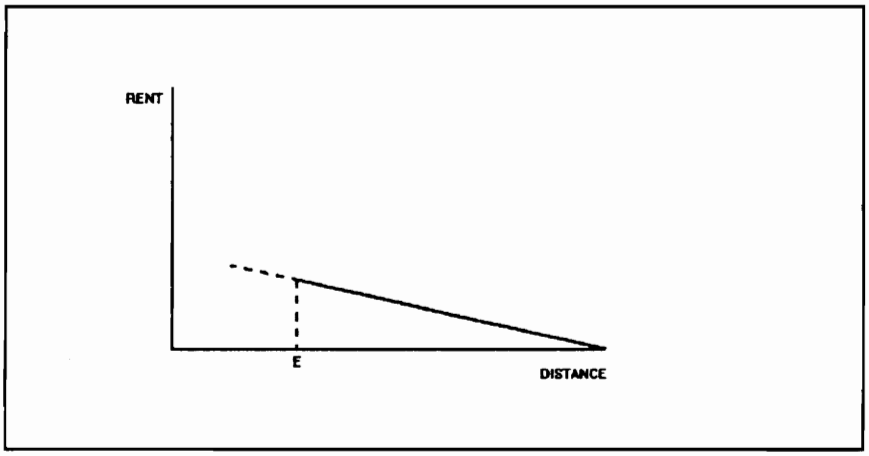

Figure 2.1: Agricultural Land Rent and Distance

Von Thunen argues that a pattern of agricultural land uses evolves from the negative relationship between economic rent and distance. The output of this theory is a model

of a city encircled by concentric rings of different agricultural land uses. As one moves away from the city, the intensity of production decreases. Goods which are heavy relative to their value, and therefore more expensive to transport, would be grown closer to the city. More perishable goods would also be produced closer to the city, to lessen the risk of spoiling during transport. Land further away from the city would be used to produce goods which were lighter in relation to their value. This system of land use develops as uses which benefit from a closer proximity to the city push the other uses further away by outbidding them for land.

Alonso's Monocentric City

In the 1960s, William Alonso applied the basic principles of von Thunen's work to develop a model used to describe the urban spatial structure. His work has been credited with beginning the study of urban economics (Mills and Nijkamp, 1987). Alonso proposes a monocentric city, with a central business district (CBD) which is the locus of all economic activity. Like von Thunen, Alonso also uses the concept of land rent, which is defined as the price of land services during a specific time period. This is contrasted with land price, which is the present value of all future land rent yields.

In the monocentric city, there are several urban sectors, which are sets of institutions with the same rent functions, or rent curves. These rent functions are what Alonso

called bid rent curves, which represent combinations of land prices and distances from the central business district among which the individuals in a sector are indifferent. It had been observed that the value of urban land decreases as one moves further from the city center, and again, the influence of transportation costs on economic rent is the force behind this. Alonso's model proposes that people want to pay less for land further from the center, since they have to factor in increasing transportation costs the further they are from the center of economic activity. Those urban land uses which benefit the most from location at or near the center will outbid other land uses for ownership of that land.

The bid rent curve describes urban land use in concentric circles from the CBD. At the center of the city one would find central office functions, those which require regular interaction with other businesses. The next circle contains manufacturing operations, for which it is less essential to be located at the center. The outer urban ring is residential, containing households whose members commute to jobs in the CBD.

This concept is shown graphically in Figure 2.2. The bid rent curve for the office sector is the steepest, since this group is willing to pay the most for land at the urban center, while land further away rapidly becomes less valuable to them. The manufacturing sector has a relatively flatter bid rent curve, with the flattest curve being for the residential sector. Where the curve of one sector lies above the curve

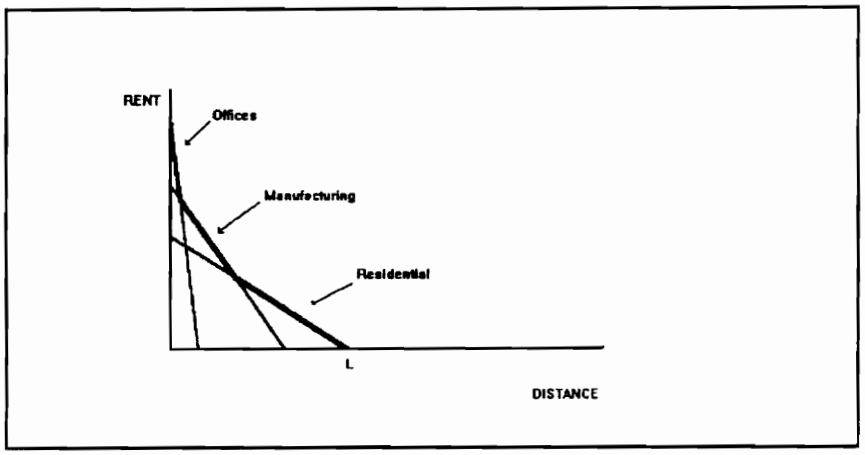

Figure 2.2: Urban Bid Rent Curve

for another sector, the higher sector will outbid the lower sector for land at that site. The overall bid rent curve for the city is composed of the segments of the individual bid rent curves which lie above all others, shown in bold in the figure. This curve is convex and downward sloping, representing the decline in value of land as distance from the CBD increases. At some point L distant from the city, land has no value for urban users and the bid rent falls to zero.

The Place of Peri-Urban Areas

These two models provide a basic explanation of both the relationship between land value and location and of important features of the organization of land uses in a city and its surrounding area. Von Thunen's model portrays the city as static, and does not allow for growth or expansion. Alonso's urban model also portrays the city as it

exists at one point in time. Both models show rural and urban land uses intersecting at a point. This point, however, moves outward over time as the city expands, because of population or income growth (which increases demand for land), or falling transportation costs (which makes peripheral locations more desirable). If we use both models in combination to describe land use in and around a city, an additional ring would need to be added, one which encompasses the edge of the city and makes the model dynamic. This would be a place in which the city was expanding through growth, and land was changing from rural, agricultural uses to urban, primarily residential, uses. This ring, neither completely rural nor urban, is the peri-urban area.

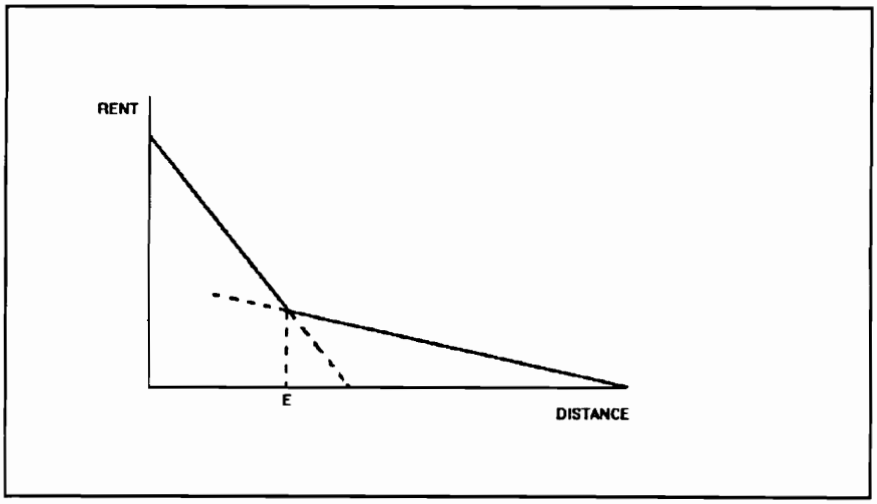

Figure 2.3: Urban and Rural Bid Rent Curves Combined

The two models are combined in Figure 2.3. The urban bid rent curve has been simplified by straightening it. The intersection of the two curves at point E is the functional edge of the city. Where the urban bid rent curve falls below the agricultural rent curve, agricultural land uses outbid the urban land uses for the land. Point E is conceptualized as the point of conversion, the interface between the rural sector and the urban sector.

As Coquery-Vidrovitch (1991) writes, a city is not an isolated entity and is linked in many ways to its surrounding countryside. The difficulty is distinguishing between the different component parts, in drawing the line between what is city and what is country. There is in reality no distinct point, such as point E in Figure 2.3, where the city suddenly turns into the country. Rather, the edge of a city is characterized by urban sprawl, a band several miles wide containing a mix of both urban and rural land uses (Mills and Hamilton, 1994).

The factor contributing to this sprawl is that agricultural land is converted to urban uses at different times, both because it is not homogenous and due to the preferences of individual owners to sell. There is a random component in the way land is released, as some plots are developed while other remain in agricultural production, or are held vacant by speculators. This causes development to leapfrog from one area to the next, and all land at a certain distance from the CBD is not developed at the same time.

One constraint imposed by both the von Thunen and Alonso models is that development occurs on a uniform plain and is focused around one urban place or central business district. This criteria that the CBD is the center of commercial activity is no longer met in most American cities. However, in developing countries, and in Africa in particular, the central business district of a city is still where the principle economic and administrative activities are located (Tiwari, 1979). Land values were also found to be strongly associated with distance to the CBD in Nairobi (Soja, 1979). Thus the development models discussed here still retain a relevancy in an African development context, and can be used to study African urban development without too much distortion in this area.

3. The African Peri-Urban Literature

The model developed in the preceding chapter provides the context for a review of the peri-urban literature. The literature search was undertaken with two goals. The first was to find studies which look specifically at the development of peripheral areas of cities, specifically those which provide information on both the characteristics of these areas and the processes which act in their development. The second goal was to determine how the term peri-urban is used by academic writers, looking at both their explicit and implicit definitions.

The review concentrated mainly on the literature about sub-Saharan African urban development, with some attention given to work done in the United States and Latin America to provide a comparison. Griffin and Ford (1980) justified developing a separate model of urban structure for Latin American cities based on the unique cultural, social and technological factors which influenced urban development. The same factors contribute to the need to treat sub-Saharan African cities as a separate unit.

Much of the research on peri-urban areas in Africa has focused on the periphery of one city, or even on one peri-urban area of a city. This is a justifiable approach in that each city develops in a unique way, and any analysis needs to be done in an historic context. The problem with this is everything becomes a case study, and this

limits the ability to generalize the findings. The French were among the first to address peri-urban areas in their work on West Africa, doing a great deal of work on agriculture in the urban fringe (for example, Auger and Vennetier, 1976) and producing a series of studies of African cities. Much of the French work looked at peri-urban areas as sources of food for urban areas in francophone Africa. Their research emphasized urban space and planning, which contrasts with the body of anglophone literature which tends to concentrate on anthropology and social change (Coquery-Vidrovitch, 1991). This section will review the major points from the anglophone literature.

The African Rural-Urban Dichotomy

Before beginning the review of the peri-urban literature, a brief look at the rural-urban dichotomy as it pertains to Africa needs to be presented. If we define peri-urban areas as the interface between rural and urban, a clearer definition of what constitutes rural and urban should be discussed, and some implications in the African context raised.

Moore (1984) proposes three ways to differentiate between rural and urban sectors. First is the physical classification. In this case, rural implies the natural environment, while urban means the built environment. A functional classification of the two sectors differentiates rural and urban according to the types of services which are

provided in an area. Finally, in an occupational classification rural and urban areas are categorized by the types of jobs residents of these areas perform.

Thus there are three ways to define rural and urban, according to the economic and physical environment. Western authors tend to use the physical environment as the point of division, classifying rural-urban as a dichotomy between agricultural and urban land uses (Lee, 1979) or the open countryside (Chicoine, 1981). Rural and urban in Africa, however, are not as easily defined, as rural migrants to African urban areas bring rural practices to the city.

There often is no clear distinction between urban and rural land uses in African cities. Urban agriculture, the practice of growing food crops for sale or home consumption on small, undeveloped plots of land within the city, has been documented as an important survival strategy for urban residents in Africa (Freeman, 1991). Crops are produced not only at the urban periphery, but on any unutilized land within the city, such as vacant lots or on the sides of roads.

Defining urban and rural by services offered or types of employment is also problematic in Africa. The large informal economy characteristic of African cities (House, 1984) means that many urban residents do not work at typical urban jobs, such as manufacturing or in offices. The financial limitations of African governments mean that many urban residents also have no higher standard of living that rural

residents, lacking what are termed urban services, such as electricity or water.

One of the features which is characteristic of African urbanization is that urban residents consider their real home to be their natal village (Ross and Weisner, 1977; Peil, 1981). Many migrants to urban areas come for jobs, but maintain strong ties with their native village, which is often close enough to visit frequently. Even though they may stay in the city for 20 or 30 years, their ultimate plan is to return to the village to live, and they do not consider themselves urban residents. This particularly affects the types of housing choices these migrants make in the city. They are often satisfied with low-cost rental housing, since they do not intend to make a permanent investment in the city. Instead, they invest in land and housing in their village. This practice may be changing, however, as rural ties grow less with new generations and city residents realize the investment value of urban land.

There is not always an absolute line dividing the rural and urban sector in African countries, at least not as distinctly as in the United States. However, casual observation allows one to distinguish between urban and not urban areas in Africa, and clearly cities there do have an edge. It is the character of African urban development, arising from the large numbers of migrants, that rural practices are retained in the cities. Thus care must be used when defining the two poles, and definitions need to be flexible. For the purpose of this analysis, urban is the more densely built environment inside and surrounding legally defined cities.

Defining Peri-Urban Areas

In 1968, Pryor published a paper reviewing how the concept of the urban fringe had been used in studies of U.S. cities. The term urban fringe was first used in the 1930s to refer to the built up area outside the corporate boundaries of a city. Since that time what he calls a confusion of terminology has characterized the literature, as different terms have been used for this area, including fringe, suburb, or satellite, and sub sets of these, such as pseudo-suburb or pseudo-satellite. Different authors ascribed a different shade of meaning to each term.

In reviewing the literature on African urban development, it becomes obvious that the confusion of terminology which characterized the earlier work in the U.S. has yet to be resolved, with many researchers working with their own concept of what exactly constitutes a peri-urban area. Studies of the urban periphery often fail to provide a definition of exactly what is meant. The definition of what constitutes a peri-urban area varies in part because there is such variety in these areas themselves, and researchers alter their definition to suit the needs of their research. Studies in Africa have looked at the urban periphery or fringe alternately as a place, a process or as one of the attributes describing a community.

Most authors do agree that peri-urban areas are first a place at the city's edge, somewhere between the "true" urban area and the surrounding "rural countryside".

Peri-urban implies some spatial orientation towards the city, a spatial relationship between city and country. In a hierarchical ranking of degree of urban development, the peri-urban concept is invoked to describe the outermost, least urbanized ring in a usually three tiered classification, such as urban, semi-urban and peri-urban (Mabogunje, 1990) or central city, intermediate zone and peripheral zone (Muwonge, 1982). Mortimore (1975: 188) defines as peri-urban the "zone of spatial contact between town and country, [between the] urban tract (built up area) and rural environs." When one leaves the peri-urban area, one exits what is functionally the city.

Most studies of the urban development process in Africa use the term peri-urban for certain types of development occurring at the edge of a city. In doing so, they have narrowed the definition of the term from a spatial zone of urban expansion and change to a value laden term, most commonly used as an adjective, to describe a spontaneous settlements of low-income city dwellers. McClintock (1973) refers to the peri-urban areas in Kisumu, Kenya as areas of substandard or informal housing surrounding the city. Simon (1992) describes peri-urban areas, which he also calls the fringe or periphery, as those land areas outside a city which are either vacant but ready for subdivision or squatting, or have recently been developed into shanty towns.

One other term which is frequently associated with peri-urban or fringe areas is suburbs. Some authors seem to use the terms almost interchangeably (Barnes, 1982;

Brand, 1972), while others seem to imply that the two are different places (Mabogunje, 1990; Simon, 1992). This may in part be explained by the characteristics attributed to suburbs in a U.S. context, as places housing the middle and upper class residents in well planned and organized neighborhoods. This contrasts sharply with much of the development being studied in Africa at the fringe, so researchers may be hesitant to use the term suburbs to describe it.

A definition of peri-urban areas provided by the OECD stresses that it is location together with other social and economic factors which classify an area as peri-urban. They define peri-urban as "the periphery of urban agglomerations where economic and social activities are directly affected by the presence and expansion of the city" (OECD, 1978: 9-10). The definition goes on to list economic factors characteristic of these areas. There is a change in the physical structure, resulting in an increased demand for land, with a corresponding increase in land value. There is an increase in the number of residents, more of whom work in the city. There are changes in the markets, most notably for agricultural products, and there is a deterioration of the environment from pollution. The theme common to all the factors listed is that these areas, in addition to being characterized by their location on the urban periphery, are places of economic and social change.

Peri-urban Communities

One of the main topics addressed in studies of peri-urban areas is the question of who lives there. Researchers see peri-urban areas as not just places where people house themselves, but as communities which exhibit social organization and cohesion (Clark, 1978). Peri-urban settlements have been used as a unit of analysis for examining various social factors such as ethnicity (Gutkind, 1962) or religion (Rigby and Lule, 1975).

The general impression from the African literature, however, is that it is the poor who inhabit the city's fringe. Barnes (1982) proposes that there are three residential enclaves in West African cities. The monied elite live in the city itself. The middle income class resides in the city, but are located more towards the edge. The poor are economically pushed from the city, and are forced to live in the peri-urban or suburban areas. Most of the studies reviewed mentioned the fact that poor communities are characteristic of the urban fringe, and undoubtedly there are many low income families residing in these areas. It must be remembered, however, that a large segment of the African urban population can be judged poor by Western standards, and can be found living in all zones of a city.

There are historical precedents in Africa for the urban periphery being allocated to the urban poor. Simon (1992) notes that in pre-industrial cities, social class tends to

increase with proximity to the city center. Before gaining their independence, native citizens of many African countries were segregated or forbidden from living in the city itself. They were housed in communities at the city periphery which generally lacked urban services, and came into the city to work (Coquery-Vidrovitch, 1991). This structure was carried over after independence, when the new African elite occupied the housing of the former European colonizers.

Alonso's urban model provides one rationale for the poor inhabiting peripheral communities. The periphery is where the cheapest urban land is found, or vacant, previously agricultural land is available for squatting. Those with little or no money can find land for housing there. On the other hand, the poor can economize by consuming less housing nearer to the city center, thus minimizing commuting costs. Turner (1967), based on his research in Peru in the 1960s, theorized that recent migrants to urban areas do initially locate in the city center in order to be near economic opportunities. After establishing themselves in the city, however, they tend to move to the periphery where vacant land was available for them to build their own homes. Even though the inhabitants of these peripheral communities were poor, Turner saw these communities not as slums, but as self-improving suburbs.

Griffin and Ford (1980), based on their work in Latin America, also concluded that a city's peripheral zone was the domain of the poor. They describe this zone in Latin American cities as characterized by poor quality, poorly serviced squatter settlements.

However, they disagree with Turner's theory, stating that it is recent in-migrants to the city who inhabit this zone.

Fewer studies have acknowledged that today other classes also reside in African peri-urban areas. Brand (1972) notes that in Accra, both the city's elite and poor are drawn to the city's periphery, the elite for the space available and the poor for the cheap land. Davies (1986) found both low and middle income families living in the peripheral areas of Harare. Simon (1992) states that the cheapest housing in most African cities is available in peripheral shanty towns or informal settlements, but also concedes that affluent groups live in the city suburbs.

Little is also said in most studies about other land uses in peri-urban areas. Meunch (1972) found that the ring of development surrounding Ibadan, Nigeria contained a variety of modern land uses, including industries and an airport, in addition to low density residential development. Some communities also become fringe communities not from choice, but because expansion causes the urban area to envelop farm communities and small towns formerly outside of the city.

The Rural vs the Urban Fringe

To capture the process of gradual change and mixed land use found at the urban periphery, a differentiation was made within the fringe in some studies Pryor (1967)

reviewed. The urban fringe is that part of the fringe contiguous with the central city and characterized predominantly by residential, commercial and industrial development. The rural fringe is contiguous with the urban fringe, but is characterized by a lower population density and a higher proportion of farm activities. Pryor does acknowledge that the overall fringe is a heterogenous place and difficult to characterize, but he still feels that compared with the characteristics of both rural and urban areas, it is a distinct and definable area. He refers to it as "the residual zone between two more readily defined poles" (p.205).

Figure 3.1 identifies these two components of the fringe. The urban fringe is that area between U and E. Most of the land in this area has recently undergone conversion to urban uses. The rural fringe lies between E and R. Land in this area is under pressure to develop in the near future. The total area lying between U and R makes up what can be argued is the peri-urban zone. While the two rent curves are shown continuing with the same slopes in this area, it is difficult to determine exactly what rents land will produce in this zone, as there are many forces acting during the process of conversion.

In the peri-urban literature, some researchers characterize peri-urban areas as places of agricultural production, while others take an urban perspective and see peri-urban areas as the outlying residential areas of a city. The line seems to be drawn between the rural fringe and urban fringe. The agriculturalists look at peri-urban growth in

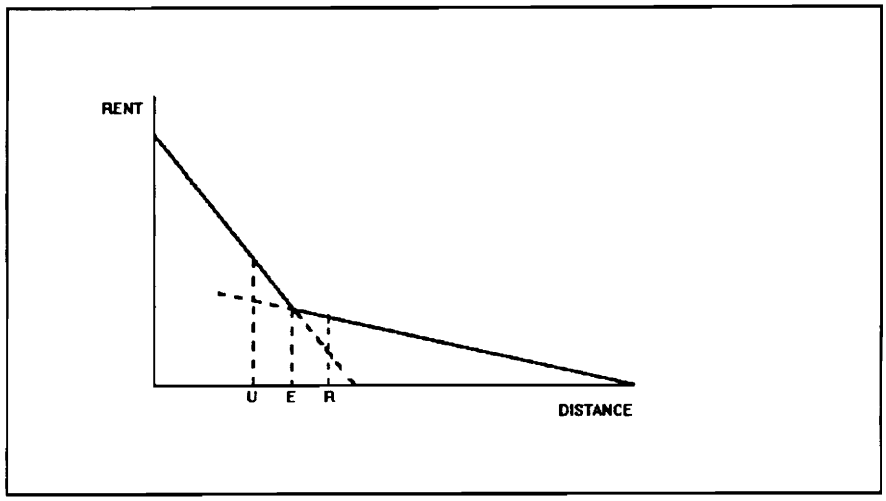

Figure 3.1: Urban and Rural Fringes

terms of agricultural land uses. Studies focusing on the agricultural potential of peri-urban areas in developed countries often lament the loss of arable land (OECD, 1978; Cruickshank, 1982). Even in Africa, the rural-urban interface has been described as a place of conflict between agriculture and urban growth (Mortimore, 1975). Briggs (1991) calls them transition zones, where agricultural land is being converted to urban uses. Swindell (1988) talks about the fringe as a place where both rural and urban interests meet, commonly for the purpose of agricultural exchange.

The productive potential of these areas and their roles in providing food for city residents is also emphasized. Briggs describes the function of Dar es Salaam's peri-urban areas as sources of food. Settlers in these areas produce food for sale in the city. Swindell demonstrates that farming in the urban periphery is an activity of both

rural and urban based residents. What these researchers are describing is the area of primarily agricultural production, which borders on the built up area of the city. It is an area which is under development pressures, but is still primarily rural in character.

The research which is most applicable to this study is that which has been undertaken from a perspective of urban growth, looking at the urban fringe areas. These studies have examined the process urbanization, and addressed some of the issues which arise with the types of settlement occurring in peri-urban areas. This is the work which is reviewed in the remainder of this chapter.

The Functional vs the Legal City

The functional city does not always correspond to the legal city. In both the western and African literature, the legal boundaries of the city are used to determine what is peri-urban. Both Barnes (1982) and Doxiadis Associates (1973) define peri-urban areas as those settlements which lie outside of the city's boundaries. Other authors, however, classify as peri-urban areas those outlying zones which have recently been incorporated into the city's jurisdiction (McClintock, 1973; Sada, 1970). The conflict results when a city's legal boundaries do not accurately reflect the true scope of urbanization, where built-up areas economically and socially tied to the city are not technically classified as a part of it.

Figure 3.2 shows this incompatibility between what is on paper the city and what is in reality. The legal boundary of the city is set at point B. Beyond that point, however, urban residents are still willing to pay more for land than people who want it for agricultural purposes. This causes the built urban environment to spill over the legal city boundary up to point E, where the agricultural bid rent curve is higher than the urban bid rent curve.

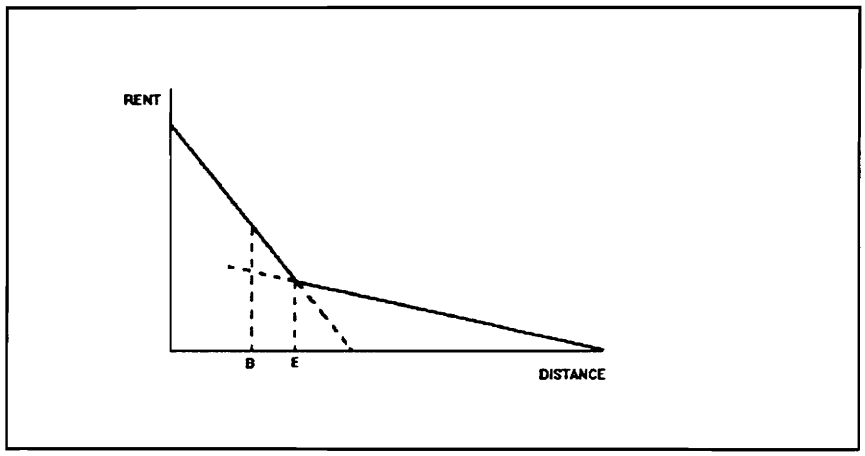

Figure 3.2: Legal and Functional Urban Boundaries

This situation creates both problems and opportunities for city governments and peri-urban residents. One issue is the provision of urban services. A city government is not obligated to provide urban services such as water or electricity beyond their legal boundaries. This can be a benefit to a city administration which does not have the funds to provide these services, a situation in which many African countries find themselves. Some U.S. local governments have successfully used what is termed the

urban service boundary to control urban growth, stopping development by simply not providing services beyond a certain point (Sullivan, 1990).

Evidence from Africa, however, indicates that a lack of urban services does not necessarily prevent settlement of a peri-urban area. The one service which is a prerequisite for peri-urban settlements is access to transportation to the city (Doxiadis Associates, 1973). This is vital for the economic viability of the area, so that its residents are connected economically to the city. It is the urban transportation system which initially opens the fringe areas up to urban development. As most peri-urban residents are tied economically to the city through employment, some way of commuting to their jobs is essential. At the same time, growth in these areas can overwhelm the transportation resources available. McGrath (1988) describes the rapidly growing peri-urban areas around Banjul, The Gambia, where the problem of transporting people, not only to jobs, but to school and other essential services, arises.

Other urban services are less necessary to prospective peri-urban residents. Sada (1970) does note that a hospital and a college located on the periphery made the areas around them attractive to settlers in two communities he studied, but these facilities were no doubt connected by road with the city. Researchers describe peripheral communities as poorly serviced or lacking amenities (Memon, 1982). The housing in these areas is also often described as being of low quality. Muwonge (1982) reports

that peripheral housing units in Nairobi generally consist of only one room. These observations, however, reflect the bias in the literature towards associating peri-urban areas with poverty. It can be assumed that the elite who choose to live in a city's suburbs have access to whatever services they desire.

When city boundaries do not encompass the entire built area, there is little administrative control in peri-urban areas outside the legal city boundary, so that development in these areas is subject to few or no restrictions. This lack of government controls means that people can build without regulation, but the lack of planning in these areas can cause development to be dense and haphazard (McClintock, 1973; Memon, 1982). Problems emerge for city governments when the city boundaries are enlarged to encompass these newly urbanized areas. Their unregulated development makes the provision of services even more difficult.

The lack of controls on development can make peri-urban areas more attractive for people looking for land on which to build. Figure 3.3 demonstrates a possible effect this has on land prices. Land just outside the legal city boundary B becomes more desirable to city residents, since it is cheaper to build there. This is the result of not needing to get permits or conform to building codes. Buyers are thus willing to pay more for this land, which is reflected by the steeper rent curve between points B and E. The increase in the price paid for land is inversely related to the savings gained due to the lack of regulations.

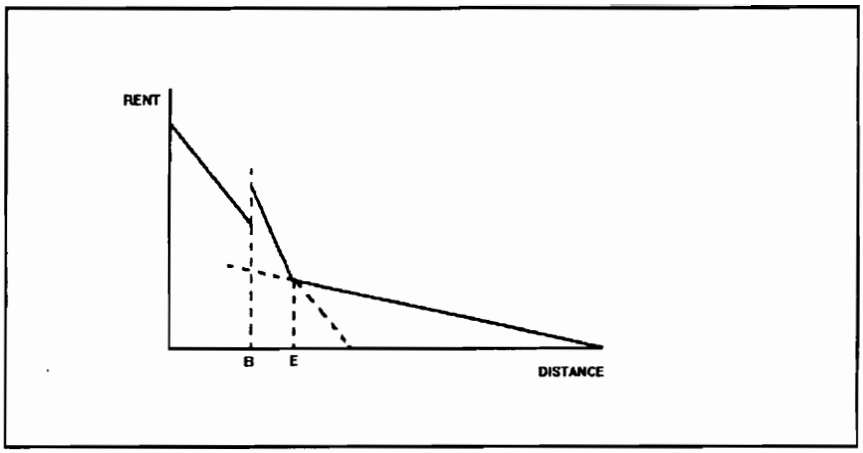

Figure 3.3: Land Value Increase Outside the Legal Urban Boundary

One factor which may counteract this increase in value of peri-urban land in African countries is that secure title to land is sometimes difficult to obtain in these peri-urban areas. This is due to the fact that many residents of peripheral settlements have simply occupied vacant land (Peil, 1969). Another factor contributing to land tenure insecurity is the customary tenure practices governing the ownership of land in some African countries. Even though a person has paid for the land, it may be contested by a family member of the seller who has claim to part of the title of the land.

Peri-Urban Land Speculation

As noted, the basic models proposed by von Thunen and Alonso are static, in that they do not account for outward growth of the city. Sinclair (1967) presents an

enlightening critique of von Thunen's model which specifically examines this rural-urban interface under growth conditions. He notes that as transportation systems have evolved in more developed nations, the costs and constraints of transportation have become less of a force in determining patterns of agriculture. The primary force acting on land uses at the edge of a city is the price difference between urban and rural land. Both sectors are competing for use of the land, but urban uses will always win. In growing cities, urban expansion becomes the dominant force, influencing land use well in advance of the built up area. Thus people owning land near the edge of a city anticipate urban encroachment, and do not commit their land to any long term agricultural uses.

Studies done in the U.S. of the urban fringe (Lee, 1979; Brown et al, 1981; Chicoine, 1981) have focused on this process of land conversion from agricultural to residential use. Cruickshank (1982) defines peri-urban as the urban fringe plus that area which lies in the urban shadow, the area under development pressure. An important component of these works is the temporal dimension to the fringe. For example, Brown's study comprised areas beginning from the edge of the built urban environment out to areas expected to be developed within the next twenty years. Land facing the prospect of conversion within the next ten years they considered to be under intense development pressure.

The growth of peri-urban areas in developing countries is a direct result of an unmet

demand for housing by city households. City residents seeking to buy cheap land go to the urban periphery, where poorly serviced plots are easy to acquire (Mabogunje, 1990). Yahya (1982) reports that thousands of plots of residential land are created in Kenya every year through the conversion of agricultural land in peri-urban areas.

The effects of urban growth on land rents in peri-urban areas are illustrated in Figure 3.4. As a city grows, demand for urban land increases. Land prices throughout the city increase, moving the urban bid rent curve out from A to A' in a given time period. This moves the functional city boundary out from E to E'. The effect on the value of a plot of land held at point S is shown. Before expansion, the land is used for agricultural purposes and produces a rent of P. Urban expansion causes the land to be converted to urban uses, and increases the rent to P', as urban users are willing to pay more for the land than agricultural users. The landowner at point S who is willing to convert his land will receive the rent increase P'- P. If he chooses not to convert his land, but continues to use it for agricultural purposes, he receives no increase in rent. Thus there is pressure on him to convert.

As in the studies conducted in the U.S., expected urban expansion in African cities causes peri-urban land values to rise (Yahya, 1982). Once a peri-urban settlement has been established, people begin buying and holding land for its speculative value. Land has been shown to be one of the most productive and secure investments in most African countries (Amis, 1984). Swindell (1988) found that as population density

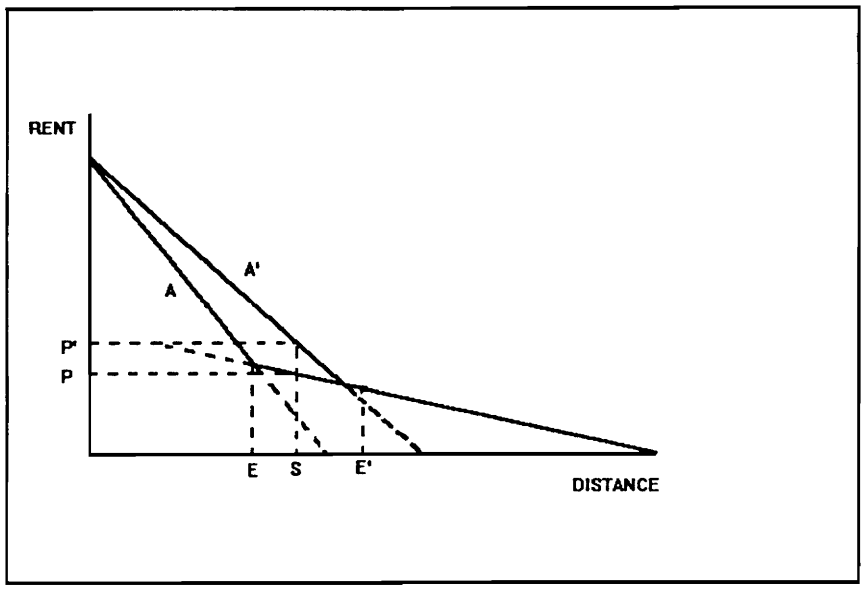

Figure 3.4: Urban Expansion

increased in a peri-urban settlement, the number of land sales increased and land speculation became more prevalent. Muwonge (1982) reported that speculators took advantage of the housing shortage in Nairobi by buying peripheral land and building cheap housing on it for rent. This finding was corroborated by Memon (1982). In peri-urban Nairobi, small poor houses built to rent were some of the first structures put up on formerly agricultural land. In the community he studied, he found that 75% of the households were tenants.

The effect that anticipated urbanization has on peripheral land values is shown in Figure 3.5. Land in the area E to R distant from the city is outside the functional urban boundary, and therefore not in demand by urban residents. However, if owners of land in this area anticipate urban development occurring, they expect that

the value of their land will jump above the rent it produces in agricultural production. They will thus be less inclined to commit their land to agricultural production, as hypothesized by Sinclair, and will ask a higher price if they sell their land, in an attempt to capture some of the profits resulting from urbanization. This is what causes the rent curve to move to a higher level in this area, as illustrated in the figure.

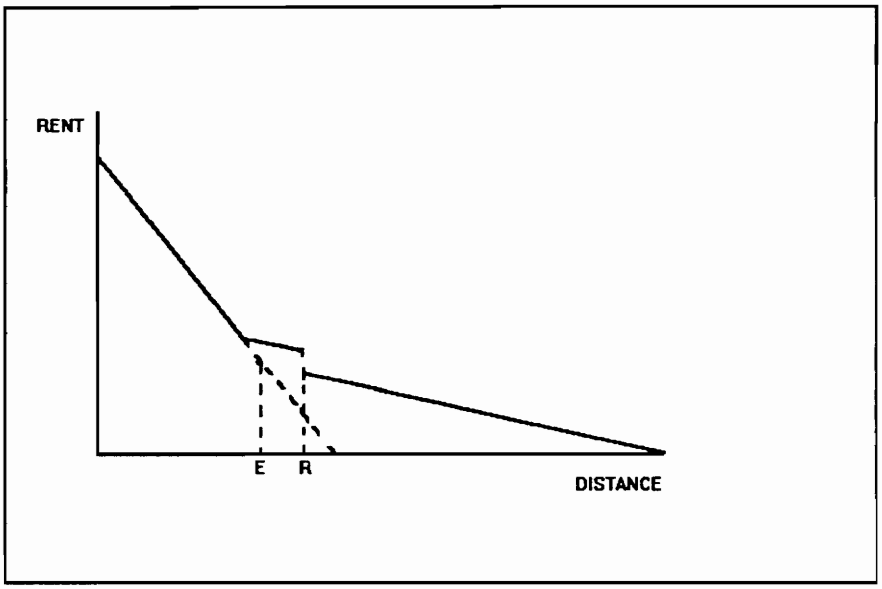

Figure 3.5: Effects of Anticipated Urban Expansion on Agricultural Land Values

Recent Research

The United States Agency for International Development has recently commissioned research looking specifically at patterns of development in peri-urban areas. A report

of the preliminary findings for studies undertaken in Bangkok, Jakarta and Santiago has been issued. In this paper, Browder et al. (1992) summarize the data from surveys of peri-urban communities conducted in each of the three cities. The questions were primarily socio-economic in nature, and respondents were resident households of these communities. Several small samples were collected from different sites in each city, which allowed comparisons to be made between countries.

The peri-urban areas of their study were inhabited primarily by lower-middle and middle-income longtime urban residents. Land ownership rates were high, and public services were available to the inhabitants. They found that patterns of peri-urban development were highly diverse, and that these areas could not be characterized as dominated by poverty. Their conclusion was that the peri-urban concept was of limited value as a discrete category of analysis. Development patterns were too diverse and it was impossible to develop a definition of peri-urban which could cover all metropolitan areas.

While their study was rigorously carried out, and collected valuable quantitative data, it again focused only on primate cities. These cities are exceptional as urban areas within each country. The socio-economic approach they took is subject to cultural effects, particularly when combining cities from such different parts of the world. Finally, all of the conclusions they reached may not be true in an African context.

Summary

The published African urban literature does not contain a clearly defined branch dealing with peri-urban areas. While there are some studies which have looked specifically at peri-urban development, there is little cohesion among them. For the most part, references to the urban periphery or urban fringe are scattered throughout the literature. There is no commonly accepted definition of peri-urban areas, and most researchers use this term simply to describe the location of a community. Certain attributes are associated with these peri-urban communities. The foremost is that they are poorly serviced slums or shanty towns, housing the poorest city inhabitants. Less is said about other socio-economic classes or other land uses.

There is some disagreement about the motives for those building houses in peri-urban areas. Some studies report that in African cities, speculators build houses for rent. This indicates that there should be a high percentage of tenant households in peri-urban areas. On the other hand, Turner's theory supposes that households move to the urban periphery in order to find land to build a house of their own.

Finally, an implicit part of the definition of peri-urban areas is change. The literature notes that land in these areas is being converted to urban uses, but little description of this process is provided. Since almost all studies deal with one large city, there is no data on how city size affects peri-urban development. Likewise, nothing is said about

the effects that a city's past rate of growth might have on its current patterns of development.

The study of peri-urban areas is at the intersection of several different disciplines, just as the peri-urban zone is the intersection of rural and urban sectors. The areas' urban characteristics are neglected by agricultural economists just as their agricultural characteristics are ignored by urban economists. As a result, there is not as yet a clearly defined branch or urban literature dealing with peri-urban areas. The peri-urban African literature is in one sense old, in that there are references to peripheral development made throughout the past three decades. It is an emerging branch of the literature as well in that there is little agreement among the various studies, and no set of guidelines laid out for research in peri-urban areas. The following chapters will attempt to look at some of the questions raised by this review and provide some preliminary answers, which should serve to guide future work.

4. Data and Methodology

Data

This analysis uses data from a survey carried out in 1983 by the Kenyan Central Bureau of Statistics for the Kenyan Ministry of Economic Planning and Development[1]. The survey sampled randomly selected urban residential structures in 32 Kenyan cities and towns. Data were collected on 8481 structures concerning structural characteristics, infrastructure provision, socio-economic characteristics of the owner, rental activity, and acquisition and financing of the land and the structure.

This data set has two characteristics which make it suitable for the current analysis. First, the data were collected from the owner of the structure, as opposed to simply the occupant. This allowed questions to be asked about the acquisition of both the land and structure, characteristics of owners, and information about rental activity. It does not provide a socio-economic breakdown of urban residents, since it does not collect any information about renters. One problem which arises when surveying owners is that absentee structure owners can be difficult to locate. This contributed to a significant amount of missing data in these cases.

[1] A copy of the survey questionnaire is found in Appendix A.

The second attribute of this data set which makes it unique among data collected in developing countries is that it includes a large number of observations distributed among cities within the same country. As was noted in the literature review, most other urban studies in Africa have used data from one city or community. The data used in this analysis allowed me to compare cities of different sizes and growth rates. The large sample size makes it easier to generalize the results.

National censuses conducted in Kenya in the years 1969 and 1979 provided additional data on the populations of the cities included in the survey[2]. The population counts used were for the town itself, as opposed to the district, which comprises both the town and surrounding area. No data were available for towns with less than 2000 inhabitants. This affected eight towns in the 1969 census. In each of these cases, these towns were assigned a population of 2000 for this year. This over-estimates the population for these towns in that year, but was necessary to calculate growth rates.

The units of analysis in the survey are residential structures. For the purpose of this research, these units have been grouped by city. The observations for each city are classified as lying in either the central or peripheral zone of that city.

[2] For a list of cities and their populations, see Appendix B.

Definition of the Peri-Urban Zone

Urban growth takes place irregularly around a city, following roads or responding to other geographic features, and peri-urban areas do not always respect the legal city boundaries. A peri-urban zone is unique for each city, but its definition depends on time. Each area in a growing city was at one time in the peri-urban zone, but as urban growth continues, the peri-urban zone moves outward.

The main flaws in the survey data affecting this study are that they do not give any indication of whether the structure lies in or outside of the legal city boundaries, and they do not provide any way of determining if the structure in fact lies on the "true" peri-urban area of the city. The assumption made in this research is that all observations in the survey lie within the legal urban area, and that they extend to the edge of these boundaries in each city. The variable used in this study to define peri-urban is the distance of a structure from the city center, which is measured in one kilometer increments to five kilometers from the city center, then from 5 to 10 kilometers, and over 10 kilometers. The observations for each city can be grouped in a set of concentric circles or rings, with the city center as the central node. There is no indication, however, of the city sector in which the structure lies.

If we accept that urban areas expand gradually outward, then the set of rings for each city is roughly correlated with time, and an inner ring is relatively older than a ring

lying outside of it. Organizing the data in this highly simplified way allows an analysis to be made of areas which have been developed relatively more recently than others. Thus what is defined as peri-urban for the purpose of this research may not always correspond to the "true" peri-urban zone of the city as defined in Chapter 3, but it still allows a contrast to be made between center and periphery and characteristics which are hypothesized to depend on time of development to be examined.

The peri-urban zone is operationalized in this analysis by defining as peri-urban the outermost ring in each city for which there are data. There are two exceptions to this.

1. If the outermost city ring contains less that 1% of the total observations for the city then the outermost two rings are considered the peri-urban area. This occurs in five cases.

2. If there is a gap of more that two rings without data (two kilometers) separating the outermost ring from the rest of the observations, then the outermost ring of observations is dropped and the outermost contiguous ring of data is classified peri-urban. The justification for doing this is that the observations dropped are too far from the city and constitute a satellite town in the metropolitan area. This occurs in two cases.

City Size

The cities in the study were organized by their 1979 populations into three groups: large, medium and small. The large group comprises the three largest cities with populations over 150,000, which are separated by a natural break in the data. These cities are different enough in their functions and development that they should be considered separately. The medium group contains 13 cities, falling in a range of 20,000 to 100,000 inhabitants. The final group of 16 small cities all have less than 20,000 in population. The decision on where to divide the medium and small groups was somewhat arbitrary, but was based on a break in populations at the 20,000 point.

City Growth Rate

A second grouping of cities was done based on rates of growth. A growth rate for each city was calculated by subtracting the 1969 population from the 1979 population, and then dividing by the 1969 population. Upon examination, no clear breaks emerged from this data, so the cities were divided into quartiles, each containing eight cities. Quartile 1 contains the cities which have grown the most rapidly, increasing from four to fifteen times in size over the ten year period. Quartile 4 contains those growing the least rapidly, increasing between 0.15 and 0.65 times during the decade. No cities in the study lost population during this period.

One potential problem that emerged from this was that the lowest quartile contained

the two largest cities in the study, along with some of the smallest. The result of this is that the number of observation in the two large cities tend to overwhelm the rest of the cities, and bias the results of this quartile towards the patterns of development in these cities.

Absentee Owners and Resident Owners Defined

Resident structure owners were defined as those structure owners who reported living in any part of their structure. Just under half of all structures in the sample were held by resident owners, and the rest by absentee owners. Resident owners, as defined in this study, may also be an absentee owner of another structure, and many resident owners do receive rental income from the structure in which they live. Twernty-six percent of all resident owners report renting out the units in the structure that they do not personally occupy, and almost 60% of all resident owners do not report renting any separate units, but still report having rental income from the structure. This leads to the conclusion that they are sharing their unit with a boarder. This high rate of rental activity is not a surprising finding, as other authors have reported similar findings for other African cities (for example, Tipple and Willis, 1991).

Methods

The methods used in this analysis are contingency tables and measures of central

tendency. These basic statistical tools are suited to this analysis since the goal is primarily to describe peri-urban areas. They also are useful for analyzing the type of data available, mainly nominal or categorical. I performed most of the data analysis was done using the SAS statistical package on a mainframe computer, although I did some calculations by hand.

The majority of the analysis is presented in two way contingency tables. For each cell the cell's percentage share of the column total is given, followed by the number of occurrences in that cell in parentheses. At the bottom of each column, the number of missing observations is listed for that column.

The Chi squared statistic was calculated for each table. Chi square assesses the probability that the independent variable, in this case location in the center or periphery, has an effect on the dependent variable. For each table, the calculated Chi squared statistic is given, along with the probability level (P=) generated by SAS, reported to three decimal places. The P value is read as the probability that the distribution of observations in the cells is random, or that there is no relationship between the independent and dependent variables. The Chi squared statistic is influenced by sample size. A large sample causes findings of significance to be made more frequently. A very small absolute difference may be a statistically significant difference. This attribute of Chi squared is what produced the large number of P=0.000 findings in this study. In this case, more is learned from looking at tables

where Chi squared is not significant, where the assessment can be made that there is no relationship between the variables.

Due to the inadequacies of Chi squared, the Gamma statistic also was calculated for each table. This statistic ranges from 1 to -1, and assesses the strength of the relationship between the dependent and independent variables. The closer Gamma is to 1 or -1, the greater the correlation between the two variables. A Gamma equal to 0 indicates no relationship. Gamma allows the strength of the relationship of the dependent variable with location to be compared between tables.

Means and medians were used to analyze variables such as distance and income. These data were collected by category, so they were modified for this analysis. To perform the calculations, the values of all members of a category were set to the mid-point of that category. In cases where the medians for two variables are the same, this indicates that the median value for those variables falls in the same interval, but is not necessarily identical.

Simple T tests were done to determine if observed differences in means were statistically significant. All t tests were done at the 0.05% confidence level. Caution must be used in interpreting findings of significant differences. Due to the large number of observations in the sample, even very small differences become statistically significant. While one may reach the conclusion that there is a difference in a

dependent variable attributable to the independent variable, this difference may be too small to be worth acting upon, and thus not politically significant.

5. Data Analysis and Findings

This chapter presents an analysis of the Kenya housing survey data. It examines three aspects of development in peri-urban areas. The first section looks at some general development characteristics, grouping all structures together and dividing the observations between into peri-urban and central city zones. The second section uses the same variables, but looks at the differences between structures held by absentee landlords and structures held by owner occupants. The third section examines some specific development characteristics, grouping the structures by both size and rate of growth of the city they are in, and assessing the impact these variables have on peri-urban development.

Section 1: The Peri-Urban Fringe vs the Central City

This section tests the general hypothesis that due to the recent expansion of the city into these zones, peri-urban areas are different from central zones in their current level and structure of urban development. The von Thunen-Alonso model implies that as a city expands, landowners convert their land to urban uses in order to capture the profits from moving to the higher urban bid rent curve. In peri-urban areas, the unserviced land used for agricultural production is gradually developed for residential and other urban uses. In developed countries, provision of services precedes or accompanies development, whereas throughout most of the developing world urban

residential development often precedes the provision of infrastructure.

The African urban development literature repeatedly emphasizes that peri-urban residents are poor and live in poorly serviced, low quality housing. They often build on land they do not own. The characteristics examined in this section include land ownership and development, the types of structures and service levels, and the types of structure owners. Hypotheses for each set of characteristics will be presented and examined in turn.

General Residential Patterns

Hypothesis: Peri-urban areas are the location where new urban growth occurs, on land that has been converted from agricultural uses. In central areas new growth can occur only through infill or by increasing density. We hypothesize that peri-urban areas will have lower densities but a higher proportion of units under construction.

A general description of the structures in the sample is presented in Table 5.1. The total number of structures, or buildings, included in the survey for all cities combined is given. The number of units is the total number of dwelling places contained in all the structures. As shown, the average number of units per structure is 3.62 and 3.07 respectively for central and peripheral zones, and the median for both zones is 2. While the average number of units per structure is nearly the same in both zones, the

Table 5.1: Number of Structures and Units, by Zone

	Center	Periphery
Total Number of Structures in Sample	6596	1602
Total Number of Units in Sample	23,862	4912
Average Units Per Structure*	3.62	3.07
Median Units Per Structure	2	2
* Difference significant at P=0.05		

Source: Kenyan Ministry of Economic Planning and Development: Urban Housing Survey, 1983.

average for the central zone is, statistically, significantly larger than the peripheral zone. As one gets closer to the center of the city, buildings are higher, since land is more expensive. The further from the city center, the less the number of units one would expect per structure.

The number of the total units reported as still under construction was tabulated, which allowed the calculation of construction rates for each zone. This is presented in Table 5.2. The difference in these rates is statistically significant for the two zones, yielding the expected conclusion that there is a higher percentage of units under construction in the peri-urban zone. Vacancy rates were also calculated for Table 5.2. The periphery has a higher proportion of unoccupied units than the center. This difference in the vacancy rates also is due to the relatively recent growth of the

peripheral area, with a supply of houses constructed to meet anticipated demand in the area.

Table 5.2: Construction and Vacancy Rates by Zone

	Center	Periphery
Unfinished Units	335	123
Construction Rate*	1.4%	2.5%
Habitable Units (Total-Unfinished)	23,527	4789
Number of Units Vacant	983	322
Vacancy Rate*	4.2%	6.2%
* Difference significant at P=0.05		

Source: Kenyan Ministry of Economic Planning and Development: Urban Housing Survey, 1983.

Land Ownership

Hypothesis: The African urban literature proposes that city residents move to the periphery because there is vacant land available on which they can build a home. These plots of undeveloped land can be obtained through either legal or illegal subdivision of agricultural land, or by squatting. We hypothesize that peri-urban areas will have a large percentage of owners who have developed the land themselves.

Table 5.3 presents the status of the plot at the time of acquisition by the current

owner. In the peripheral zone the rate of owners purchasing their plots undeveloped is higher than in the central zone. A majority of the plots in both zones, however, were vacant when acquired, and the current owner was responsible for constructing the buildings on them. The periphery did have a sizable percentage of owners who bought developed land.

Table 5.3: Status of Plot at Acquisition by Current Owner, by Zone

	Center	Periphery	All Structures
Developed	25.2% (1317)	17.2% (245)	23.5% (1562)
Undeveloped	74.8% (3918)	82.8% (1178)	76.5% (5096)
Total	100% (5182)	100% (1423)	100% (6605)
Missing	(1524)	(192)	(1716)
Chi Square=39.3 P=0.000		Gamma=0.235	

Source: Kenyan Ministry of Economic Planning and Development: Urban Housing Survey, 1983.

The type of land tenure arrangement under which the plot is held by the current owner is shown in Table 5.4. Structure owners either have formal ownership of the land, lease the land on which their structure sits, or have some other sort of tenure arrangement. These other types of tenure could include illegal occupation (squatting)

Table 5.4: Type of Land Tenure Arrangement, by Zone

	Center	Periphery	All Structures
Own	51.6% (2708)	49.5% (709)	51.2% (3417)
Lease	23.6% (1236)	8.7% (125)	20.4% (1361)
Other	24.8% (1300)	41.8% (599)	28.4% (1899)
Total	100% (5244)	100% (1433)	100% (6677)
Missing	(1462)	(182)	(1644)
Chi Square=237.2 P=0.000		Gamma=0.165	

Source: Kenyan Ministry of Economic Planning and Development: Urban Housing Survey, 1983.

or some form of traditional land use right. The percentage of structure owners who legally own the land is about the same in the two zones, and accounts for half of all observations. Looking at those who lease their land reveals that this arrangement is more common in the central zone, while other forms of land tenure are more common in the peripheral zone. The model supposes that the peripheral zone would contain more undeveloped, formerly agricultural land which is open for illegal occupation. Since these areas are newly urbanized, cadastral surveys have not yet been completed, making the documentation of ownership rights, and the transformation of traditional ownership to formal ownership, more difficult. This lack of administrative control

also might account for the lower rate of land leases on the periphery, as this requires regulatory controls to ensure the rights of both parties are maintained.

Structure Types

Hypothesis: Peri-urban areas are where new development is occurring, so the average structure should be relatively new. Since it is proposed in the literature that these areas are where the city's poor are locating, the types of structures which they can afford to build will be lower quality. We hypothesize that peri-urban areas will contain more relatively recently built, lower quality dwellings than the central city.

The observations in the survey are broken down by structure type in Table 5.5. Some modern form of house is the predominant type of structure in both zones. Apartment buildings are almost non-existent in the peripheral zone, while making up 5% of the structures in the central zone. Swahilis, a traditional form of housing, are equally distributed in both zones. There is almost twice the rate of shanties in the peripheral zone as the central zone. Other types of structures also make up a larger percentage of peripheral structures. (Gamma was not calculated for this table, due to the nature of the dependent variable.)

The significantly higher rate of shanties and other unclassified structures seems to support the hypothesis that structures in the peripheral zone are lower quality. It is initially surprising that swahilis are evenly distributed in both zones, since one would

Table 5.6: Structure Types, by Zone

	Center	Periphery	All Structures
House	56.6% (3763)	49.9% (805)	55.3% (4568)
Maisonette	3.0% (197)	2.5% (40)	2.9% (237)
Block of Flats	5.2% (343)	0.1% (2)	4.2% (345)
Swahili	15.1% (1004)	15.0% (241)	15.1% (1245)
Shanty	4.7% (312)	8.3% (134)	5.4% (446)
Other	15.4% (1025)	24.2% (390)	17.1% (1415)
Total	100% (6644)	100% (1612)	100% (8256)
Missing	(62)	(3)	(65)
Chi Square=180.0 P=0.000			

Source: Kenyan Ministry of Economic Planning and Development: Urban Housing Survey, 1983.

assume that these would be an inexpensive form of housing and would make up a higher percentage of peripheral dwellings. However, new units constructed are probably of more modern designs, so these swahilis are possibly a holdover from earlier development.

Table 5.6 dissaggregates the structures by age. Almost half of all structures in the peripheral zone were built during the preceding five year period, as opposed to only a quarter of the central zone structures. The data do support the hypothesis

Table 5.6: Structure Ages, by Zone

	Center	Periphery	All Structures
Less Than Five Years Old	24.3% (1498)	43.6% (662)	28.1% (2160)
Five to Ten Years Old	20.2% (1250)	24.1% (366)	21.0% (1616)
Ten to Twenty Years Old	22.1% (1363)	14.3% (218)	20.5% (1581)
Twenty or More Years Old	33.4% (2063)	18.0% (273)	30.4% (2336)
Total	100% (6174)	100% (1519)	100% (7693)
Missing	(532)	(96)	(628)
Chi Square=301.8 P=0.000		Gamma=-0.358	

Source: Kenyan Ministry of Economic Planning and Development: Urban Housing Survey, 1983.

about structure age, but not as conclusively as we would expect. This is due partially to the fact that new structures are built in the central zone, as urban growth causes pressure to increase building densities through infill.

There are two possible explanations for the high rate of structures older that 10 years in the peripheral zone. Some of these could be houses which had formerly been part of outlying villages, and were enveloped by the city as it expanded. The other explanation is that the ring designated as peri-urban for purposes of this research was developed more than 10 years ago, and the city has continued to expand beyond it since that time. However, these data do support the hypothesized negative relationship between distance and age of development.

Urban Services

Hypothesis: With the rapid urban expansion occurring in developing countries, there is a time lag as municipal authorities provide services to the more outlying areas. The other constraint is the costs involved in providing infrastructure, particularly in the case of water or electricity. Local authorities in African cities do not have the money available to finance this investment (Martin, 1991). We therefore hypothesize that peri-urban structures will have lower rates of urban services than more centrally located structures.

To test this hypothesis, the percentages of structures with electric, water and garbage collection services are presented respectively in tables 5.7, 5.8, and 5.9. In each case, a greater percentage of peripheral structures lack these services than do central zone structures. Even so, a large percentage of structures in the periphery have

Table 5.7: Electricity Provided to Structure, by Zone

	Center	Periphery	All Structures
Yes	48.2% (3194)	30.9% (495)	44.8% (3689)
No	51.8% (3435)	69.1% (1108)	55.2% (4543)
Total	100% (6629)	100% (1603)	100% (8232)
Missing	(77)	(12)	(89)
Chi Square=156.3 P=0.000		Gamma=0.351	

Source: Kenyan Ministry of Economic Planning and Development: Urban Housing Survey, 1983.

Table 5.8: Water Provided to Structure, by Zone

	Center	Periphery	All Structures
Inside	47.6% (3157)	31.8% (511)	44.5% (3668)
Outside	48.2% (3194)	49.7% (800)	48.5% (3994)
None	4.2% (280)	18.5% (297)	7.0% (577)
Total	100% (6631)	100% (1608)	100% (8239)
Missing	(75)	(7)	(82)
Chi Square=590.8 P=0.000		Gamma=0.590	

Source: Kenyan Ministry of Economic Planning and Development: Urban Housing Survey, 1983.

access to each of these services. Approximately one half of central structures lack electricity, compared with over two thirds of peripheral structures. Almost 20% of peripheral structures have no water supplied in or near the building, compared with only 4% of central structures.

Table 5.9: Frequency of Trash Collection, by Zone

	Center	Periphery	All Structures
More Than Once a Week	31.7% (2076)	9.7% (153)	27.4% (2229)
Once a Week or Less	24.7% (1616)	13.1% (208)	22.4% (1824)
None	43.6% (2855)	77.2% (1225)	50.2% (4080)
Total	100% (6547)	100% (1586)	100% (8133)
Missing	(159)	(29)	(188)
Chi Square=590.8 P=0.000		Gamma=0.590	

Source: Kenyan Ministry of Economic Planning and Development: Urban Housing Survey, 1983.

The most surprising finding was in the rate of trash collection. While both electricity and water require a considerable investment in infrastructure, trash collection is a relatively less costly service for municipal authorities to provide, yet just under half

of all central structures and over three quarters of all peripheral structures have no regular monthly trash collection. While this may be a lower priority for city residents compared to water and electricity, its importance to urban sanitation and public health should be recognized by city authorities.

The final urban service which is examined is access to paved roads, shown in Table 5.10. The hypothesis here is that there should be no difference observed between the two zones, since access to transportation is one of the prerequisites opening the fringe

Table 5.10: Distance to Nearest Paved Road, in Kilometers

	Center	Periphery
Structure-Road Vectors	6540	1613
Mean*	0.89	1.15
Standard Deviation	1.42	1.68
Median	0.5	0.5
* Difference significant at P=0.05		

Source: Kenyan Ministry of Economic Planning and Development: Urban Housing Survey, 1983.

to development. These data were collected in one kilometer intervals, so each response was assigned the midpoint of the category. The data show that the average distance to the nearest paved road is slightly greater for peripheral residents, just over one kilometer as opposed to just under one kilometer for central zone residents. The

median value, however, is one half kilometer for each group, indicating that there is a small group of peripheral residents living farther from paved roads which is pulling the mean up for this zone.

Owner Characteristics

Hypothesis: The literature proposes that peri-urban areas are the domain of poor urban residents. The model demonstrates that this is where the cheapest urban land is available. We hypothesize that the owners of peri-urban structures will be relatively poorer than central city structure owners.

The final part of this analysis of central and peripheral areas is to look at structure owner characteristics. Table 5.11 presents structure owner income statistics. Again, the data were collected in intervals, so the midpoint of each interval was assigned as the value for all responses in that interval. The mean income for central zone owners is almost 1,000 Kenyan shillings higher than the mean income for peripheral owners. The median for both groups, however, is the same. This would suggest that the actual difference in incomes is less than indicated by the difference in means, and that there is a group of high income central zone owners pulling up the mean income for that group. Thus these data do not show a dramatic difference in incomes of structure owners, but do indicate that the wealthiest residents most likely live in the central city. It must be remembered that this income average is for structure *owners*, not all households in the periphery. It may be that the household income differential is much

Table 5.11: Household Income of Structure Owner, by Zone, in Kenyan Shillings

	Center	Periphery
N=	3554	1176
Mean*	4236.9	3327.2
Standard Deviation	7022.8	6440.8
Median	1500	1500
* Difference significant at P=0.05		

Source: Kenyan Ministry of Economic Planning and Development: Urban Housing Survey, 1983.

greater between the two zones, as this would include poor families which rent dwellings at the periphery.

Table 5.12: Sex of Structure Owner, by Zone

	Center	Periphery	All Structures
Male	79.4% (2968)	80.1% (981)	79.6% (3949)
Female	20.6% (771)	19.9% (244)	20.4% (1015)
Total	100% (3739)	100% (1225)	100% (4964)
Missing	(2967)	(390)	(3357)
Chi Square=0.3 P=0.597		Gamma=0.022	

Source: Kenyan Ministry of Economic Planning and Development: Urban Housing Survey, 1983.

Finally, table 5.12 dissaggregates the structures by the sex of their owners. About 80% of all structures are owned by men. Both zones are essentially identical in the proportion of ownership, and the Chi Square test demonstrates that there is no significant relationship between location and distribution by sex of structure owners.

Summary

This section demonstrated that there are significant differences between peri-urban structures and structures in the rest of the city in certain characteristics. Peri-urban areas have more units under construction and higher vacancy rates. More owners have built their own houses on vacant land. This land is more likely to be held informally or illegally by the structure owner.

The structures are lower quality, with significantly more shanties and unclassified structures in the peri-urban areas. These houses are provided with lower levels of urban services. The owners themselves have lower incomes than central households, but gender does not predispose an owner to be in one zone over the other.

Section 2: Absentee Owners vs Resident Owners

This section will examine differences between absentee landlords and resident owners in both the central city and the periphery. The primary hypothesis for this section stems from the statements made by Muwonge (1982) and Memon (1982), that speculators are building low cost, poorly serviced housing in the peri-urban zones as an investment. The contrasting hypothesis is Turner's (1967) assertion that the periphery provides opportunities for home ownership to urban residents, who locate there to stop paying rent.

The structures in each zone were divided into two groups, those held by absentee owners and those held by resident owners. Absentee owners rented the entire structure. Resident owners included those owners who rented part of their structure, but did reside in it themselves.

The breakdown of these groups is shown in Table 5.13, which shows that the peripheral zone in fact has a higher rate of owner occupied structures than the central zone. A majority of the structures in the central zone are owned by absentee landlords, while 60% of the peripheral owners live in their structure. The remainder of this section examines some of the attributes of each of these four groups (absentee-center, resident-center, absentee-periphery, resident-periphery).

For this analysis it is sufficient to distinguish between resident and absentee owners. The main difference between these groups which will impact the study is that resident landlords to a large extent share the housing conditions of their tenants. Since they also must interact with their tenants on a daily basis, they have less opportunity to take advantage of their tenants than does an often faceless absentee landlord.

Table 5.13: Absentee Owners vs. Resident Owners, by Zone

	Center	Periphery	All Structures
Absentee Owners	57.3% (3749)	39.1% (622)	53.8% (4371)
Resident Owners	42.7% (2791)	60.9% (969)	46.2% (3760)
Total	100% (6540)	100% (1591)	100% (8131)
Missing	(166)	(24)	(190)
Chi Square=171.1 P=0.000		Gamma=0.353	

Source: Kenyan Ministry of Economic Planning and Development: Urban Housing Survey, 1983.

Land Ownership

Hypothesis: Muwonge's hypothesis is that it is the absentee landlords who are constructing, or having constructed for them, the housing that they are renting in the periphery. They also are more likely to have legal ownership of this land, as they are

not physically present to protect their claim to the land. We hypothesize that peripheral absentee owners are more likely to have developed their land, and to own it outright.

Table 5.14 contrasts the four groups by whether they developed the land themselves or acquired the structure with the land. While the majority of owners in all groups developed the land themselves, the group most likely to do this is resident owners at the periphery. The group most likely to purchase developed land is the resident owners in the central city. The Chi squared test shows, however, that there is no

Table 5.14: Status of Plot at Acquisition, by Owner Status

	Center		Periphery	
	Absent	Resident	Absent	Resident
Developed	21.5% (572)	28.7% (721)	17.8% (89)	16.8% (153)
Undeveloped	78.5% (2085)	71.2% (1791)	82.2% (412)	83.2% (759)
Total	100% (2657)	100% (2512)	100% (501)	100% (912)
Missing	(1092)	(279)	(121)	(57)
	Chi Square=35.4 P=0.000 Gamma=-0.189		Chi Square=0.222 P=0.637 Gamma=0.035	

Source: Kenyan Ministry of Economic Planning and Development: Urban Housing Survey, 1983.

difference between the status of land acquired by absentee owners and resident owners in the periphery. These findings seem to refute Muwonge's hypothesis, but still, over 80% of absentee owners in the periphery have developed the land themselves. Turner's hypothesis is supported by the high rate of resident owners in the periphery acquiring undeveloped plots.

Table 5.15: Type of Land Tenure Arrangement, by Owner Status

	Center		Periphery	
	Absent	Resident	Absent	Resident
Own	56.1% (1495)	47.0% (1179)	63.1% (318)	41.9% (385)
Lease	25.0% (666)	21.9% (551)	10.7% (54)	7.6% (70)
Other	18.9% (505)	31.1% (782)	26.2% (132)	50.5% (464)
Total	100% (2666)	100% (2512)	100% (504)	100% (919)
Missing	(1083)	(279)	(118)	(50)
	Chi Square=103.3 P=0.000 Gamma=0.205		Chi Square=79.1 P=0.000 Gamma=0.414	

Source: Kenyan Ministry of Economic Planning and Development: Urban Housing Survey, 1983.

Table 5.15 presents the breakdown of land tenure types among the groups. Absentee owners in the periphery were the most likely to own the land outright, while

peripheral resident owners were the least likely to own the land. The rate of leased land was highest for central zone absentee owners, and lowest again for peripheral resident owners. Peripheral owner occupants were the group most likely to hold the land under some other form of tenure, either traditional or illegal, at a rate almost twice that of absentee owners on the periphery. These findings seem to support the hypothesis about the need for tenure security by absentee landlords.

Structure and Services

Hypothesis: Muwonge's hypothesis is that absentee landlords in the periphery are taking advantage of housing shortages and earning excessive profits by providing inadequate housing. We hypothesize that structures owned by absentee landlords in the periphery are more likely to be lower quality and poorly serviced.

Table 5.16 shows the types of structures owned by each group. Absentee owners and resident owners hold the different types of structures at about the same rate as each other. One exception is that absentee owners are more likely to own a maisonette, but these account for only 5% of the structures they own. They are also less likely to own swahilis, shanties, or unclassified types of structures, all of which are less modern types of structures. These findings seem to contradict Muwonge's hypothesis.

Table 5.16: Structure Type

	Center		Periphery	
	Absent	Resident	Absent	Resident
House	62.2% (2323)	49.0% (1364)	50.8% (315)	48.9% (474)
Maisonette	2.2% (81)	4.0% (112)	5.5% (34)	0.6% (6)
Block of Flats	6.4% (238)	3.6% (101)	0.2% (1)	0.1% (1)
Swahili	9.5% (356)	23.1% (642)	12.9% (80)	16.5% (160)
Shanty	2.7% (103)	7.5% (208)	7.4% (46)	9.1% (88)
Other	17.0% (636)	12.8% (356)	23.2% (144)	24.8% (240)
Total	100% (3737)	100% (2783)	100% (620)	100% (969)
Missing	(12)	(8)	(2)	(0)
	Chi Square=374.7 P=0.000		Chi Square=40.8 P=0.000	

Source: Kenyan Ministry of Economic Planning and Development: Urban Housing Survey, 1983.

Table 5.17 examines the level of water service among the four groups. While both groups in the periphery had lower rates of water service, resident owners were even less likely to have water available in the house. Table 5.18 illustrates that the same holds true for electric service. These findings indicate that while peripheral residents

Table 5.17: Water Provided to Structure, by Owner Status

	Center		Periphery	
	Absent	Resident	Absent	Resident
Inside	53.1% (1981)	38.9% (1081)	44.7% (277)	23.2% (224)
Outside	44.1% (1645)	54.9% (1527)	39.2% (243)	56.7% (548)
None	2.9% (107)	6.2% (172)	16.1% (100)	20.1% (194)
Total	100% (3733)	100% (2780)	100% (620)	100% (966)
Missing	(16)	(11)	(2)	(3)
	Chi Square=147.8 P=0.000 Gamma=0.279		Chi Square=81.7 P=0.000 Gamma=0.315	

Source: Kenyan Ministry of Economic Planning and Development: Urban Housing Survey, 1983.

as a whole live in poorer conditions relative to central residents, someone renting a peripheral house is more likely to live in better conditions than a peripheral resident living in his own house.

Socio-economic Characteristics of Structure Owners

Hypothesis: Absentee owners are building in the periphery as an investment, while residents are building there out of necessity. Thus we hypothesize that absentee owners in peri-urban areas will have a higher socio-economic status that owner occupants.

Table 5.18: Electricity Provided to Structure, by Owner Status

	Core		Periphery	
	Absent	Resident	Absent	Resident
Yes	53.2% (1986)	40.2% (1117)	39.9% (248)	24.6% (237)
No	46.8% (1746)	59.8% (1663)	60.1% (373)	75.4% (726)
Total	100% (3732)	100% (2780)	100% (621)	100% (963)
Missing	(17)	(11)	(1)	(6)
	Chi Square=108.5 P=0.000 Gamma=0.275		Chi Square=41.7 P=0.000 Gamma=0.341	

Source: Kenyan Ministry of Economic Planning and Development: Urban Housing Survey, 1983.

Table 5.19: Structure Owner Income, by Owner Status, in Kenyan Shillings

	Center		Periphery	
	Absent	Resident	Absent	Resident
N=	1352	2177	348	828
Missing	(2397)	(614)	(274)	(141)
Mean	5779.6	3252.6	4894.4	2668.5
Standard Deviation	8457.5	5705.6	8152.0	5439.5
Median	3000	1500	1500	750

Source: Kenyan Ministry of Economic Planning and Development: Urban Housing Survey, 1983.

Table 5.19 contrasts the household incomes of the four groups. These averages were calculated as described in the previous section. In both zones, absentee owners have the highest average household incomes, while peripheral owner occupants have the lowest. This group also has the lowest median income.

Table 5.20 breaks the four groups down by the level of education attained. On the whole, the absentee groups are better educated, with higher percentages having completed at least a secondary education. The group with the greatest percentage of college graduates is the absentee owners in the periphery. Surprisingly, owner occupants in the center have a higher rate of college completion than absentee owners in the center.

One issue which influences the results of both the income and education analyses is the large percentage of non-responses in the absentee owner groups. This may introduce a bias into the results, depending on how the non-responses are distributed in the population. The conclusions drawn based on these results are subject to question for this reason.

Finally, table 5.21 presents the rate of ownership of other rental structures in each group. Absentee owners are almost twice as likely to own at least one other rental structure than are owner occupants. There is relatively little difference between the two zones. The findings of this section seem to indicate that absentee owners have

Table 5.20: Education of Owner

	Center		Periphery	
	Absent	Resident	Absent	Resident
None	22.7% (296)	32.4% (737)	17.2% (59)	32.5% (275)
Primary	43.3% (563)	38.0% (863)	42.3% (145)	39.8% (336)
Secondary	29.7% (386)	22.9% (521)	27.7% (95)	21.7% (183)
University	4.3% (56)	6.7% (152)	12.8% (44)	6.0% (51)
Total	100% (1301)	100% (2273)	100% (343)	100% (845)
Missing	(2448)	(518)	(279)	(124)
	Chi Square=55.5 P=0.000 Gamma=-0.128		Chi Square=38.7 P=0.000 Gamma=-0.294	

Source: Kenyan Ministry of Economic Planning and Development: Urban Housing Survey, 1983.

higher socio-economic standing that owner occupants. Since they are more likely to own multiple rental structures, this seems to support the hypothesis that rental housing does act as a fruitful investment for this group.

Summary

This section shows that there are differences between absentee owners and resident owners in peri-urban areas, but not in the way which was originally hypothesized.

Table 5.21: Owner Owns Other Rental Structures

	Center		Periphery	
	Absent	Resident	Absent	Resident
Yes	77.8% (2028)	34.4% (838)	71.7% (363)	37.3% (342)
No	22.2% (578)	65.6% (1598)	28.3% (143)	62.7% (574)
Total	100% (2606)	100% (2436)	100% (506)	100% (916)
Missing	(1143)	(355)	(116)	(53)
	Chi Square=976.6 P=0.000 Gamma=0.740		Chi Square=154.3 P=0.000 Gamma=0.620	

Source: Kenyan Ministry of Economic Planning and Development: Urban Housing Survey, 1983.

The hypothesis was that absentee owners of peripheral housing intentionally lowered the quality of construction and the services provided in order to increase the return on their investment. The findings indicate that, to the contrary, a household renting a home in a peri-urban area is more likely to have a higher standard of accommodations than a peri-urban household owning its own house.

Absentee landlords of peri-urban structures have a higher rate of secure land tenure. Their structures were supplied with a higher level of urban services than owner occupied peri-urban houses, but this level was still below the level of services enjoyed by central city households. Absentee landlords in general had higher levels of income

and education than owner occupants, and were almost twice as likely to own other structures.

Section 3: City Size and Growth Rate Effects

The basic hypothesis in this section is that the size of a city and its past rate of growth will affect the development of its peri-urban areas. This section will look at some features of residential structures in peri-urban areas hypothesized to be influenced by city size and growth rate.

One would expect that smaller cities would have less of a difference between the attributes of structures in peri-urban and central city areas. This is due to two factors. First, transportation is less of a requirement for development on the periphery, since it is relatively easier for residents to walk to places they need to go in the city. The reduced emphasis on commuting costs reduces the pressures acting on development, as demonstrated in the model. Second, expansion in larger cities puts relatively more strain on government resources to provide services in these areas. For example, if a city with a distance of 2 kilometers from center to periphery expands outward one kilometer over a given period of time, this adds 15.7 square kilometers of area to the city. However, if a city with a distance of 10 kilometers from center to edge expands one kilometer to 11, this adds and additional 65.9 square kilometers of area to the city. The same linear distance of expansion creates over four times as much land which must be serviced in the larger city.

Previous rates of growth in a city can influence peri-urban development in two ways.

First, rapid expansion means that there is a greater lag in the provision of urban services to peripheral areas. Second, people who have seen the rapid urban growth during a period of time develop certain expectations about how this growth will continue. If they anticipate that growth will be sustained, there is likely to be speculative investment in peripheral properties, as land being converted to urban uses in these areas can provide high rates of return.

General Development

Table 5.22 looks at the residential structures in peri-urban zones, grouped by city size. The average number of units per structure decreases as city size decreases, while the median number of units shows no trend. The percentage of units under construction also shows no trend, with the largest cities having the largest construction rate. The vacancy rate does show a trend decreasing with city size.

Table 5.23 presents the same information, but groups the peri-urban areas according to growth rate quartiles, with Q1 containing the cities which grew the fastest from 1969 to 1979. There are no clear trends in either the average or median number of units per structure among the quartiles. The rate of units under construction is the highest in the slowest growing cities, while one would expect to find in the fastest growing cities. However, the majority of these observations are from two of the largest cities, which also have the highest vacancy rate, so there might be less

Table 5.22: Development by Structures and Units in Peri-Urban Zones, by City Size

	Large	Medium	Small
Number of Structures	714	589	299
Number of Units	2625	1599	688
Average Units per Structure	3.68	2.71	2.30
Median Units per Structure	3	1	2
Unfinished Units	90	17	16
Percent of Total Units Unfinished	3.4%	1.1%	2.3%
Habitable Units (Total-Unfinished)	2535	1582	672
Number of Vacant Units	184	107	31
Vacancy Rate	7.3%	6.8%	4.6%

Source: Kenyan Ministry of Economic Planning and Development: Urban Housing Survey, 1983.

incentive to finish units which are under construction. The vacancy rate indicates somewhat of an upward trend, inversely related to growth rate. This is to be expected, but the slowest growing cities have a lower rate than the third quartile. Again, this may be attributable to the inclusion of the two largest cities in the fourth quartile.

Table 5.23: Development by Structures and Units in Peri-urban Zones, by Growth Rate Quartiles

	Q1	Q2	Q3	Q4
Number of Structures	208	303	274	817
Number of Units	447	956	678	2831
Average Units per Structure	2.15	3.16	2.47	3.47
Median Units per Structure	1	2	1	3
Unfinished Units	6	20	12	85
Percent of Total Units Unfinished	1.3%	2.1%	1.8%	3.0%
Habitable Units (Total-Unfinished)	441	936	666	2746
Number of Vacant Units	13	38	79	192
Vacancy Rate	2.9%	4.1%	11.9%	7.0%

Source: Kenyan Ministry of Economic Planning and Development: Urban Housing Survey, 1983.

City Size and Peri-Urban Characteristics

Hypothesis: City size will affect the level of services provided in peri-urban areas compared to central city areas. We hypothesize that larger cities will have a greater difference between the level of services provided to structures in the two zones.

Tables 5.24 through 5.28 present five different development characteristics of central and peri-urban areas, grouped by city size. Table 5.24 examines electricity

Table 5.24: Electricity Provided to Structure, by City Size Groups

	Large Cities		Medium Cities		Small Cities	
	Center	Periph	Center	Periph	Center	Periph
Yes	57.2% (1427)	44.7% (272)	46.0% (1253)	19.8% (117)	37.5% (514)	35.8% (106)
No	42.8% (1069)	55.3% (337)	54.0% (1473)	80.2% (473)	62.5% (857)	64.2% (190)
Total	100% (2496)	100% (609)	100% (2726)	100% (590)	100% (1371)	100% (296)
Missing	(68)	(111)	(34)	(5)	(11)	(4)
	χ^2=30.9 P=0.000 Γ=0.246		χ^2=136.6 P=0.000 Γ=0.549		χ^2=0.294 P=0.0.588 Γ=0.036	

Source: Kenyan Ministry of Economic Planning and Development
Urban Housing Survey, 1983

Table 5.25: Trash Service Provided to Structure, by City Size Groups

	Large Cities		Medium Cities		Small Cities	
	Center	Periph	Center	Periph	Center	Periph
Yes	69.1% (1703)	19.0% (135)	47.6% (1301)	22.0% (130)	50.9% (688)	34.2% (96)
No	30.9% (761)	81.0% (578)	52.4% (1431)	78.0% (462)	49.1% (663)	65.8% (185)
Total	100% (2464)	100% (713)	100% (2732)	100% (592)	100% (1351)	100% (281)
Missing	(100)	(7)	(28)	(3)	(31)	(19)
	χ^2=571.1 P=0.000 Γ=0.811		χ^2=130.7 P=0.000 Γ=0.527		χ^2=26.2 P=0.0.000 Γ=0.333	

Source: Kenyan Ministry of Economic Planning and Development
Urban Housing Survey, 1983

availability. There is somewhat of the hypothesized trend in the level of electrical service, but the medium cities have a lower rate of service than the large cities. This could be explained by the fact that the large group contains the most modern cities, and extra resources are available to provide these services.

Table 5.25 looks at trash pick-up. Here the expected trend clearly emerges, with the smaller cities having a better level of service. These results seem to support our hypothesis.

Tables 5.26, 5.27, and 5.28 look respectively at average structure ages, status of plot at time of acquisition, and absentee ownership. The model does not suppose that these variables are affected by city size. This is true for the structure ages and the status of the plot at the time of acquisition. However, a strong relationship between size and level of resident ownership of peripheral structures emerges. The largest cities have a much higher rate of resident ownership in peri-urban areas, almost twice that of the smallest cities. This could be attributed to economic forces in these cities, with more people having more money in the larger cities to be able to build their own house.

Table 5.26: Structure Age, by City Size Group

	Large Cities		Medium Cities		Small Cities	
	Center	Periph	Center	Periph	Center	Periph
<5 Years Old	19.7% (459)	45.4% (313)	24.6% (628)	41.4% (236)	31.8% (411)	43.6% (113)
5 to 10 Years Old	17.2% (400)	27.7% (191)	20.7% (528)	21.4% (122)	24.9% (322)	20.4% (53)
10 to 20 Years Old	17.2% (399)	16.3% (112)	26.8% (686)	13.3% (76)	21.5% (278)	11.5% (30)
>20 Years Old	45.9% (1068)	10.6% (73)	27.9% (714)	23.9% (136)	21.8% (281)	24.6% (64)
Total	100% (2326)	100% (689)	100% (2556)	100% (570)	100% (1292)	100% (260)
Missing	(238)	(31)	(204)	(25)	(90)	(40)
	χ^2=342.5 P=0.000 Γ=-0.562		χ^2=85.6 P=0.000 Γ=-0.242		χ^2=22.2 P=0.0.588 Γ=-0.118	

Source: Kenyan Ministry of Economic Planning and Development
Urban Housing Survey, 1983

Table 5.27: Status of Plot at Acquisition, by City Size Groups

	Large Cities		Medium Cities		Small Cities	
	Center	Periph	Center	Periph	Center	Periph
Developed	36.4% (729)	17.9% (117)	18.5% (392)	20.1% (109)	17.6% (196)	8.3% (19)
Un-developed	63.6% (1276)	82.1% (535)	81.5% (1724)	79.9% (432)	82.4% (918)	91.7% (211)
Total	100% (2005)	100% (652)	100% (2116)	100% (541)	100% (1114)	100% (230)
Missing	(559)	(68)	(644)	(54)	(268)	(70)
	χ^2=76.8 P=0.000 Γ=0.446		χ^2=0.741 P=0.389 Γ=-0.052		χ^2=12.3 P=0.0.000 Γ=0.407	

Source: Kenyan Ministry of Economic Planning and Development
Urban Housing Survey, 1983

Table 5.28: Absentee Ownership vs Resident Owners, by City Size Groups

	Large Cities		Medium Cities		Small Cities	
	Center	Periph	Center	Periph	Center	Periph
Absentee Owner	43.9% (1078)	27.0% (191)	68.9% (1869)	42.6% (249)	58.6% (802)	61.1% (182)
Resident Owner	56.1% (1379)	73.0% (517)	31.1% (845)	57.4% (336)	41.4% (567)	38.9% (116)
Total	100% (2457)	100% (708)	100% (2714)	100% (585)	100% (1369)	100% (298)
Missing	(107)	(12)	(46)	(10)	(13)	(2)
	χ^2=65.3 P=0.000 Γ=0.358		χ^2=144.9 P=0.000 Γ=0.498		χ^2=0.62 P=0.0.428 Γ=-0.052	

Source: Kenyan Ministry of Economic Planning and Development
Urban Housing Survey, 1983

City Growth Rate and Peri-Urban Characteristics

Hypothesis: In fast growing cities, urban expansion and the demand for housing have caused new development at the periphery. These areas have not yet been provided with urban services, and they are where the city's poorer inhabitants are moving to find housing. We hypothesize that faster growing cities will see higher percentages of newer, relatively poorly serviced structures in peri-urban areas.

Tables 5.29 through 5.33 examine this hypothesis. Tables 5.29 and 5.30 break down the percentage of structures with electric and trash services. These both show some what of a negative relationship between services provided and rate of growth, as expected. With electricity, it seems to be the most pronounced in the fastest growing cities, with relatively little difference between the bottom three quartiles. The same is true for trash disposal, with the exception of the slowest growing group. Again, this might be attributed to the members of this group being the largest and smallest of the cities.

Table 5.29: Electric Service by Growth Rate Quartiles

	Quartile 1		Quartile 2	
	Center	Periphery	Center	Periphery
Yes	23.5% (261)	7.7% (16)	49.1% (833)	32.2% (98)
No	76.5% (849)	92.3% (193)	50.8% (862)	67.8% (206)
Total	100% (1110)	100% (209)	100% (1695)	100% (304)
Missing	(12)	(1)	(24)	(1)
	χ^2=26.6 P=0.000 Γ=0.575		χ^2=29.6 P=0.000 Γ=0.340	

	Quartile 3		Quartile 4	
	Center	Periphery	Center	Periphery
Yes	57.4% (662)	34.0% (92)	54.6% (1438)	40.7% (289)
No	42.6% (494)	66.0% (179)	45.4% (1196)	59.3% (422)
Total	100% (1154)	100% (271)	100% (2634)	100% (711)
Missing	(9)	(6)	(68)	(112)
	χ^2=48.3 P=0.000 Γ=0.447		χ^2=43.6 P=0.000 Γ=0.274	

Source: Kenyan Ministry of Economic Planning and Development:
Urban Housing Survey, 1983.

Table 5.30: Trash Collection, by Growth Rate Quartiles

	Quartile 1		Quartile 2	
	Center	Periphery	Center	Periphery
Yes	24.2% (270)	4.3% (9)	49.4% (835)	29.2% (89)
No	75.8% (845	95.7% (199)	50.6% (855)	70.8% (216)
Total	100% (1115)	100% (208)	100% (1690)	100% (305)
Missing	(7)	(2)	(29)	(0)
	χ^2=41.7 P=0.000 Γ=0.752		χ^2=42.5 P=0.000 Γ=0.407	

	Quartile 3		Quartile 4	
	Center	Periphery	Center	Periphery
Yes	74.7% (858)	52.1% (135)	66.6% (1729)	15.7% (128)
No	25.3% (290)	48.9% (124)	33.4% (865)	84.3% (686)
Total	100% (1148)	100% (259)	100% (2594)	100% (814)
Missing	(15)	(18)	(108)	(9)
	χ^2=52.0 P=0.000 Γ=0.462		χ^2=648 P=0.000 Γ=0.829	

Source: Kenyan Ministry of Economic Planning and Development: Urban Housing Survey.

Table 5.31 looks at structure age by growth rate and Table 5.32 the percentage of owners developing their own plots. In both these cases, the same results appear as in the trash collection analysis. There is a downward trend with the lowest quartile going in the opposite direction. Table 5.33 presents absentee ownership rates, which seem to exhibit no clear relationship.

Table 5.31a: Structure Age, by Growth Rate Quartiles

	Quartile 1		Quartile 2	
	Center	Periphery	Center	Periphery
<5 Years Old	32.2% (350)	49.8% (101)	21.5% (340)	53.1% (155)
5-10 Years Old	25.2% (274)	26.6% (54)	21.9% (346)	16.8% (49)
10-20 Years Old	32.1% (348)	11.8% (24)	21.4% (339)	10.6% (31)
>20 Years Old	10.5% (144)	11.8% (24)	35.2% (557)	19.5% (57)
Total	100% (1086)	100% (203)	100% (1582)	100% (292)
Missing	(36)	(7)	(137)	(13)
	χ^2=39.6 P=0.000 Γ=-0.305		χ^2=129.3 P=0.000 Γ=-0.449	

5.31b: Structure Age, by Growth Rate Quartiles

	Quartile 3		Quartile 4	
	Center	Periphery	Center	Periphery
<5 Years Old	26.7% (283)	33.3% (90)	21.5% (525)	41.9% (316)
5-10 Years Old	16.0% (170)	13.3% (36)	18.8% (460)	30.1% (227)
10-20 Years Old	23.6% (250)	15.2% (41)	17.4% (426)	16.2% (122)
>20 Years Old	33.7% (357)	38.2% (103)	42.3% (1035)	11.8% (80)
Total	100% (1060)	100% (270)	100% (2446)	100% (754)
Missing	(3)	(7)	(256)	(69)
	χ^2=12.6 P=0.006 Γ=-0.025		χ^2=279.2 P=0.000 Γ=-0.503	

Source: Kenyan Ministry of Economic Planning and Development: Urban Housing Survey, 1983.

Table 5.32: Status of Plot at Acquisition, by Growth Rate Quartiles

	Quartile 1		Quartile 2	
	Center	Periphery	Center	Periphery
Developed	10.0% (104)	5.5% (11)	20.0% (268)	10.2% (27)
Undeveloped	90.0% (940)	94.5% (188)	80.0% (1070)	89.9% (239)
Total	100% (1044)	100% (199)	100% (1338)	100% (266)
Missing	(78)	(11)	(381)	(39)
	χ^2=3.9 P=0.048 Γ=0.308		χ^2=14.4 P=0.000 Γ=0.378	

	Quartile 3		Quartile 4	
	Center	Periphery	Center	Periphery
Developed	27.6% (221)	34.6% (85)	35.3% (724)	17.1% (122)
Undeveloped	72.4% (579)	65.4% (161)	64.7% (1329)	82.9% (590)
Total	100% (800)	100% (246)	100% (2053)	100% (712)
Missing	(363)	(31)	(649)	(111)
	χ^2=4.36 P=0.037 Γ=-0.161		χ^2=81.8 P=0.000 Γ=0.450	

Source: Kenyan Ministry of Economic Planning and Development: Urban Housing Survey, 1983.

Table 6.12: Absentee Owners vs Resident Owners, by Growth Rate Quartiles

	Quartile 1		Quartile 2	
	Center	Periphery	Center	Periphery
Absentee	42.9% (477)	35.3% (73)	73.3% (1227)	63.2% (191)
Resident	57.1% (634)	64.7% (134)	26.7% (447)	36.8% (111)
Total	100% (1111)	100% (207)	100% (1674)	100% (302)
Missing	(11)	(3)	(45)	(3)
	χ^2=4.2 P=0.040 Γ=0.160		χ^2=12.7 P=0.000 Γ=0.229	

	Quartile 3		Quartile 4	
	Center	Periphery	Center	Periphery
Absentee	77.0% (887)	43.0% (116)	44.5% (1158)	29.8% (242)
Resident	23.0% (265)	57.0% (154)	55.5% (1445)	70.2% (570)
Total	100% (1152)	100% (270)	100% (2603)	100% (812)
Missing	(11)	(7)	(99)	(11)
	χ^2=121.9 P=0.000 Γ=0.633		χ^2=55.1 P=0.000 Γ=0.307	

Source: Kenyan Ministry of Economic Planning and Development:
Urban Housing Survey, 1983.

Summary

This section allowed no clear conclusions to be drawn about the relationship between either city size or growth rate and the five structural characteristics examined. Trends between city groups and the various characteristics were present in some cases, but overall the hypothesized differences between central and peri-urban areas for different city groups were not supported. This is not necessarily because they do not exist. Other factors not isolated in this analysis, such as locational effects, could be influencing development. There also could be an interaction effect between city size and growth rate.

6. Conclusions

The primary accomplishment of this study was to attempt to develop a working definition of peri-urban areas using an urban spatial model, and to test some basic hypotheses which arose from the development this model. In order to have value as a research tool, peri-urban areas need to be rigorously defined. The development of a standardized definition to guide further research will eliminate some of the confusion which currently characterizes the peri-urban literature.

It is incorrect to characterize peri-urban areas as only places where the urban poor live. This analysis has demonstrated, based on the case study of Kenya, that peri-urban residents on average do have a lower standard of housing and urban services than the average resident of the central city. However, the peripheral areas are not homogenous in this respect. Some residents of peri-urban areas have access to all of the public services available to central city residents; others have few or none.

This study demonstrated that peri-urban areas are not exclusively areas where land development takes the form of absentee landlords building cheap housing for rent. In fact, the significantly higher rate of owner occupants in the periphery seems to support Turner's theory that these are places where land is available for those urban residents seeking to consolidate their position in the urban environment through owning a home of their own.

There is some evidence that city size and growth rate influence some facets of peri-urban development, but the data did not allow the support of specific hypotheses. The economic model developed in this study implies that peri-urban areas would be more pronounced in cities undergoing expansion. It is the process of expansion which makes the urban edge fuzzy, as opposed to a more clearly defined urban edge that the model predicts would be found in slower growing cities. This fuzziness in the urban boundary would be seen in a greater difference between the central city and the peri-urban area for characteristics which distinguish peri-urban zones.

One conclusion from this study is that factors other than urban size and growth are important influences on urban development. In the case of Kenya, for example, these are environmental conditions and political forces. These factors make conducting a study on urbanization difficult if the goal is to generalize the results beyond the country or area being studied. The character of a city's growth is very unique, and determined by the interaction of many factors. It seems that it is difficult to generalize beyond one city or region, much less to attempt to include a continent. This explains the proliferation of case studies found in the literature. Even so, this analysis demonstrated that while it is dangerous to generalize about peri-urban areas, they do share some characteristics which differentiate them from central cities as a result of the urbanization process occurring in them. For African cities these characteristics include low levels of urban services, a new and expanding housing stock, and high levels of informal land tenure.

One goal of this study was to produce results which could be generalized to other countries. The type and scope of the data and the methods by which it was collected allow a statistical analysis which produces results which are testable. The fact is that even in the more limited context of a single country, there are many variables that it is difficult to control for. Sub-Saharan African countries do share some common characteristics which should permit generalization of these results in this context. The von Thunen-Alonso model can also be used to guide peri-urban research in other parts of the world.

A secondary purpose this study served was to raise a number of questions which should guide further research in this area. The biggest question is to determine what characteristics are common to all peri-urban areas, and which are the result of factors specific to the city being studied. Since change is one of the primary characteristics of peri-urban areas, they should be studied over time, with panel data, something this study was unable to do with the data available. The progression of land from agricultural to urban land uses should be documented, providing a before, during and after picture of peri-urban development.

This current study can be faulted in the applications of the Kenya data to examine peri-urban areas. There are many shortcomings in the data when used for this purpose, the most serious of which is the lack of more specific location data for the observations. This is a problem arising from using secondhand data, where the

researcher ends up with a wish list of questions he or she would like to have included. However, the data had strengths which balanced out the shortcomings. It had a large number of observations, asked simple questions which had high response rates, and included a large number of cities.

The variety of residential land uses raise the question of which land uses develop first or fastest in peri-urban areas. Other than residential development, these would probably include commercial development, to satisfy the market for urban goods in these areas, or special types of development which require large areas of land. The variety of land uses is alluded to in some of the literature reviewed, but most authors do not address land uses other than squatter settlements in peri-urban areas. Unfortunately, it was not an issue which could be addressed in the present study either.

The value of studying peri-urban development to the developing country planner is in the fact that these are the areas where new urban growth is occurring. The goal of a planner is to direct and structure growth so that it occurs in a way which benefits the entire community. Peri-urban areas present an opportunity to planners to have an impact on development, if they act before this development occurs. In order to formulate effective plans and policies for these areas, knowledge of the forces acting on them is required. There is a certain reality to the concept of the economic man (or woman), acting rationally to maximize his or her utility. This rational action is

guided by the environment in which the economic man finds himself, and the forces which reward or punish certain actions in that environment. If peri-urban areas are such an environment, knowledge of the forces acting on the residents can enable a planner to shape policies and provide incentives which will cause households in these areas to behave in ways which result in desirable urban development. It is in this way that studies such as these can assist the development process.

CENTRAL BUREAU OF STATISTICS
MINISTRY OF ECONOMIC PLANNING AND DEVELOMENT
URBAN HOUSING SURVEY 1983
STRUCTURE QUESTIONNAIRE

TOWN	STRATUM	CLUSTER	STRUCTURE	HH NUMBER	CHECK DIGIT
1				0 0	
S1	S2	S3	S4	S5	10

FORM TYPE
0 1
11 12

	INTERVIEWED	EDITED
DATE		
ENUMERATOR / CLERK		
SUPERVISOR		

SECTION 1

A DESCRIPTION OF STRUCTURE

1 TYPE OF STRUCTURE	2 TYPE OF SCHEME	3 NUMBER OF RESIDENTIAL UNITS						4 RENTAL INCOME LAST MONTH			5 AGE OF STRUCTURE	6 FLOOR	7 OUTER WALLS	8 ROOF
		Complete	In-complete	Occupied	Un-occupied	Owner-Occupied	Rented	Rented Units	Vacant / Owner-Occupied	Total	IN YEARS			
1 House	1 Private							IN K. SHILLINGS			1 Less than 5	1 Earth	01 Bricks	1 Thatch
2 Maisonette	2 Mortgage										2 5 Less than 10	2 Wood	02 Blocks	2 Tin
3 Block of Flats	3 Tenant Purchase										3 10 Less than 20	3 Terrazo	03 Stones	3 Tiles
4 Swahili	4 Sites and Service										4 Over 20	4 Concrete-Wood	04 Concrete	4 Concrete
5 Shanty	5 Unauthorised											5 Concrete-Tiles	05 Wood	5 Corrugated Iron
6 Other	6 Other											6 Concrete-brick	06 Tin	6 Asbestos Sheets
												7 Concrete-Cement	07 Corrugated Iron	7 Other
												8 Other	08 Mud - Cement	
													09 Mud - Wood	
													10 Cardboard	
													11 Other	
13	14	15 16	17 18	19 20	21 22	23 24	25 26	27 28 29 30 31 32	33 34 35 36 37 38	39 40 41 42 43 44	45	46	47 48	49
		S9	S10	S11	S12	S13	S14	S15	S16	S17	S18	S19		S11

B FACILITIES

1 WATER SUPPLY			2 TOILET FACILITIES	3 BATHING FACILITIES	4 KITCHEN FACILITIES	5 LIGHTING FACILITIES	6 GARBAGE DISPOSAL		
PROVISION FOR PIPED WATER	AVAILABILITY OF PIPED WATER	HOT WATER SYSTEM					WHERE DEPOSITED	FREQUENCY OF COLLECTION PER MONTH	CLEANLINESS OF STREETS
1 Inside	1 Private	1 Yes	1 Private Flush	1 Private Indoor	1 Private	1 Electricity	1 Private dustbin		1 Clean
2 Outside (Within 100m)	2 Communal	2 No	2 Private Pit	2 Private Outdoor	2 Communal	2 Paraffin Lamp	2 Communal dustbin		2 Some garbage
3 Outside (Beyond 100m)	3 Private / Communal		3 Communal Flush	3 Communal Indoor	3 Private/Communal	3 Other	3 Communal dump		3 Very Dirty
4 None	4 None		4 Communal Pit	4 Communal Outdoor	4 Other		4 Other		
			5 Other	5 Other	5 None				
			6 None	6 None					
50	51	52	53	54	55	S20 56	57	58 59	60

C. DISTANCE TO PUBLIC AMENITIES

1 PIPED WATER	2 NEAREST NURSERY SCHOOL	3 NEAREST PRIMARY SCHOOL	4 NEAREST SECONDARY SCHOOL	5 CHURCH / MOSQUE	6 HOSPITAL	7 CLINIC / DISPENSARY	8 POLICE POST / STATION	9 MATATU / BUS STOP	10 TARMAC ROAD	11 TELEPHONE	12 STREET LIGHTING	13 MARKET / SHOPPING CENTRE	14 COMMUNITY CENTRE	15 TOWN CENTRE
61	62	63	64	65	66	67	68	69	70	71	72	73	74	75
														S46

DISTANCE CODES IN KILOMETRES

0 WITHIN HOMESTEAD 1 1 LESS THAN 2 2 2 LESS THAN 3 3 3 LESS THAN 4 4 4 LESS THAN 5 5 5 LESS THAN 10 6 OVER 10 KM

CENTRAL BUREAU OF STATISTICS
MINISTRY OF ECONOMIC PLANTING AND DEVELOPMENT
URBAN HOUSING SURVEY 1983
STRUCTURE QUESTIONNAIRE

SECTION II

	INTERVIEWED	EDITED
DATE		
ENUMERATOR/ CLERK		
SUPERVISOR		

TOWN	STRATA	CLUSTER	STRUCTURE	H/H NUMBER	CHECK DIGIT
				0 0	

1 10

FORM TYPE: 0 2 (11 12)

RESERVED FOR COMPUTER USE

TO BE OBTAINED FROM A TRACEABLE OWNER/OWNER'S REPRESENTATIVE

TICK WHERE APPROPRIATE [✓] OR FILL WITH APPROPRIATE NUMBER [120]

. SOCIO-ECONOMIC CHARACTERISTICS OF THE OWNER

. Name of the owner..... SEX Male [ ] 1 Female [ ] 2

Postal Address .....
.....

Residential Address .....
.....

. Occupation of the owner 13

. Level of formal education attained by owner 14 18

No Schooling [ ] 1 Primary [ ] 2 Secondary [ ] 3 University [ ] 4 19

. Gross montly income of the owner's household (from all sources) in KSh.

Under 500 [ ] 0 501-1,000 [ ] 1 1,001-2,000 [ ] 2 2,001-4,000 [ ] 3 4,001-6,000 [ ] 4

6,001-8,000 [ ] 5 8,001-10,000 [ ] 6 10,001-20,000 [ ] 7 Above 20,000 [ ] 8 Unknown [ ] 9 20

. Number of income contributors [ ] 21

. ACQUISITION AND FINANCING OF LAND AND STRUCTURE

. LAND

i) Land tenure : Own [ ] 1 Lease [ ] 2 Other [ ] 3 22

ii) When acquired, was the plot: 23

Developed [ ] 1 Undeveloped [ ] 2

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				0 0	

1 10

	INTERVIEWED	EDITED
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SUPERVISOR		

RESERVED FOR COMPUTER USE

iii) Size of the plot _____ acres

iv) Year of acquisition of land _____

v) Value of land when acquired _____ KSh.

vi) Estimated current value of land _____ KSh.

vii) Annual land rate _____ KSh.

2. STRUCTURE

i) For the structure, do you have

Title deed [ ] 1 Lease [ ] 2 Temporary occupancy licence [ ] 3 Other [ ] 4

ii) Was the structure

Purchased [ ] 1 Gift [ ] 2 Inherited [ ] 3 Owner-built [ ] 4 Other [ ] 5

iii) Year of acquisition _____

iv) Amount paid _____ KSh.

v) Year structure completed _____

vi) Total legal fees paid _____ KSh.

vii) Amount of architectural fees paid _____ KSh.

viii) Total construction costs _____ KSh.

ix) Estimated current value of structure _____ KSh.

x) How was the acquisition financed?

Cash [ ] 1 Credit [ ] 2 Not applicable [ ] 3

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SECTION II

TOWN	STRATA	CLUSTER	STRUCTURE	HH NUMBER	CHECK DIGIT
				0 0	

10

	INTERVIEWED	EDITED
DATE		
ENUMERATOR/ CLERK		
SUPERVISOR		

RESERVED FOR COMPUTER USE

i) For Cash Only

a) How was this financed? 570

Savings [1] Gift [2] Sale of property [3] Loan [4] Other [5]

b) If loan, source:

Commercial Bank Mortgage [1] 571
Housing Finance Company [2]
National Housing Corporation [3]
Insurance Companies [4]
Co-operatives [5]
Other Financial Institutions [6]
Employer [7]
Other [8]

ii) For Credit Only

a) Amount of downpayment 572 _____ KSh.

b) Monthly mortgage payments _____ KSh.

c) Period of mortgage payments _____ Years

d) Source of finance:

Commercial Bank Mortgage [1]
Housing Finance Company [2]
National Housing Corporation [3]
Insurance Companies [4]
Co-operatives [5]
Other Financial Institutions [6]
Employer [7]
Other [8]

iii) Do you own other residential structures? 576 Yes [1] No [2]

iv) Location of other residential structures:

In this town [1] In other towns [2] Both in this town and other towns [3] Not applicable [4]

86 87 88–94 95–98 99–100 101 102 103

APPENDIX B

Towns included in survey, arranged in order of 1979 population

	Town	1969 Population	1979 Population
1	Nairobi	509286	834549
2	Mombasa	247073	341501
3	Kisumu	32431	150373
4	Nakuru	47151	92643
5	Machakos	6312	84322
6	Meru	4475	72552
7	Eldoret	18196	50219
8	Thika	18387	41253
9	Nyeri	10004	35758
10	Kakamega	6244	31751
11	Kisii	6080	30661
12	Kericho	10144	29613
13	Kitale	11573	28389
14	Bungoma	4401	25070
15	Busia	2000	24980
16	Malindi	10757	23306
17	Nanyuki	11624	19085
18	Webuye	2000	17631
19	Embu	3928	16176
20	Muranga	2000	15343
21	Garisa	2000	14072
22	Nyahururu	2000	11243
23	Naivasha	6920	11231
24	Athi River	5343	10012
25	Lamu	7403	8552
26	Homa Bay	3252	7387
27	Voi	5313	7329
28	Kilifi	2662	5861
29	Siaya	2000	4005
30	Kabarnet	2000	3667
31	Karatina	2436	2929
32	Kapenguria	2000	2732

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Employment

The University Center for Transportation Research
Virginia Polytechnic Institute and State University, Blacksburg, Va.
Research Assistant, 5/93-10/93
FHWA project "Rural Applications of Advanced Traveler Information Systems"
Duties: arranged and conducted individual and focus group interviews; synthesized interview results; prepared final report.

Department of Urban Affairs and Planning
Virginia Polytechnic Institute and State University, Blacksburg, Va.
Research Assistant, 9/91-5/93
Duties: analyzed literature on peri-urban economic development in Africa; analyzed data from household survey of Maputo, Mozambique using SAS software.

Fairfax County Office of Comprehensive Planning, Heritage Resources Branch
Falls Church, Va.
Planning Intern, 6/92-8/92
Duties: assisted in developing a preservation plan for a Virginia historic byway.

G.J. Hopkins Mechanical Contractors, Roanoke, Va.
Pipefitter, 10/90-5/91
Duties: installed copper, cast iron and PVC plumbing systems.

United States Peace Corps
Rural Primary School Construction Program, Gabon
Peace Corps Volunteer, 6/88-9/90
Duties: directed the construction of cinderblock schools; developed project budgets; formulated work plans; hired, trained and supervised work crews.

Windson Development Corporation, McLean, Va.
Labor Foreman, summers, 85-87
Duties: supervised labor crew; performed general labor on housing construction site.

Education	Master of Urban and Regional Planning, June 1994 Virginia Polytechnic Institute and State University, Blacksburg, Va. Bachelor of Arts, January 1988 University of Virginia, Charlottesville, Va. Double major in Economics and Anthropology
Honors	•David Loeks Outstanding Planning Student Award- 1993 •Deptartment of Urban Affairs and Planning Scholarship- 1991, 1992 •Virginia Citizens Planning Association Scholarship- 1991-1993
Activities	•Virginia Chapter, American Planning Association- Board of Directors (Student Representative) •College Honorifics Committee- Student Representative •Graduate Urban Affairs and Planning Association- Member
Computer	•WordPerfect •Quattro Pro •SAS •Mainframe