

LAND-USE CONFLICTS AND IN-OPTIMAL SPATIAL PATTERNS IN PERI-
URBAN AREAS OF THE CITY OF NAIROBI, KENYA.

DUP

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by

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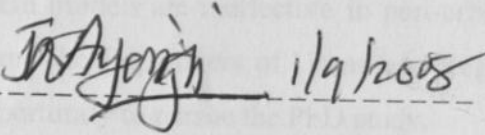
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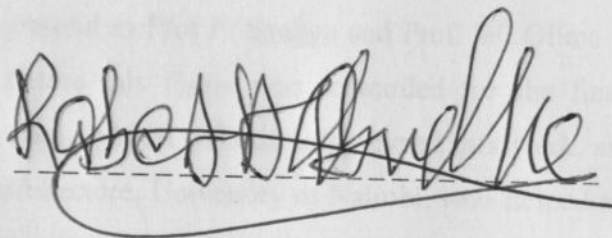
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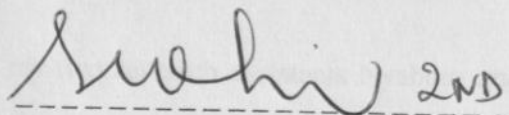
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DEDICATION

To the memory of my late father, William Amwoma Ayonga, who taught me wisdom. To my wife Alice Nyabuti and our children: Brian Amwoma Nyabuti, Diana Kerubo Nyabuti, Vivian Kemunto Nyabuti and Kelvin Angwenyi Nyabuti, who stood by me all the time I was carrying out the study.

ABSTRACT

Over 50 % of Kenya's total population would reside in urban areas by 2025, majority of whom would emanate from the rural areas. Studies have shown that urban authorities shall be forced to expand buildings or convert open spaces into buildings in order to accommodate the surging population. Some of the areas where such open spaces would be found include the rural-urban interface (RUI). In countries which are dichotomized as rural and urban, the conversion of open spaces into buildings at the RUI would actually take place in the rural zone. This trend will create a new form of human settlement, which, being neither rural nor urban in nature (mixed land use), can be seen as a third sector. Other studies have also established that the mixed land uses in peri-urban areas of Nairobi cannot be regulated using the instruments borrowed from the colonial governments. This implies that urban development in Kenya would be characterized by conflicts in land use at the RUI and some model of sprawl would evolve which urban authorities shall find difficult to service. Sustainable urban management in Kenya then must, first, seek to understand why people move to suburbia and why land control instruments become ineffective and this was the purpose of this study. In order to explain factors which make land use control instruments to be ineffective at the RUI, this study postulates that due to the rural-urban sector development approach in Kenya, the rural-area specific and urban-area specific development control models cannot be effective in the mixed land use zone (Peri-urban). It was also hypothesized that if a land use control model applied in a specific sector turns out to be more expensive than in the other sector, developers would avoid the expensive zone and relocate to the cheap zone in order to maximize profits. The study established that there is lack of appropriate land use policy and institutional frameworks specifically to handle the mixed land use in peri-urban Nairobi. The study also established that whereas there were no significant variations in threshold levels between the city of Nairobi and the areas of the RUI, zoning and development control in Nairobi brought very significant variations in levels of development costs between the inner city and the RUI. The variations in cost levels then created opportunities for speculative development in the RUI and this led to peri-urban formations. The conclusion made in this study is that undue peri-urban formations, in-

optimal land use patterns and conflicts in space use in RUI of Nairobi can only be managed well by creating a unified land use system coordinated by a lead agency.

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LIST OF ABBREVIATIONS AND ACRONYMS

CAA	Chiefs Authority Act
CEREPAT	Controlled Erection of Physical Artifacts
CLTC	Cooperative Land Tenure Clusters
CODEP	Cost of Development Permission
CODPA	Cost of Deed Plan Approval
COL	Commissioner of Lands
COLARARM	Cooperative Land Rights Adjudication and Registration Model
COLARD	Cost of Land Registration and Delivery
COLAUSS	Composite Land Use System
COLES	Cost of Legal Services
COLRS	Cost of Land Registration Service
COPS	Cost of Planning Services
COSS	Cost of Survey Services
DA	Director of Agriculture
DAOC	Development Activities of citizens
DCE	Development Control Expert
DECOST	Development Cost
DLR	District Land Registrar
DPP	Director of Physical Planning
D-SSDR	Developer State Shared Development Rights
FHLTC	Freehold Land Tenure Cluster
GLA	Government Land Act
GCS	Growth Center Strategy
GLTC	Government land Tenure Cluster
GOVULARARM	Government Land rights Adjudication and Registration Model
HOBUHOM	House Builder for Home

HOBURE	House Builder for Rent
HOBUSE	House Builder for Sale
HOVA	House Value
HSS	Human Settlement Strategy
IPA	Interim Planning Area
IPAA	Interim Planning Authority
LABOC	Land Control Board Cost
LARARM	Land use rights Adjudication and Registration Model
LAs	Local Authorities
LASPE	Land Speculator
LAUP	Land use Processes
LAVA	Land Value
LCA	Land Control Act
LCB	Land Control Board
LEGIPOGUIDE	Legislative and Policy Guide
LGA	Local Government Act
LPA	Land Planning Act
LPP	Land Purchase Price
LTA	Land Titles Act
LUP	Land use Patterns
MA	Minister for Agriculture
MPP	Minister in charge of Physical Planning
NAO	Native Authorities Act
NLO	Native Lands Ordinance
OPTIMUMLUP	Optimum Land use Patterns
PPA	Physical Planning Act
PPD	Physical Planning Department
PUAs	Periurban Areas
RESUS	Regulatory Subsystem
REVA	Rent Values
RLA	Registered land Act
RTA	Registration of Titles Act
RUCOLAUSS	Rural Composite Land use system
RUI	Rural-Urban Interface
SCS	Service Center Strategy
SDCA	Single Development Control Authority
SP	Spatial Plan (Framework)

SPASUS	Spatial Subsystem
SPOAPURBAN	Sporadic Appended Urban
SSP	Sessional Paper no. 10 of 1965
SUSIDECO	Sufficient Single Development Control Authority
TC	Total Cost
TLTC	Trust Land Tenure Cluster
TPA	Town Planning Act
TR	Total Revenue
URBACOLAUSS	Urban Composite Land use System
URBASP	Urban Sprawl

CHAPTER 1

INTRODUCTION

1.1 Background to the Research Problem

Spatial planning in less developed countries (LDCs) generally treats urban areas and rural areas as separate entities (Rondinelli, 1978; Obudho, 1974; King, 1990; Smith, 2000). As a result, components of the two spatial systems are not integrated and their functions are not clearly understood (Rondinelli, 1978; Okpala, 2004). In view of the foregoing, planning policies found in LDCs, therefore, tend to reflect either an urban development or a rural development bias.

During colonial Kenya, most of the Africans were restricted to live in the rural areas whereas towns were reserved for the whites (Obudho, 1974; Mochache, 1989, 1990). This created the rural urban divide, a policy, which again, was continued to the post-colonial period. In the post-colonial era, the development approaches and investment priorities were focused in the rural sector and this bias was justified on the assumption that the majority of the people in Kenya would remain rural engaging in agriculture as their major source of livelihood (Obudho, 1984, cited in Mwangi, 1994).

In order to achieve the desired rural development objective, some of the key policies pursued by the government encompassed the Growth Centre Strategy (GCS) and the Service Centre Strategy (SCS). Essential community facilities were supposed to be located in certain selected categories of centers to serve the population in the hinterland and this was seen as a necessary strategy to optimize the cost of service provision. Urban areas were also seen as growth centers to generate economic development of their hinterlands through spread effects. The Growth and Service Center strategies were informed by theories that were earlier propagated by Hirschman (1958), Perroux (1964) and Friedman (1967).

As a result of the dualistic development approaches in Kenya, firstly, two spatial systems emerged: the urban area spatial system (UASS) and the rural area spatial system (RASS)

(Obudho, 1974). Secondly, a dualistic legal and institutional framework based on both the rural-urban spatial systems also emerged (Mwangi, 1994). In keeping with the dichotomous legal systems, different land tenure systems were created to promote the apparent dualistic space-use objectives within the rural and the urban. However, the rural land tenure systems did not promote effective land use planning as observed by Mwangi (1994). The two legal provisions which applied to rural areas were the Registration of Lands Act (Kenya, RLA, Cap 300) and the Land Control Act (Kenya, LCA, Cap 302).

Several scholars have observed that institutional variations tend to have an impact on spatial patterns and often this can be reflected in physical forms (Boeke, 1953; Higgins, 1954; Rondinelli, 1978; Obudho, 1974; King, 1990; Violich, 1987; Mwangi, 1994; Okpalla, 2004). In the context of such postulations, the dual legal and institutional frameworks in the rural and the urban spatial systems would then lead to separate spatial patterns which can then be referred to as the Rural Area Spatial Patterns (RASPs) and Urban Area Spatial Patterns (UASPs).

If the rural and urban spatial systems were to be mutually exclusive today, and in the future, then this arrangement would not create any land-use management problems. However, there has been increasing demand for more space in the urban areas caused by people migrating from the rural to the urban areas and, therefore, the assumption of mutual exclusivity between the two spatial systems no longer holds true. Since 1990, accelerated urbanization has been witnessed in Kenya (Kenya, CBS 1999; UN, 1993; Mireri, 2006). In this regard, Kenya should be ready to accommodate more people in the urban areas than before. The same applies equally to the rest of Africa (Sida, 2002). Table 1.1 depicts the urban population growth projections of a few African countries.

Table 1.1; Percentage Urban Population in Selected African Countries.

AFRICA	1965	1980	1995	2010	2025
ANGOLA	17.5	21.0	32.2	44.2	55.6
BOTSWANA	3.9	15.1	30.8	46.9	58.0
CAPE VERDE	18.1	23.4	32.0	43.6	55.1
EGYPT	40.7	43.8	44.8	51.8	62.2
ETHIOPIA	7.6	10.5	13.4	19.5	29.9
GUINEA BISSAU	14.3	16.8	22.2	32.6	44.6
KENYA	8.6	16.1	27.7	39.7	51.5
LESOTHO	6.3	13.3	23.1	35.3	47.3
MOZAMBIQUE	4.6	13.1	34.2	50.5	61.1
NAMIBIA	16.7	22.8	30.9	42.1	53.7
S. AFRICA	47.2	48.1	50.8	59.5	68.6
TANZANIA	5.3	14.8	24.4	36.3	48.2
TUNISIA	39.5	50.3	59.0	67.9	75.2
UGANDA	6.5	8.8	12.5	18.8	28.8
ZAMBIA	23.3	39.8	43.1	49.7	59.9
ZIMBABWE	14.4	22.3	32.1	43.9	55.4

Source : (UN, 1993, cited in Sida 2002,72)

In the economies which are characterized by disparate rural and urban spatial systems, people traditionally migrate from rural areas to urban areas. If this rural-urban migration trend could remain the same, policy approaches should focus on the rural areas, the source of the migrants and the inner city, the destination of the migrants. However, recent evidence shows that the peri-urban areas are also targeted by migrants (Mwangi, 1994; Yahya, 1976; Shibira, 1978; Simiyu, 2002; Kombe, 2005) and this means that policy approaches should also focus on the development of the peri-urban areas also.

Others proponents have also argued that urban growth characterizes the conversions of non-urban land to urban use and this is likely to be at the rural-urban interface (Cheng et al, 2001). However, the rural-urban interfaces, where the migrants opt to settle and where urban growth will occur, are not part of the urban spatial system (UASS). The rural-urban interface is largely characterized by land use conflicts because development control is ineffective (Yahya, 1976; Shibira, 1978; Mwangi, 1994; Murithi, 1990; Simiyu, 2002). The land use conflicts have been manifested by the emergence of incompatible

developments including workshops, quarries, bars, butcheries and graveyards. These activities are found in the peri-urban areas adjoining residential homes and schools (Shibira, 1978; Simiyu, 2002).

The foregoing analysis then raises two fundamental questions. Why would developers bypass land, which is serviced in the inner city to invest in the un-serviced peri-urban land? Secondly, why would development control instruments, which are fairly effective in the inner city, prove ineffective in the peri-urban areas (PUAs)?

1.2 Problem Statement

1.2.1: Space Use Conflicts and In-optimal Land Patterns in Peri-urban Areas.

Whereas planning and development control within the gazetted towns of Kenya had direction and some element of effectiveness, planning of small markets and the peri-urban areas was found to be ineffective (Mwangi, 1994). During the colonial rule and the period up to 1996, rural areas and urban areas operated under different legal systems and therefore variations in land use control could easily be discerned. However, after 1996, the two spatial systems of urban and rural were operating under similar development control regimes (Kenya, LGA Cap 265; Kenya, PPA 1996, Cap 286). This then would ordinarily mean that development control responses between the two spatial systems should be similar.

The observed mismatch can be explained in different ways. First, there are those who saw a positive correlation between ineffective land use management in the peri-urban and the presence of freehold land tenures (Shibira, 1978; Mwangi, 1994; Simiyu, 2002). In Europe, land for planning purposes is placed in the public ownership domain. This in effect means that the state retains development rights through land use zoning (Kivelli, 1993), although land would belong to an individual and the developer would carry out development. Those who advocate for effective land use control through public land ownership argue that this approach tends to promote planning efficiency (Hall, 1976; Roberts, 1977, cited in Kivelli, 1993). As such, this position is in consonance with preliminary conclusions of the studies carried out in Kenya as already alluded to (Shibira,

1978; Mwangi, 1994; Simiyu, 2002). However, no study has been carried out in Kenya to establish why the freehold land tenure system does not promote efficient planning and this creates a lacuna that this study sought to examine.

Secondly, other scholars contend that planning and development control cannot be effective without a strong, dynamic and relevant planning law (Mwangi, 1994; Galbraith, 1998; Faludi, 1973; Etzioni, 1968). As a result, ineffective land management in the peri-urban areas of Nairobi, for example, has been attributed to weak planning law (Murithi, 1990; Mwangi, 1994). However, there has been a plethora of physical planning legislations in Kenya, which started with the Town Planning Act (TPA) (Kenya, 1931, Cap 134), since repealed, and the Land Planning Act (LPA) (Kenya, 1968, Cap 303), also repealed. Later, the government enacted the Physical Planning Act (PPA) (Kenya, 1996, Cap 286) which was also augmented by the Local Government Act (LGA) (Kenya, LGA Cap 265) in order to strengthen land management in the country. Despite all these legal amendments and provisions, land use controls in the peri-urban areas of Nairobi have remained elusive.

It can then be argued that planning law *per se* cannot be a panacea to land use management in the city of Nairobi and its environs and, therefore, there is need for an alternative approach. However, it is conceded that all the foregoing explanations tend to look at the peri-urban land use problems from the atomistic point of view and this tends to ignore the bigger picture of the peri-urban as a land use system. In this regard, it is argued in this study that the peri-urban land use dynamics can only be better understood by looking at it as a system seen from the context of the systems theory. The position taken in this study is supported by other scholars who argue that an urban area is a complex system and can only be managed by an appreciation of its component parts (Thomlinson, 1969; Mcloughlin, 1969).

The two land use systems of urban areas and rural areas for example were aimed at achieving different objectives. The urban area specialized in the production of non-farm activities and services and the rural area tended to specialize in the production of

agriculture, mining, livestock and wildlife. The peri-urban, which is the focus of this study, falls in the transitional area, which is neither urban nor rural. Seen in the context of the two-sector development paradigm, it can however be argued that the rural-urban spatial systems, if considered from the point of view of the systems theory have different components, institutions, legal systems and development control logics. The variations between the two land use systems create harmony in the two sectors of urban and rural. The internal harmony within the two spatial systems can, however, be possible only if the two spatial systems remain separate. It is observed also that the two spatial systems remain in an optimum position without conflicts in land-use until there is an overlap between the two systems.

However, the land use activities in the conceptualized third sector; the Peri-urban areas (PUAs) are neither urban nor rural and this is the reason why the area is conceptualized as a sector in its own right (Chapter 3). This means that the two-sector specific development control approaches meant to regulate the urban or the rural may not be applicable to the mixed land-use peri-urban (Third sector). For example, conflicts in space use in PUAs were identified in the late 1960s and this was the reason why the LPA (Kenya, 1968, Cap 303) was enacted to control land use in the three miles peri-urban strip together with areas along the trunk roads where ribbon development has emerged. The Land-Planning Act (LPA), however, proved ineffective in either controlling conflicts in space use at the PUAs or in controlling ribbon development (Shibira, 1978). Later, PPA (Kenya, 1996, Cap 286) was enacted which sought to control land use in the urban areas, the mixed land use third sector and the rural areas by using a single and homogeneous development control instrument. This approach has, however, proved ineffective especially in the third sector (Simiyu, 2002).

It can be argued that it was futile to control development in an entirely different sector without understanding what the components of that sector are, what objectives the system aimed to achieve and at what stage to institute controls. In order to control development in the peri-urban (Third sector), it is necessary to establish whether the components that constitute the mixed land use spatial system can be seen as those of the urban area spatial system or those of the rural area spatial system. This then would enable policy makers to design the institutions, land use planning law and a development control framework,

which is suitable to the third sector. Secondly, there is need to establish the stage at which the third sector, (the mixed land use sub sector) tends to develop conflicts in space use and at what stage the system fails to convert the inputs into outputs that are necessary to achieve optimality in a land patterning process. There is need for a criterion to establish optimality in the land patterning process and what it takes to bring about the envisaged optimality in the same. The criteria (model) used to estimate conflicts in space use and to measure optimality in a land patterning process have been conceptualized in chapter 3.

This then can be seen as an exploratory study. Firstly, this study seeks to understand whether the third sector spatial system can be capable of being seen as a system in the true sense of the word where the system components are working to attain the system objectives. Secondly, the study attempts to establish the level at which the mixed land use in the third sector tends to develop conflicts in land use and at what level the system develops in-optimality in land patterns. This analysis is carried out in chapter 7 of the study using the model of obtaining land patterning optimality conceptualized in chapter 3. It is argued that unless this kind of diagnosis is carried out in the third sector, policy makers cannot harmonize objectives in space use, evolve appropriate development control logic and instruments and set up an appropriate institutional framework that would regulate the third sector spatial system towards homeostasis (Mwangi, 1994).

1.2.2 Factors contributing to the Evolution of the Mixed Land- use Peri-urban Zone.

Studies have shown that peri-urban formation is brought about by activities of migrants from the inner city (Thomlinson, 1969; Carter, 1981; Adell, 1999). The question, which the study therefore attempts to unravel, is: since developers who construct physical artifacts in the peri-urban are assumed to come from the city, what motivates them to avoid the inner city and prefer the peri-urban? Mwangi (1994) argues that in the rural urban migration journey, there are those people who cannot afford plots in the inner city; hence this group opts to settle in the peri-urban where land is affordable. Simiyu (2002) concurs with the views of Mwangi that those who settle in the urban fringe are motivated by low land values.

The two scholars thus advance the poverty hypothesis as a factor that motivates people to settle at the RUI and, therefore, resulting in peri-urban formation. In North America, those who settle in the urban fringe tend to be the rich and the middle class (Burgess, 1925; Hoyt, 1939; Ullman and Harris, 1945). The poverty hypothesis advanced by Mwangi and others, therefore, contradicts evidence from North America where the earliest movements to suburbia were observed. Therefore, this is an area, which merits critical examination to explain the contradiction.

The type of development seen in the peri-urban areas of Nairobi can best be described as mixed development. Some of the houses seen in the peri-urban area are comparable to those in the up-market areas of Muthaiga, Karen, Lavington, Kitsuru and Westlands within the city of Nairobi. These housing types are juxtaposed with medium class houses similar to those seen in the city areas of Buruburu, South C and Golden Gate. All these developments are intermingled with very high-density flats and interspersed with informal housing estates built of timber and iron sheet materials. Other houses were also built of wattle, mud walls and grass thatched roofs. This then gave an impression of Nairobi's PUAs as being a multi-class neighborhood. This observation negates the poverty hypothesis (Mwangi, 1994; Simiyu, 2002) and contradicts those who saw suburbia as an area for the rich (Burgess, 1925; Hoyt, 1939; Ullman and Harris, 1945).

Others have postulated that economic hardships have forced some people to migrate to the rural-urban interface and therefore this has resulted into peri-urban formations (Kombe, 2005). The economic hardships within the city are caused by low incomes, unemployment, high rental charges and high food prices in the inner city (Kombe, 2005). Kombe's economic hardship hypothesis is valid if there were significant variations between the rent levels within the city and those of the peri-urban. Therefore, the contention that people were migrating from the city to the peri-urban because of high food prices, high rental prices and low income does not seem to hold at all times.

Another school of thought argues that peri-urbanization and in-formalization of the fringe is a result of declined public capacity to service and regulate urban land-use (Watson et

al, 2002, cited in Kombe, 2005). People relocate to the fringe because there is no serviced land within the city boundaries. There was evidence of plenty of space being unutilized or underutilized in the inner city areas of Nairobi and yet people preferred the suburbia. In any case, land in the peri-urban was not serviced either. This then makes the lack of serviced land in the inner city as a hypothesis less plausible in the case of Nairobi. The search for the factors that push developers to the peri-urban then becomes necessary.

Some scholars have argued that migrations between two spatially separated areas are motivated by income differentials (Todaro, 1984; Oucho, 1998). This means that income levels in the peri-urban would be higher than those of the inner city and the rural areas from where people migrate. If this were the case, what then is likely to create income differentials between the two sectors? There are two differences between the urban area and the rural area, where peri-urban formation is taking place and these are the differences which are likely to cause the income differentials between the two sectors. First, unlike in the inner city, development control in the peri-urban is either missing or ineffective (Yahya, 1976; Shibira, 1978; Mwangi, 1994; Murithi, 1990; Simiyu, 2002). Secondly, land tenure in the urban areas is leasehold category while that in the rural areas is freehold. In the urban areas, the state retains development rights through zoning and developers are required to obtain development permission in order to comply with the plan. The developer in the rural area retains an absolute freehold title, which does not have any discernible development control conditions except those aimed at promoting agriculture. This again was because of the dichotomy created between the urban and the rural in terms of space use objectives.

This situation prompted this study to seek answers to one question, which emerges as a result of the gap ensuing from the foregoing observations. Does land use control create significant cost variations? If the difference in development cost between the inner city and the peri-urban were found to be significant, can it be a factor, then, which attracts speculative developers to the peri-urban? True, a situation of cost variations in the development process can make a shrewd investor to avoid the zone with high cost and move to the location of low development cost. However, a developer is profit motivated

and therefore not likely to consider the factor of development cost alone. Besides considering the development cost outlay, the developer is likely to consider the total revenue as well and seek locations where the difference between total cost and total revenue provides the highest profit.

1.2.3 Summary of Research Issues

Land-use control problems in peri-urban Nairobi can be understood within the context of two independent variables. Conflicts in space use and in-optimal land patterns in the peri-urban areas of Nairobi are caused by land use control instruments which are ineffective, but the reasons why such instruments which are fairly effective in urban areas fail to be effective in peri-urban areas are not understood. It is clear that conflicts in space use and in-optimal land patterns are a result of development activities which are spearheaded by developers who avoid the city and opt for areas in the RUI. The urban land use activities then conflict with those of the rural land use system. Peri-urban formation can, therefore, be seen within the context of the activities of such developers. In order to effectively manage urban areas at the area of RUI where urban expansion is likely to take place, the factors which motivate developers to rural urban interface must be understood. Secondly, the study must establish why instruments of land use regulations are ineffective at the rural urban interface. Policy makers would then be able to promote sustainable urban management by putting in place policy strategies to resolve conflicts in land use and to control urban sprawl. If left unresolved, conflicts in land use shall be a threat to public health and the environment and urban sprawl shall make service provision very expensive for city managers.

The antecedent variables which explain peri-urban formation and conflicts of land use and in-optimal spatial patterns are investigated using the systems approach. In the systems theory, it is assumed that the urban and the rural areas form dual land use systems and the dichotomous land use systems are a result of the rural urban land use paradigm policy approach. In the context of the two-sector paradigm policy development, which created the two land use systems, several questions which seek to explain the issues of concern in this study are raised in the following subsection.

1.3 Research Questions

(I) Considering that, despite the recent application of the Physical Planning Act (Kenya, 1996, Cap 286), Kenya uses a two- sector model policy approach to planning and development (urban and rural), is there policy provision for land use management and control in the third sector (the emerging peri-urban zone)? In order to understand the adequacy of policy and the related legal and institutional capacity required to resolve peri-urban land use problems, this study will assess the following factors.

- Does policy in Kenya address the process of urbanization by recognizing the interaction of the rural-urban spatial systems in time and space?
- Who are the actors in a land use and development control process in PUAs and what is the contribution of each player in the land patterning process?
- Are all the actors and their development activities in a land use process coordinated by Local Authorities as specified in the PPA (Kenya, 1996, Cap, 286)?
- Can an optimum/desirable spatial pattern be predetermined by manipulating the components of the land use system and if yes, what would be the model to aid such a manipulation?

(II) Since development control has a cost implication, is the cost so significant that it can create major income differentials in the unregulated rural-urban interface, the factor which then motivates developers to avoid the area within the city and opt for the RUI, hence creating peri-urban formation? In order to effectively address this question, this study seeks to examine the following related issues:

- What are the conditions and requirements for obtaining development permission both in sector 1 and sector 3, and what does it cost the developer at every stage? (e.g., cost of land delivery, cost of hiring the services of development consultants and opportunity cost). Does the cost between the two locations of urban and RUI vary significantly?
- Do incomes earned by land developers in the inner city and the peri-urban vary significantly?

- In-case income earning capacities were found to be similar between the urban and peri-urban, what was likely to create the threshold that made the peri-urban a viable investment destination?
- Can the PUA be seen as being on its own or linked to sector 2 or sector I (one) for example?

1.4 Study Objectives

The overall objective of this study is to assess the nature and magnitude of land-use control problems in peri-urban areas of the city of Nairobi. To that end, the study will:

1.4.1 Assess the causes and levels of conflicts in space use and in-optimal land patterns in peri-urban areas of Nairobi and the effectiveness of the existing policy in resolving them.

1.4.2 Examine the functional relationships between the urban area subsystem, the rural area subsystem and the peri-urban area and the cost implications of regulating land-use development in sector 1 and the subsequent creation of a minimum cost-maximum profit (MINIMAX) zone in the peri-urban sector.

1.4.3 In view of the findings in objectives 1 and 2 devise a development control strategy appropriate to the PUAs of the city of Nairobi.

1.5 Study Hypotheses

1.5.1 In a two-sector policy dichotomy development paradigm, the urban and rural land use systems tend to emerge with distinct development control models; however, mixed land use activities inadvertently evolve at the area of Rural-Urban Interface, where the purely rural and urban specific regulation models cannot be effective, hence, this results into space use conflicts and in-optimal land patterns in peri-urban areas.

1.5.2 Faced with a choice of where to locate business, land developers would be indifferent between sector 1(UASS) and sector 3 (PUAs) because the two sectors are linked and share threshold population, zoning and development control in the inner city, however, makes the uncontrolled area of rural- urban interface a zone of minimum costs-maximum profits (minimax) which developers seek to widen investment opportunity and maximize profits, thus, this results in the evolution of the third sector with mixed land uses.

1.6 Justification of the Study

The study on space use conflicts and in-optimal land patterns can be justified as follows:-

1.6.1 Urban Growth and Space Requirements

The anticipated acceleration in urban population growth will require that urban authorities increase the densities within the inner cities in order to accommodate the increasing urban population. Alternatively, urban authorities need to expand the city boundaries and studies have shown that this would be the most likely scenario (Cheng et al, 2001). Since land use conflicts occur in the peri-urban areas, which will later constitute part of the inner city, harmonizing the two land use systems when the needs for boundary extensions arise will be the enormous project of the twenty- first century. The reason why people prefer to settle in the peri- urban zones is not knowledge that is within the purview of policy makers, planners and scholars.

This study postulates that peri-urban problems may be as a result of lacking a theoretical understanding regarding the relationships between the two-sector dichotomy model on which the planning approach is based. This understanding is necessary in order to establish the parts that constitute each of the two systems and the way to synchronize the components of the two land use systems when the needs for boundary extensions arise. This is because, currently, the system to be controlled is not understood and the components of that system are not known.

1.6.2 The Need for Sustainable Urban Management and Frequent Revisions of

Planning Law.

The concept of sustainable urban management stresses the need for cities to focus on the economy of the city, social cohesion and environmental protection. The three pillars however need to be anchored by good urban governance which implies strong land use planning laws. There have been frequent revisions of the planning law in Kenya since Independence which shows a strong commitment by those in authority to strengthen good urban management. Despite the numerous amendments, development control in the peri-urban areas has been ineffective. The failure of the revisions of the legal provisions to

address peri-urban land use management can only be interpreted to mean that the said laws were enacted before understanding the components of rural-urban spatial systems. The amended laws sought to redress the system without understanding how that system was functioning and what in the system the laws intended to streamline. Findings from such a study can therefore be used to inform initiatives to amend the planning law in future when need arises.

1.7 Study Assumptions

The research is based on the following assumptions.

1.7.1 Desire by Government to Eradicate Conflicts in Space Use

Both the central government and local authorities seek to ameliorate conflicts in space use and in-optimal land patterns in the peri-urban areas of the country's towns. This desire is shown by the various attempts to enact new land planning laws. The first land planning regime was urban based and was mainly used to regulate land use development in the urban area (Kenya, 1931, cap 134) and the rural area that were occupied by white settlers. The LPA was enacted in 1968 to facilitate planning outside the municipal boundaries (Kenya, LPA, Cap 303). The provisions of the Act only covered areas within three miles of the peri-urban areas of the municipalities and four hundred feet from the center of trunk roads.

The PPA was enacted in 1996 to regulate the use of land both in the rural areas and in the urban areas. All the above legislations have proved ineffective when used in the control of peri-urban land use. However, the frequent changes in the legal regimes show a commitment on the part of higher authorities to address and streamline land use problems but the reason why it is ineffective are not understood and therefore instruments which are ineffective are in place.

1.7.2 Need for Institutional Framework

Local authorities will remain the principal planning and development control agents in Kenya. This is in accordance with the Concept of Localizing Agenda 21 of the United Nations (UNCED: 1992). However, local authorities have been given responsibilities without clear mandates and without sufficient capacity and, as a result, planning and development control in Kenya have been ineffective. The assumption made in this inquiry is that the perceived failure by local authorities to control land use is not of their making *per se*. It is because the institutional framework is not provisioned to remove the ambiguity and incapacity.

1.8 Organization of the Thesis Report

1.8 Scope and Limitation of the Study

The study seeks, first, to establish the factors for peri-urban formation in Kenya. Two, the study seeks to establish the factors, which make instruments of land use control ineffective when applied in the peri-urban. The two issues, which are of concern to this study, are investigated within the context of the dualistic theory. The general hypothesis which the study aims to investigate is that as times goes by, an area of mixed land use tends to evolve between the urban and rural interface (peri-urban formation). This means then that the land use control approaches which are used to regulate the urban area and the rural areas separately tend to be ineffective at the area of interface where mixed land use develops. This then can explain the observed conflicts in space use and in-optimal land patterns in peri-urban Nairobi. Three, within the two sector development paradigm, one sector is regulated while the second sector is not and this makes investment in the city expensive since the city is regulated. Developers then opt for locations at the RUI to maximize profits and this explains peri-urban formation at the area of RUI.

1.10 Definition of Key Terms

The study covers the administrative divisions of Kajiado and Machakos which border Nairobi. These divisions were Ngong-Ngong and Kitengela in Kajiado and Mavoko Municipality in Machakos district. Within the study areas, sample areas were selected based on a land tenure cluster approach. The land tenure clusters which were covered in this study were the Government land tenure cluster (GLTC) in Ngong Town and Athi river town. The second land tenure cluster is that which covers the former African rural

areas. The former African rural areas are covered by freehold land tenure clusters (FHLTC) and these were found in Ngong-Ngong area of Kajiado and Katani areas of Machakos district. The third land tenure cluster is that of trust land (TLTC) which covers Mulolongo town in Machakos side and Ongata Rongai in Kajiado district. The last land tenure cluster which was covered by this study was the cooperative/company land tenure (CLTC). The first land use activity to move to suburbia is housing and, therefore, the categories of developers who were selected for this analysis fall within the housing land use sub-sector.

1.9 Organization of the Thesis Report

The report contains 10 chapters arranged as follows.

Chapter 1: Introduction

Chapter 2: Land use management in Nairobi City and Variations in Spatial Patterns.

Chapter 3: Towards a theoretical and conceptual framework.

Chapter 4: Determinants of peri-urban formations in selected countries

Chapter 5: Research Strategy and Methodology

Chapter 6: Land use policy in Kenya and its application to peri-urban formation in
Nairobi

Chapter 7: Factors in peri-urban land use conflicts and in-optimal land patterns

Chapter 8: Land use zoning and control within the city and the formation of suburbia.

Chapter 9: Summary of findings and conclusions.

Chapter 10: Towards the resolution level of Nairobi's Appended urban model of peri-
urban formation

1.10 Definition of Key Terms

1.10.1 Land includes land covered with water, all things growing on land and buildings and other things permanently affixed to land" (Onalo: 1986:14).

Use is referred in connection to putting the land into some service or utilization. According to the Collins English dictionary 21st Century (2000), USE refers to enjoyment of property, land, by occupation or by deriving revenue from it. This is the

type of land use meant in this context.

1.10.2 CONFLICTS: It is recognized that all human activities require the use of land space in one way or another.

"Conflicts in urban activity use in dualistic economies arise not necessarily because of shortage of space but largely as a result of the contention as to which should be the boundaries for each of the categorized activity. This contention has escalated at spatial planning level because the traditional notion that urban activities can be contained in bounded zones (such as a shopping zone, high or low income residential zones, market center) still looms in urban planning activities", (Mochache, 1989:1).

In this study, conflict means opposing forces, incongruousness, or incompatible relationships in land use activities. Agriculture use, urban residential use, industrial use, education use, recreational use, public use, commercial use, transport or communication use or public utility can conflict if:

1. Two or more land uses cannot harmoniously be located adjacent to each other e.g. smoke emitting factory locating next to a school or area of residence (Incongruousness or incompatibility).
2. High-income residential area is mixed with a low-income residential neighborhood, (mixed development).
3. If some land users are ignored in space allocation (Denied the right to space use) and, therefore, undermining equity considerations as an element of public interest.
4. Standards meant to safeguard the environment are ignored (e.g correct space size, land use densities, setbacks, appropriate road widths etc). This leads to environment degradation.
5. Conflict between road users, for example, a motorist and a pedestrian over the use of narrow road can be seen as land use conflict (Self, 1982: 5)

1.10.3 Development Control

The term development is defined as (a) the making of any material change in the use or density of any building or land or the subdivision of any land which for the purposes of this Act, PPA (Kenya,Cap,286) is classified as class 'A' development and (b) the erection of such buildings or works and the carrying out of such buildings operations as

the minister may from time to time determine which for purposes of this Act is classified as class ‘‘B’’ development (Kenya, cap 286, part, 1, section 3). Development control or management then refers to the act of prohibiting or controlling the use and development of land and buildings in the interest of proper and orderly development by requiring developers to obtain development permission. Control of development is undertaken by Local Authorities.

1.10.4 Leasehold and Freehold Land Ownership

The term lease is defined differently. However, the Indian Transfer of property Act (1882) defines lease of an immovable property as a transfer of a right to enjoy such property, made for a certain time, express or implied, or in perpetuity, in consideration of a price paid or promised, or of money, a share of crops, service or anything of value, to be rendered periodically or on specified occasions to the transferor by the transferee (lessee), who accepts the transfer on such terms (Onalo, 1986). Freehold is the greatest interest in land a person can have and gives the holder absolute ownership of land. A freehold title deed generally has no restriction as to the use or occupation (Kenya, 1991, p 18)

CHAPTER 2

LAND USE MANAGEMENT IN NAIROBI CITY AND VARIATIONS IN SPATIAL PATTERNS

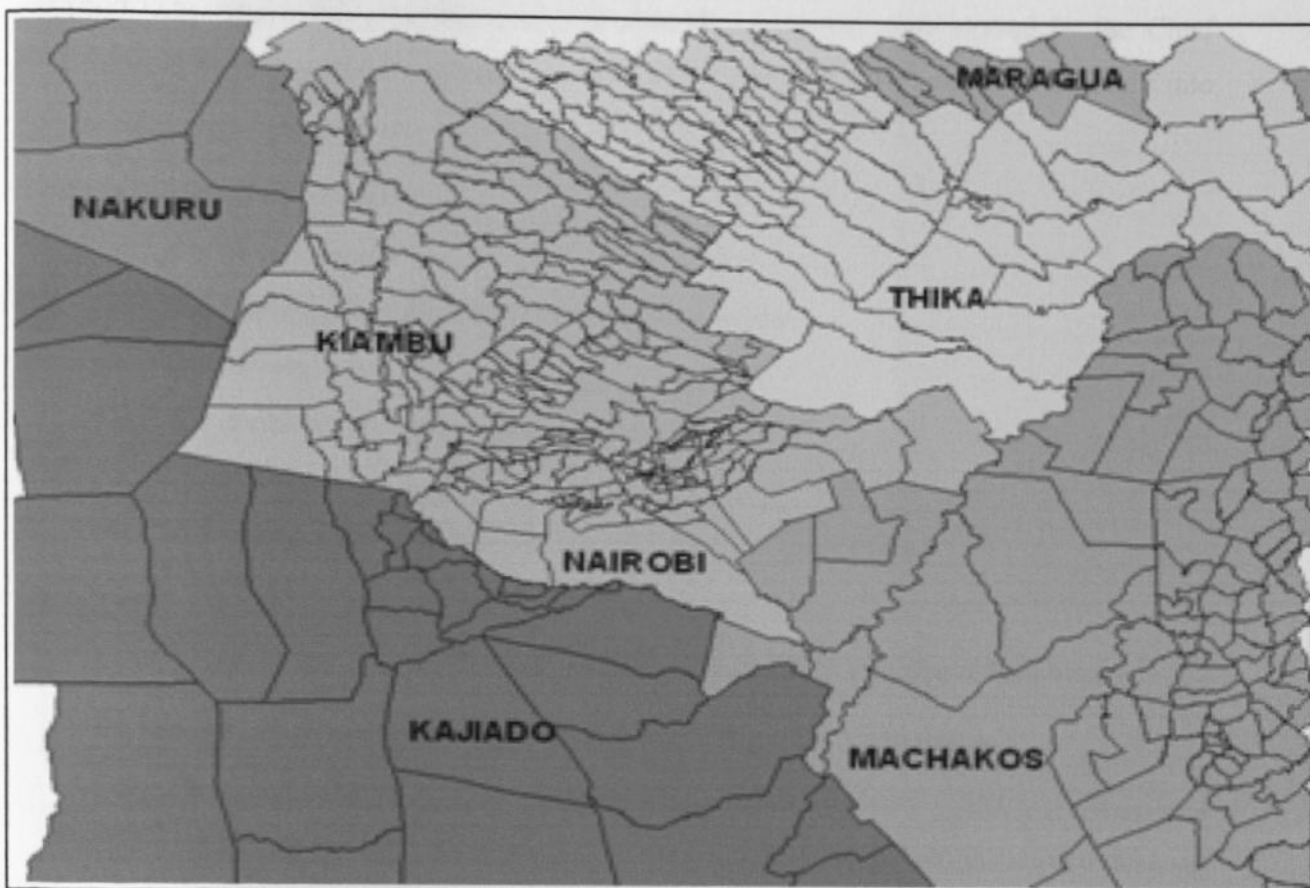
2.1 Introduction

Although urbanization in Europe, North America and Latin America started earlier, a similar trend is just emerging in Africa and Asia. The greatest challenge in Africa and Asia, where the phenomenon of urbanization is just emerging, relates to the management of urban growth given the limitation in capacity and experience. There is evidence that urban management within the designated city boundary of Nairobi is better than the land use management in peri-urban areas and within the small markets (Mwangi, 1994). The variations in management approaches then create desirable spatial patterns within the city and undesirable patterns outside the city. This chapter reviews the land use strategies within the city of Nairobi over the years in order to establish the causes of the dichotomy in land use patterns between the city and its peri-urban areas. The living conditions in the city are also reviewed over the years to explain the push factors which may have created impetus for suburban formation at the rural urban interface of Nairobi.

2.2 The City of Nairobi: An Introduction

The city of Nairobi is located along longitude 36 50' and 1 17'South (Stuma, 1992) with a mean altitude of 1700 above sea level. However, the city of Nairobi has marked variations in altitude which ranges between 1600 above sea level to the east, 1800 meters to the west and north-west respectively (Nganga, 1991; Stuma, 1992). The city receives a mean annual rainfall of 1080mm which falls in two seasons. The long rains extend in March to May and the short rains extend from October to December (Stuma, 1992, page 167). Map 2.1 below shows the location of the city of Nairobi in relation to its peri-urban districts

Map 2.1; Nairobi City and its Environs.



Source: Survey of Kenya, Ruaraka

2.2.1 Historical Background of the City of Nairobi

Nairobi derives its name from a Maasai name called 'Enkare Nairobi', which means a place of cool waters. The site was first settled by Sergeant Ellis of the British Royal Engineers in 1896. Sergeant Ellis established a transport depot with stores and stables to feed oxen and mules (White et al, 1948). Until the arrival of the railway line at the present site of Nairobi, there was no African settlement in the area except the Kikuyus and Maasais who were grazing cattle (Emig and Ishmail, 1980, 8). The current site of Nairobi was chosen because a head lay much steeper slopes and the Rift Valley escarpment presented construction difficulties. The Nairobi River upstream had enough water for human consumption as an added advantage to the city's location (Emig and Ishmail, 1980). It can be argued that Nairobi owes its birth to the Kenya-Uganda railway

which reached Nairobi in 1899 en-route to Kisumu (then part of Uganda) (Stuma, 1992:167). The railway headquarters were in Mombasa but were moved by the Chief Engineer Sir White House to Nairobi. By 1906, Nairobi as a town had sorted itself into the following areal sectors:

- The railway center
- The Indian bazaar
- The European business and administrative centre
- The railway quarters
- The dhobi (washing) quarters
- European residential suburbs
- The military barracks outside the town (White et al ,1948:4)

2.3 Definition of the City Boundary and the Creation of City-Rural Dichotomy

2.3.1 Fixing Urban and Rural Boundaries and Boundary Extensions

The first township boundaries were established in 1900, which defined Nairobi as an area within a radius of 1.5 miles from the railway station (Emig et al, 1980). In 1919, Nairobi became a municipality and in 1950, it acquired city status through a royal charter with an area of 83 square kilometers (Kenya, NMGS, 2005). The boundary was extended to an area of 684 square kilometers in 1963 to include Nairobi National Park (Kenya, NMGS, 2005). By 2005, the population of Nairobi was estimated to be three million, one hundred people (3.1m) and the population is growing at an annual growth rate of 4.8% compared to the national growth rate of 3.4% (Kenya, CBS, 1999). The population of Nairobi has over the years grown as depicted in Table 2.1

Table 2.1; Changes in Population and Population Density of Nairobi

Year	Population	Area in square kilometers	Population density
1963	350,000	684	512 persons/km ²
1979	828,000	684	1211 persons per km ²
1989	1,325,000	684	1937 persons /km ²
1999	2,137,000	684	3124 persons/km ²
2005	3,100,000	684	4532 persons/km ²

Source: Kenya; NMGS, 2005

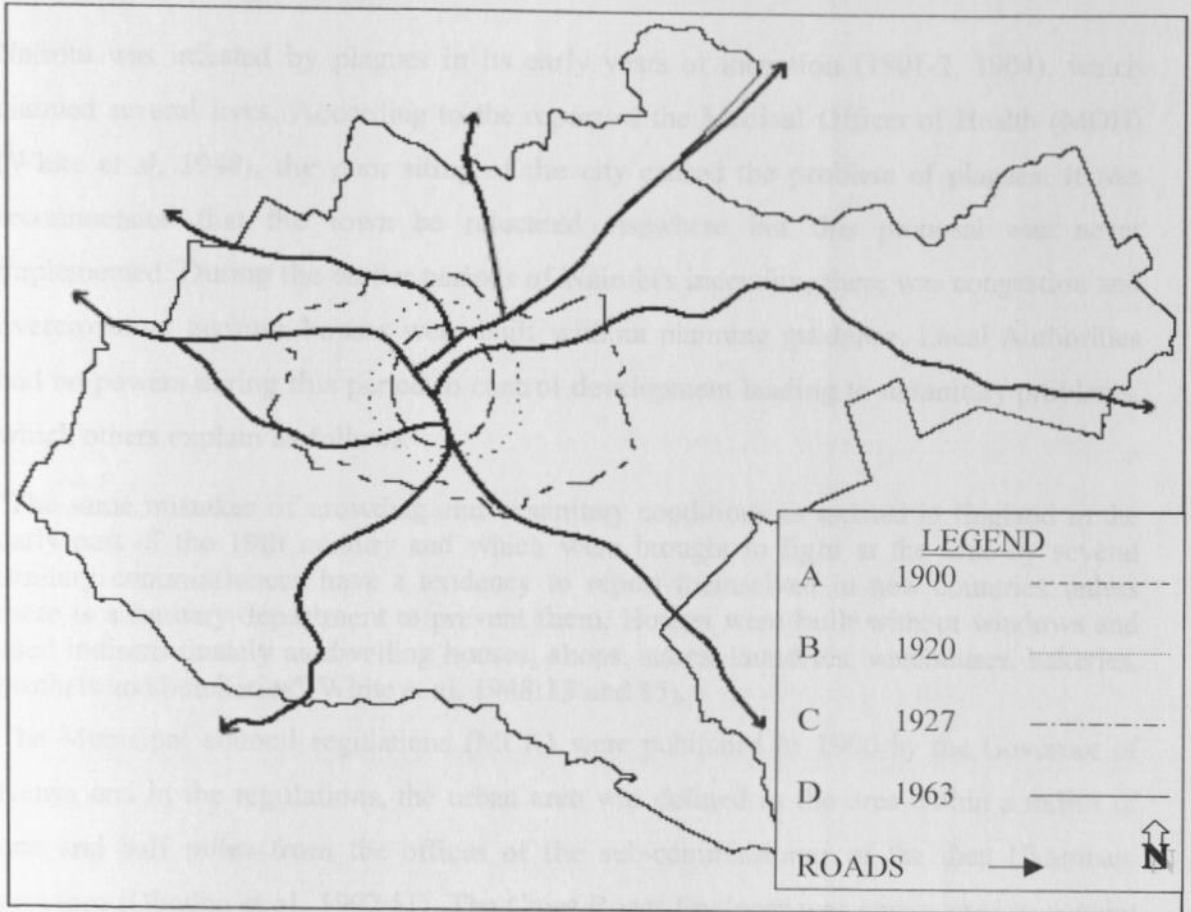
It can be observed that although Nairobi's population has been increasing over the years, the total area of the city has remained the same hence population densities within the city have been rising (Table 2.1). However, most of the increase in population tends to occur in Eastlands part of Nairobi and, therefore, it is in Eastlands where population densities are highest (Kevin, 1992). Population levels in Nairobi are expected to hit the 8 million mark by the year 2030 (Kenya, NMGS, 2005).

Source: Adapted from African Urban Quarterly, 1992

1.4 Planning Challenges in Nairobi City and Land Use Regulation Strategies: a Historical Perspective

Over its history, the city of Nairobi has experienced a lot of land use problems and the strategies to tackle with land use challenges have been diverse as discussed below.

Map 2.2; City of Nairobi; Boundary Changes 1900-1963



Source: Adopted from African Urban Quarterly, 1992

2.4 Planning Challenges in Nairobi City and Land Use Regulation Strategies; a Historical Perspective

Since its inception, the city of Nairobi has experienced a lot of land use problems and the strategies to resolve such land use challenges have been diverse as discussed below.

2.4.1 Plagues of 1901-1902-1904, Public Health Concerns and Nairobi Municipal Council Regulations

Nairobi was infested by plagues in its early years of inception (1901-2, 1904), which claimed several lives. According to the report of the Medical Officer of Health (MOH) (White et al, 1948), the poor siting of the city caused the problem of plagues. It was recommended that the town be relocated elsewhere but this proposal was never implemented. During the earlier periods of Nairobi's inception, there was congestion and overcrowding because houses were built without planning guidance. Local Authorities had no powers during this period to control development leading to unsanitary problems, which others explain as follows:

"The same mistakes of crowding and unsanitary conditions as existed in England in the early part of the 19th century and which were brought to light at the time by several sanitary commissioners have a tendency to repeat themselves in new countries unless there is a sanitary department to prevent them. Houses were built without windows and used indiscriminately as dwelling houses, shops, stores, laundries, warehouses, bakeries, brothels and butcheries" (White et al, 1948:13 and 15).

The Municipal council regulations (MCR) were published in 1900 by the Governor of Kenya and in the regulations, the urban area was defined as the area within a radius of one and half miles from the offices of the sub-commissioner of the then Ukambani province (Obudho et al, 1992:51). The Chief Roads Engineer was empowered to acquire land compulsorily for public use. His powers were derived from the Indian Land Acquisitions Act (1882) and initially the need for land acquisitions was for the use of the railway (Obudho et al, 1992).

Rules were laid in 1904 for the whole colony to provide for streets, roads and erection of buildings. Development control issues related to sanitation, the location of slaughterhouses, markets, bakeries, lodgings houses and preservation orders were also covered in the rules (White et al, 1948:13). Areas which had developed as eyesores were burned. In the absence of proper development control approaches, burning became the alternative as argued below. "But removal of parts of the town by burning was still the only method of improvement known to Africans, just as medieval medicine only knew of blood letting and amputation" (White et al, 1948:14).

The other development control strategy was the use of racial segregation. Professor W.J.Simpson who was sent to advice on the issue of planning for Nairobi suggested that development of the city be undertaken along the lines of racial segregation. He argued that Indians and Europeans had to be segregated because the lives of Indians were not consonant with those of Europeans. He also argued that Africans were primitive and unfamiliar with and not adapted to urban life. Africans could not, therefore, live with Europeans either (White et al, 1948). Simpson argued that in the interest of every community, it was necessary that in every town and trade centre, planning approaches provide well-defined and separate quarters for Europeans, Indians and Africans (White et al, 1948:15). Arguably, the segregation was to be maintained on sanitary and social grounds (White et al, 1948).

2.4.2 The 1926 Nairobi Zoning Plan as Instrument of Land-use Control

This plan tended to institutionalize the racial segregation because areas were set aside for the Europeans and Asians. The planning process almost excluded the Africans from the town because no area was set aside for Africans (Emig and Ishmail, 1980:20). Zoning also created different densities in different racially segregated areas. In the western part of Nairobi for example where the white settlers lived, there were to be a maximum of one to two houses per acre. In the central and eastern part, nearest to the city where the Asian lived, there were to be a maximum of twelve houses per acre. In the eastern part of the city, there was to be the whole of the African population (Emig et al, 1980:20). The areas where the middle class and lower class lived were not renovated because as it was argued, the cost involved would be too high (Emig and Ishmail, 1980). For the African locations, it was stated; "No native development be permitted west of Race Course road and that an area be reserved east and south east of Pumwani for Africans "(Emig et al, 1980,:47).

Residential areas in the city of Nairobi were, therefore, categorized into four zones: the Europeans, the Asian high class, Asian middle class and the African zones. In 1926, the European population which comprised less than 10% of the total population of approximately 30,000 occupied an area of 2,700 acres (42%) of the total area of Nairobi (Emig et al, 1980).

2.4.3 The 1948 Nairobi Master Plan (NMP) and the First Peri-urban Concerns

The Asian population which constituted 30% of the total population of Nairobi occupied only 300 acres (121.4 hectares) or 4.7% of the total area of Nairobi for residential purposes. Although Africans were not supposed to be in towns, they could not be avoided completely because they were needed as laborers for the railway and as domestic servants. All of them were, therefore, located at Pumwani (Emig et al, 1980:25). The Africans were about 18,000 then and constituted 60% of the total population of Nairobi but occupied an area less than 5% of Nairobi (Emig et al, 1980).

The 1948 master plan showed the possibility of peri-urban formation around the city of Nairobi if policy did not restrict the residential market. It was argued that if the African and Asian residential properties were overvalued to ensure that the Africans and the Asians did not buy property in their areas. Africans were for example paid between 6 and 15\$ per year when land values in their areas were between 200-500 British pounds per acre (Emig et al, 1980:32). European areas had the best land but the cost was only one hundred pounds per acre. However, Africans and Asians were not allowed to live in the European areas and they could not buy land in the areas occupied by Europeans even if they had money (Emig et al, 1980).

In the Asian areas, land cost 780 British pounds per acre. This means that Europeans kept on buying land in the Asian areas and building houses for Asians to rent. The Africans with their low salaries could not be able to buy land even in the areas where they lived. This policy created congestion in the African areas and made it difficult for them to acquire property within the city. Most of the investors in peri-urban areas are owned by Kenyans of African descent (chapter 8). It can be argued that perhaps the congestion in the Eastland of Nairobi city where the Kenyan Africans live could be the push factor

which motivated developers to seek peri-urban locations together with the fact that they could not afford land within the city. However, this possibility can only be verified by comparing the land values between the city and that of the rural urban interface (RUI) to find out whether the land in peri-urban is cheaper (Chapter 8).

2.4.3 The 1948 Nairobi Master Plan (NMP) and the First Peri-urban Concerns

The first master plan for Nairobi was prepared in 1948. It was recognized in the Nairobi Master Plan (NMP) that if the planning of the Town had to be sustainable, then issues of regional planning must be linked to those of the master plan.

"If sprawl of people working in Nairobi over the surrounding countryside is to be stopped, some coordination of policy between the municipality and the district is necessary" (White et al, 1948:55).

The 1948 master plan foresaw the possibility of peri-urban formation around the city of Nairobi if policy did not address the rural-urban linkage. It was argued that if the linkage was not addressed, some employers might build factories in the adjoining areas of Nairobi and impose upon the municipality the task of housing workers of the factory (White et al, 1948). Secondly, unscrupulous persons may avoid municipal rates or municipal byelaws to invest in the areas adjoining the city unless such enactments would cover that wider area which is related to the life of the municipality (White et al, 1948:55). It was in the interest of the municipality and that of the surrounding countryside that machinery be devised to deal with common problems (White et al, 1992).

To address the rural-urban linkage, it was suggested in the Nairobi master planning approach that there should be a national body set by the government to carry out a periodical review of all resolutions and actions of the major urban areas in Kenya. Part of the mandate of the national body, it was suggested, would be to study the effects of major cities on the surrounding districts and see that districts conform to them (White et al, 1948). The use of the provincial administration as an authority to mediate between urban

areas and rural councils was not seen as a possibility because they were already overburdened (White et al, 1948). It can be concluded that although the need for integration between Nairobi City and its surrounding was raised; the authority to undertake the integration of Nairobi city and the hinterland was not put in place. Therefore, the urban rural dichotomy at micro level concerning Nairobi and its environs was never addressed during this period.

Planning was introduced in the city but not in the rural areas. The African residential areas were congested and Africans could not buy land in the city because of low salaries. This scenario has persisted to date. Land use patterns in the urban areas were therefore predetermined and therefore desirable/optimum but those of rural areas evolved sporadically.

2.5 Nairobi's Planning problems in post colonial-periods

In post-colonial period, an unprecedented migration of people from the rural areas to the urban areas was witnessed (Obudho et al, 1992). However, the areas where the African settled were the Eastlands of Nairobi where the colonial government restricted them during colonial rule. The Eastlands areas of Nairobi experienced deficiencies in infrastructure and health services (Muganzi, 1992:64). Health facilities were inadequate and, therefore, children born in the Eastlands of Nairobi where the Africans resided were subject to higher probabilities of dying earlier than those born in the westlands part of Nairobi (Muganzi, 1992:64). Overcrowding and congestion was observed in Eastlands where in some parts up to five persons shared a room (Muganzi, 1992).

Many of the residents in the Eastlands were unemployed and came from the rural districts where there are high incidents of mortality levels (Muganzi, 1992). Because of the high poverty levels; majority of the people in Eastland could not access health facilities even if those facilities were available in their neighborhood. The congestion in the African areas of Eastland, which was seen during the colonial days, therefore, continued in post-

colonial periods. By 1980, the low-density areas of Westland (Woodley, Kileleshwa, Kilimani, Lavington, Muthaiga and Thomson) accommodated 2-25 people per hectare, the medium density areas of Nairobi South C accommodated between 30-40 people per hectare (Kevin, 1992:69). However, the low-income areas of Eastland had a density of between 200-300 people per hectare (Kevin, 1992). Others have observed that the Eastland part of Nairobi is poorly served by municipal schools (Kevin, 1992:69). The urbanizing situation in Eastland is an illustration of subsistence urbanism (Kevin, 1992:69).

Population density in Eastlands could stand at 2000 persons per hectare, 40-60% higher than the city average (Unicef, 1989, cited in Kevin, 1992). Sixty-six percent (66%) of this population live in rental accommodation, often spending 40% of their disposable income on rents (Kevin, 1992). Children living in Nairobi's Eastland are malnourished, below average heights and weights (Unicef, 1989). A study carried out in Pumwani shows that 78% of the residents were tenants, 15% were subtenants and only 7% were landlords (Syagga and Kiamba, 1992:83). Most people (94%) in Pumwani lived in two rooms with an occupancy rate of 4 persons per room and an average room size, which was 10 by 10 feet (Syagga and Kiamba, 1992). Toilets were shared (94%), water points were communal, and roads were murramed except secondary roads, which were tamarked (Syagga and Kiamba, 1992). About 80% of the structures were built of mud and wattle while 14% were built of cement and sand (Syagga et al, 1992).

The Eastland part of Nairobi also lacks basic recreational facilities. Most of the recreational facilities were found in the rich suburbs of wetlands and in the central business district (Omondi, 1992). Eastlands was meant for Africans who happened to be the poorer members of society as compared to other racial groups.

2.6 Lessons Learnt From Nairobi's Urbanization Scenario Before and After

Independence

The urban population was divided and located on space according to racial basis. The Eastland was reserved for Africans during colonial rule. In post-colonial Kenya, most of the migrants from the rural areas were Africans and who joined their relatives in Eastland. Again most of the migrants from the rural areas were poor and could not easily get jobs. Most of those who managed to be employed joined the informal sector which does not pay well. Those in Eastland whose incomes had improved, therefore, may have opted to locate to less congested areas such as the peri-urban areas. This then could explain the coincidence that peri-urban areas of Nairobi are occupied by Kenyans of African origin. However, one may still ask why such migrants could not go to other areas of the inner city which were not congested. This question is discussed in Chapter 8 of this thesis.

The other emerging issue is that as a result of congestion, land use zoning and planning were found necessary in the city during colonial rule. The first planning strategy was the introduction of rules, then zoning and this was followed by the comprehensive 1948 master plan. This has helped to predetermine desirable land use patterns within the city. The authority to undertake planning was given to municipal authorities which later became a city authority. Planning was, however, within the precincts of the city boundary and not outside the city and this explains the conflicts in land use and in-optimal land patterns in peri-urban areas of the city. If the need to plan the city was as a result of congestion, then there is a similar concern currently in the peri-urban areas because of congestion.

CHAPTER 3

TOWARDS A THEORETICAL AND CONCEPTUAL FRAMEWORK.

3.1 Snopsis

This chapter is divided into three sections. In section I of the chapter, the theory of dualism is analyzed. The analysis in section I then puts the phenomenon of duality between the rural and urban areas in Kenya, and Nairobi in particular into context. It is postulated that peri-urban formation, conflicts in space use and in-optimal land patterns can both be explained within the context of dualistic theory.

It is conceptualized further that, as a result of the two land use systems of rural and urban, the space specific land use control models based on either the urban or the rural cannot be used to regulate the mixed land use in the peri-urban. This mismatch where inappropriate development control models are applied in the mixed land use sector, which is neither urban nor rural, can then explain the conflicts and in-optimal land patterns currently observed in peri-urban Nairobi. However, those who seek to address the conflicts in space use and in-optimality in land patterns must understand the levels in the land use process where such land use problems occur and the factors which bring them about. The model, which can aid the understanding of the problems, related to conflicts in space use and in-optimality in a land use pattern within a land use system is conceptualized in section II of this chapter. In section III of this chapter, peri-urban formation within the context of duality is discussed both from a theoretical perspective and from a conceptual perspective.

SECTION I

3.2 Understanding the Rural-Urban Relationship

In this section, the study analyzes the theories which explain the existence of the urban and rural areas and the relationship of the two land use systems.

3.2.1 Dualistic Theories and the Paradigm of Rural-Urban Land Use Systems.

In this section, the study seeks to establish how the dualistic theory can be used to explain the rationale for the two-sector development paradigm and the way the two sectors of urban and rural manifest themselves and relate to one another.

Dualistic theories are attributed to the works of Boeke (1953). While studying the Indonesian economy, Boeke concluded that every society exhibits a certain social style, which consists of three characteristics: the social spirit, the organizational forms and the technology dominating it. When the three characteristics of social spirit, organizational forms and technology, which dominate the society, are combined, then they form the social system or social style of that particular society. Homogeneous societies have only one social system but other societies may have two or more social systems simultaneously. A society with two social systems is then called a dual or plural society (Boeke, 1953, cited in Jhingan, 1997).

In a dual society, therefore, there would be two forms of social styles (systems); an advanced western system and an indigenous pre-capitalist agricultural system. The former is under western influence and supervision, uses advanced technology and the average standard of living of the people is high. The latter is native, with low levels of technique, and low levels of economic and social welfare. Boeke calls it Social dualism and defines it as a clashing of an imported social system with another style (Cited in Jhingan, 1997:198). Boeke's (1953) theory of social dualism was closely followed by Higgins (1954, cited in Jhingan, 1997) theory of Technological Dualism. Higgins (1954) further argues that in the two sector development approach economies, there exist two different production techniques and, therefore, there exists technological unemployment in the industrial sector and disguised unemployment in the rural traditional sector.

Based on the thinking of the dualistic theories, other models emerged which argue that the world is divided between two sets of countries; the more developed countries (MDCs) and the less developed countries (LDCs). MDCs are in the center (Western Europe, Britain and USA) and LDCs are in the periphery (backward). Continents which were categorized in the bracket of backward or periphery include Asia, Africa and Latin America. Frank (1976, cited in Jhingan, 1997) calls the developed countries as metropolis and the less developed countries as satellite countries and, further, observes that LDCs were incorporated into the world economy during the period of colonialism.

In that respect, the dualistic theory attributes the formation of the two-sector economy in Africa and Asia to the colonial era when the LDCs were divided between urban and rural. What is relevant about the concept of dualism to this study is that the urban and rural spatial systems are distinct from each other and mutually exclusive because the two sectors differ in organizational forms. The urban and rural sectors also vary in the type of technology used and the social spirit which dominates them. The two spatial systems have different social styles and, therefore, such variations in social systems would be reflected in spatial forms and patterns, which accordingly would vary, of necessity.

If the urban and rural sectors are seen as separate land use systems, what then creates conflicts in space use in the rural part of the land use system? This is explained in the section that follows.

SECTION II

3.3.0 Conceptualizing Space Use Conflicts and In-Optimal Land Patterns in Peri-urban Areas.

3.3.1 Overview

In this section, the study seeks to analyze theories that explain conflicts in space use and in-optimality in land use patterns within land use systems of peri-urban Nairobi. It is necessary, first, to establish the meaning of the terms space use conflicts and in-optimality in a land-use pattern. This then would enable the inquiry to establish the levels within the land use system where such in-optimality and conflicts in space use tend to occur and components within the land use system which contribute to such in-optimality in land use patterns and conflicts in space use. The term conflict is already explained in Chapter 1 of this study. In-optimality in a land use pattern is explained below.

3.3.2 Optimality in Land Use Patterns

What is a spatial pattern and when is a spatial pattern seen as in-optimal or optimal? A spatial pattern in an urban area is defined as solid-void relationships (Trancit, 1986, cited in Otoki, 2006). Urban solids may be individual buildings, groups of buildings or urban blocks. Voids are public open spaces, which are often found between

buildings in a town (Otoki, 2006). If a spatial pattern refers to solid-void relationship, when does a spatial pattern then become in-optimal? The definition of optimality varies depending on the discipline and context. For example, an architect may simply be interested in the relationship between voids and solids alone and their impact on the visual impression. An architect would then define a spatial pattern from a visual impression point of view regarding the relationship of voids and blocks. The definition from the point of view of a land use planner would also vary.

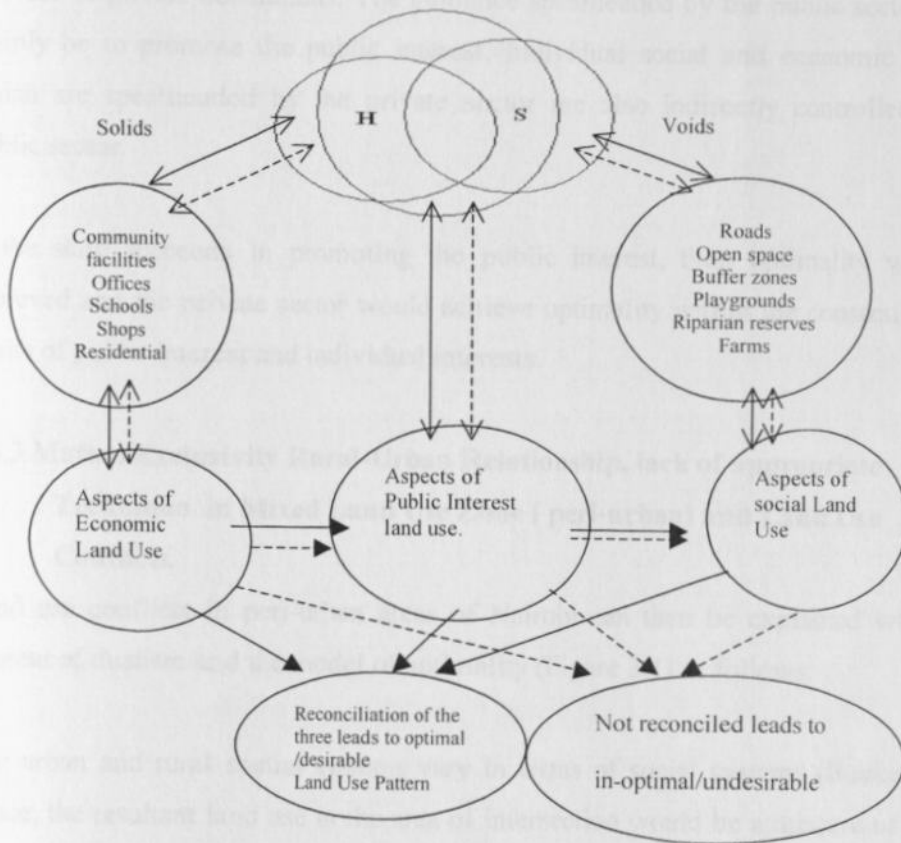
Figure 3.1: In-Optimality and Optimality Desirability of a Land Use Pattern

From the land use planning point of view, an optimum land use occurs when the location of solids and voids are able to promote the interest of three actors within a human settlement cluster in a land use process as follows: The residents of the town who may be viewed as the main actors in a land use process should be able to conveniently access public blocks and voids for individual needs which may be the optimization of individual social or economic needs. Secondly, public authorities who provide services to the blocks and voids should be able to spend the lowest public funds, which mean that human settlements should be compact but at the same time easily accessible. Some of the services provided by public authorities include schools, sewerage services, electricity, telephone and water.

Thirdly, investors who create wealth should be able to achieve the highest returns from such blocks or voids without compromising the right of others to enjoy their social and economic rights and without compromising public interest. This means that an ideal/desirable land use pattern is where the three components of a land use determinant; elements of public interest, the economic motive and the social motive are reconciled. The ideal land use pattern relationship is conceptualized as shown in Figure. 3.1. The ideal land use pattern is also shown in bold line and the in-optimal land patterns are shown in dotted line. If blocks and voids in a human settlement are not reconciled to meet the three interest groups in society, then elements of in-optimality are said to ensue. Some of the manifestations of in-optimality in a land patterning scenario within a given settlement cluster would include; incongruous land uses (conflicts), blocks which do not incorporate public health concerns, commercial blocks which are far from residential areas, missing community facilities (equity considerations), lack of sufficient connectivity, and roads which are narrow and cannot accommodate all users (traffic jams). Other manifestations of in-optimality in

a land use process include settlements which are spread out and, therefore, making service provision expensive (economy and efficiency), neighborhoods which lack sufficient solid waste management (environmental considerations), neighborhoods where areas of employment are located far from the areas of residence (lack of convenience, wastage of time and fuel) and, therefore, requiring long traveling distances.

Figure 3.1; In- Optimality and Optimality/Desirability of a Land Use Pattern



Source: Author's Construct

KEY	
↔	Desirable Relationship
↔---	In- optimal/undesirable relationship
H-S	Human Settlement

The private sector often spearheads the social and economic motives, which promote wealth creation and promote social cohesion. The public sector on the other hand promotes the interests of the public. Optimality in a land use pattern can then be achieved when there is a balance between the economic motives in land use, the social motives and the motives of promoting public interest in the land use process. However, it is assumed in this study that individuals who are seeking social and economic utilities know how to optimize individual interests in a land use process without being guided closely. If they need any such guidance, they can seek the services of private consultants. The guidance spearheaded by the public sector would mainly be to promote the public interest. Individual social and economic interests which are spearheaded by the private sector are also indirectly controlled by the public sector.

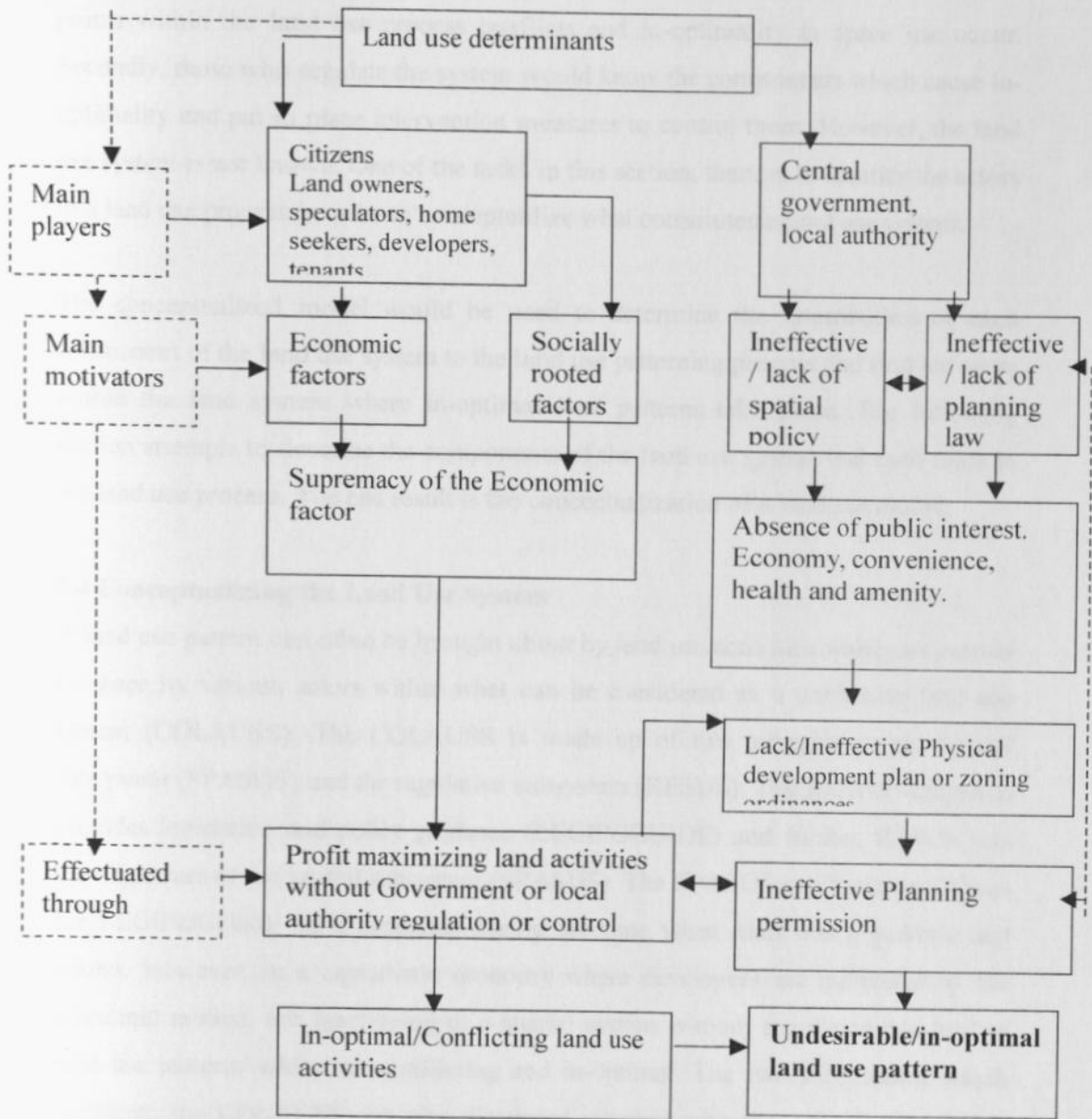
If the state succeeds in promoting the public interest, then optimality would be achieved and the private sector would achieve optimality within the constraint of the limits of public interest and individual interests.

3.3.3 Mutual Exclusivity Rural-Urban Relationship, lack of appropriate Technique in Mixed Land Use Zone (peri-urban) and Land Use Conflicts.

Land use conflicts in peri-urban areas of Nairobi can then be explained within the context of dualism and the model of optimality (Figure 3.1) as follows.

The urban and rural spatial systems vary in terms of social systems (Boeke, 1953), hence, the resultant land use in the area of intersection would be a mixture of the two technologies, two social spirits and dual organizational forms. The apparent clash of two social systems in the mixed land use peri-urban cannot be resolved by either the purely urban specific or the purely rural specific techniques. Developers would, therefore, pursue the profit motive at the expense of public interest and this explains the current conflicts in land use in peri-urban areas (Figure 3.2)

Figure 3.2; Un-Ideal/In-Optimal Land-Use Process and Formation of Undesirable/In-optimal Land-Use Patterns in Sector 3 (The Peri-Urban Zone).



Source: Conceptualized by Author

Discussion-However, in order to find out the possibility of predetermining optimum/desirable land use patterns, the land use system must be understood. This would then enable those who seek to control the land use system to know which points within the land use process conflicts and in-optimality in space use occur. Secondly, those who regulate the system would know the components which cause in-optimality and put in place intervention measures to control them. However, the land use system is not known. One of the tasks in this section, then, is to identify the actors in a land use process in order to conceptualize what constitutes a land use system.

The conceptualized model would be used to determine the contribution of each component of the land use system to the land use patterning process and find out areas within the land system where in-optimal land patterns take place. The following section attempts to describe the components of the land use system and their roles in the land use process. The end result is the conceptualization of a land use model.

3.4 Conceptualizing the Land Use System

A land use pattern can often be brought about by land use activities which are carried in space by various actors within what can be considered as a composite land use system (COLAUSS). The COLAUSS is made up of two subsystems; the spatial subsystem (SPASUS) and the regulative subsystem (RESUS). The RESUS subsystem provides legislative and policy guidance (LEGIPOGUIDE) and further, RESUS sets the objectives of the spatial subsystem (SPASUS). The SPASUS can function without the LEGIPOGUIDE as it happened during the time when man was a gatherer and hunter. However, in a capitalistic economy where developers are motivated by the economic motive, the functioning of a spatial system without regulation can lead to land use patterns which are conflicting and in-optimal. The two subsystems, which constitute the COLAUSS, are also discussed together with the components, which constitute the two subsystems.

3.4.1 The Regulatory Subsystem and its Components.

The regulatory subsystem (RESUS) is spearheaded by the public sector and consists of the following components.

3.4.1.1 The Role of Public Sector in a Land Use System

The role of the public sector in a land use process is regulatory and this role is carried through planning intervention. In democratic economies, strategic approaches to planning emphasize on the important role of the private sector and less of government control. One would wonder then whether land use planning and control are necessary in a land use system when global trends are moving away from restrictive planning. This section tries to revisit the justificatory theory of planning in order to establish whether planning and control are still relevant. Further, this study seeks to establish whether the role of the state in a land use process through planning intervention is necessary.

3.4.1.2 Justifying the Role of the Public Sector in a Land Use System

In section iii of this chapter, it is established that public interest is one of the determinants of land use and this motive is spearheaded by the public sector (Chapin and Kaiser, 1979; Faludi, 1973; Etzioni, 1968; Rawls, 2005). However, the concept of public interest and the way to arrive at the perceived public interest is an idea which has been hotly contested by those who belong to the pluralist school of thought (Rawls, 2005; Faludi, 1973). Scholars who belong to the normative school of thought, however, argue that planning is necessary in society because it tries to avoid risks and hazards by predicting the outcomes of actions of various actors or developers in society (Evans, 2003a, cited in Rawls, 2005).

Others argue that human development can only be achieved through the transformation of man's physical environment using planning as a tool (Faludi, 1973). This means that man must shape the human institutions which include the social environment into the orbit of his control through planning (Faludi, 1973). Faludi further justifies the need for planning by arguing as follows:

“Human beings are faced with the challenge to pursue growth relentlessly and to fight obstacles of growth, whenever they may be. This includes the challenge to abandon or check certain types of growth where they develop pathological aspects, however dear they maybe to one’s heart, the challenge of facing up to the anxieties involved in making decisions in the pursuit of growth, the challenge of sharing responsibility for mankind’s future” (Faludi, 1973, 48)

In urban areas for example, practices of sustainable urban design and urban development are carried out in order to better the living environment (Faludi, 1973). Planning is like a vehicle, which is used for controlling and accelerating the process of human growth.

In section iii of this chapter, activities that fall in the realm of public interest are discussed. These are health and safety, environmental conservation and amenity, social equity, economy and efficiency (Chapin, 1972; Chapin and Kaiser, 1979). Planning intervention in a land use process can then be justified on the basis of achieving the public interest as already identified by others (Chapin, 1972; Chapin et al, 1979). If planning intervention is ignored, development actors would mainly be from the private sector and they tend to be motivated by the economic and social motive at the peril of public interest considerations (Chapin et al, 1979).

While the need for planning has been recognized (Faludi, 1972; Rawls, 2005), the pluralist school of thought argues that what constitutes public interest must not be imposed on people by the state (public sector) but be agreed upon through consensus. The pluralist school of thought argues that the state must engage in public participation when identifying what to be considered as public interest (Faludi, 1973; Rawls, 2005). Others argue that members of the public within a particular state/country have many things which they consider as 'goods' which then makes the idea of obtaining consensus in what constitutes public interest through public participation cumbersome. What is considered from the point of view of the majority as 'good' is ambiguous and that is why others call it as a 'thick theory' of good (Stein et al, 2005). It is necessary, therefore, to evolve the 'thin theory' of good for public realm from the 'thick theory' of good found within the individual realm (Stein et al, 2005).

The process of public consultation enables individuals drop some of the things they hold as 'good' or private interest for the sake of obtaining public good (public interest). In order to separate individual interests and achieve public interest through consensus, Rawls proposes a system of 'wide reflective equilibrium' (WRE). The model of wide reflective equilibrium then tries to achieve the common good by

involving every member of the society and ensuring that such process occurs through consensus.

Discussion-The conclusion reached in this discussion is that the need for planning in a modern society is indisputable and indispensable (Faludi, 1973; Etzioni, 1968; Rawls, 2005; Evans, 2003). It is also concluded that what planning seeks to achieve as public interest should be obtained through the model of wide reflective equilibrium (WRE). How then does the public sector achieve public interest within a land use system and what tools does it use?

3.4.1.3 Instruments Used by the Public Sector to Achieve Control in a Land

Use system

(i) Setting the objectives of the land use process

It is argued that the role of the state should be to set up the framework within which other actors in society plan (Faludi, 1973: 294). The public sector then sets goals to be achieved within a land use system.

(ii) Spatial framework as instrument of land use process control

Before control is carried out in the land use process, plans are prepared for urban and regional systems as proposals of intended states (McLoughlin, 1969). The urban and regional systems can only grow and change by the alteration of their component parts (activities in space) and their connections (McLoughlin, 1969). The essence of control then is to regulate those disturbances so that the systems' actual trajectory matches with the intentions of the planning process as closely as possible (McLoughlin, 1969). Each disturbance, or land development application whether for new construction, demolition, change of user or whatever, must be examined for the total effect it is likely to have on the system (McLoughlin, 1969).

Some of the checklists that the examination of the processing of an application for development is likely to follow include the following questions: -Is development proposal consistent with the intentions of the plan in terms of its user (Residential, commercial, recreation etc) and in terms of its size (number of persons, number of jobs, volume and population)? Is the amount of space proposed consistent with the standards recommended in the plan? Is the type of communication available and recommended on the plan sufficient to support the proposed development?

(iii) Institutional framework of the land- use system

In order to achieve the intentions of planning and control, an institutional framework is articulated which has similar functioning systems as those of a human being (Faludi, 1973). Faludi conceptualizes the preconditions which the 'configurations' of channels and decision points in agencies must fulfill before individuals can make rational decisions.

"Therefore the performance of agencies does not only depend on individuals, but also on the twin factors of their structure and the processes within them. Thus agencies have an organizational existence which justifies referring to them as if they were individuals" (Faludi, 1973 p 60).

In order to fulfill the required preconditions within an agency that undertakes planning, the institutional framework must have inbuilt capacity for a feedback system (the receptor). The feedback system gauges the existing state of the environment and the effect of the actions on it. The second component, which is needed within the framework of the institution, is the selector, which chooses between alternative responses on the basis of the information received from the detector. The effector produces changes in the environment on the basis of the instructions from the selector (Kuhn, 1966, cited in Faludi, 1973). Seen in the above context, the greater part of the processes going on in planning agencies involves changing ends as a result of new information.

In the UK regulatory subsystem for example, the receptor refers to the survey or research unit within the local authority. The development plan section producing the statutory development plans and programs represents the technology image. It draws on information from surveys on its own memory and the guidelines received from the selector. Most important, it draws on its goals, which are built into it. These are goals for which planning agency has been set up and the rules underlying its very existence (Faludi, 1973). The selector may be identified with in the case of public authorities (central government) the legislative or with one of its committees. This body (selector) most of the time selects from amongst alternatives presented to it by the development plan section. The effector is that part of a planning authority manipulating the control variables. There may be a special development control section administering planning permissions based on the development plan (Faludi, 1973).

(iv) The State legislates and planning law becomes component of land use system

Plan implementation involves the use of power as provided in planning law (Faludi, 1973). Some countries use planning permission to regulate development while others use public notices or issue leaflets in the languages that developers can understand (Clarry, 1970, cited in Faludi, 1973). Etzioni (1968, cited in Faludi, 1973), argues that to control development, one must exercise power or use some resources which may be classified as coercive, utilitarian or persuasive powers. Persuasive power is what planners try to exercise in mounting exhibitions, issuing pamphlets and addressing public meetings.

3.4.2 Spatial Subsystem and its Components Revisited.

Spatial subsystem (SPASUS) components were identified in Chapters 1 and 5 of this study. In this section, the roles played by each component of the spatial subsystem (SPASUS) are analyzed and the way the subsystem integrates with the other system of regulatory subsystem (RESUS) in the bigger land use system of composite land use system (COLAUSS) is also discussed.

3.4.2.1 The Role of Land Tenure in a Land Use System

Land is the platform for all human activities including physical development (Lichified, 1980, 11). Land is also a unique factor of production compared with others because it is fixed in location, immovable and incapable of expansion of supply, (except with minor exceptions such as reclamation). It is argued that there is need for policy guidance to enable the sustainable use of land.

“Because of this special place in society, it is difficult to grant an individual absolute ownership of any portions of land as against the rest of society as might have with a motor car, television set, and so on” (Lichified 1980, 12)

Land tenure involves a complicated collection of rights to own, occupy, use or improve space and to lease, sell or pass it on to one's heirs (Kivell, 1993:93). Systems of land tenure embody these legal, contractual or customary arrangements whereby individuals or organizations gain access to social or economic opportunities through land. It is argued that the size and configuration of land holdings can profoundly affect urban morphology. The way landforms and patterns appear in space can be attributed to the nature of the original land ownership (Kivelli, 1993). It has also been

argued that the reconstruction of extensively damaged or blighted areas is often constrained by the original pattern of plot ownership (Kivelli, 1993). The question one may ask at this juncture is: what category of land tenure promotes desirable/optimum land-use patterns?

Land ownership is categorized into two sectors. In the Private sector land ownership, individuals, companies and other private sector organizations own land (Kivell, 1993). However, those who hold land under private ownership have to be regulated in order to avoid land use conflicts, to protect the environment and to provide basic infrastructure (Kivell, 1993:97). The second category of land tenure is Public land ownership. Public land ownership has traditionally been justified for reasons of optimizing the common good or public interest. The idea of holding land for public interest found ready acceptance in many quarters in Britain during the immediate post-war period when comprehensive town planning was introduced (Kivell, 1993:109). It is observed for example, that in the 1947, Britain took all development rights and values into public ownership. The right to develop land was taken from landowners and vested in the state through a system of local authority planning permission (Kivelli, 1993).

3.4.2.2 Other Components of a Spatial Subsystem

It is considered in this study that land tenure, especially leasehold tenure, forms part of the spatial system component because it determines the land-use patterns. Other components, which can be seen as part of the spatial system, were those discussed in chapter 1 and chapter 5 of this thesis. The components, which were discussed earlier, were the single development control authority (SDCA) or lead agency, the spatial framework (SP) and public consultation in a development process (D-NSDR). Other components which are still within the spatial subsystem include the development control experts (DCE) and lastly the development activities of citizens (DAOC) whose activities are the subject of control. The six components then constitute the spatial subsystem: SDCA+SP+D-SSDR+D-NSDR+DCE+DAOC=SPATIAL SUBSYSTEM.

3.4.3 The Conceptualized Land Use System

As can be observed in figure 3.3, RESUS runs through all the components of the SPASUS as a blood vessel and this tends to place the role of RESUS in the center of the land use system if seen in the context of producing a desirable spatial pattern. However, if one removes the blood vessel of LEGIPOGUIDE as shown in figure 3.3, the components of the spatial subsystem would still operate, but without specific objectives and the land use pattern would not be predetermined and this would mean that it would be in-optimal. What then is a land use system?

It can be argued then that whereas the components of the regulatory subsystem (RESUS) can be considered to be invisible (invisible hand), the components of the SPASUS can be seen to be visible and that is why desirable or undesirable land use patterns are often referred to as spatial pattern and this ignores the components of RESUS. The term spatial pattern is often used because the SPASUS components are physical and can be viewed with the naked eye. However, it is argued here that a spatial pattern should, henceforth, be seen as a land use pattern because the pattern comes out as a result of the cumulative activities within a land use system, which includes the invisible hand as follows. The components shown below (figure 3.3) then constitute the land use system.

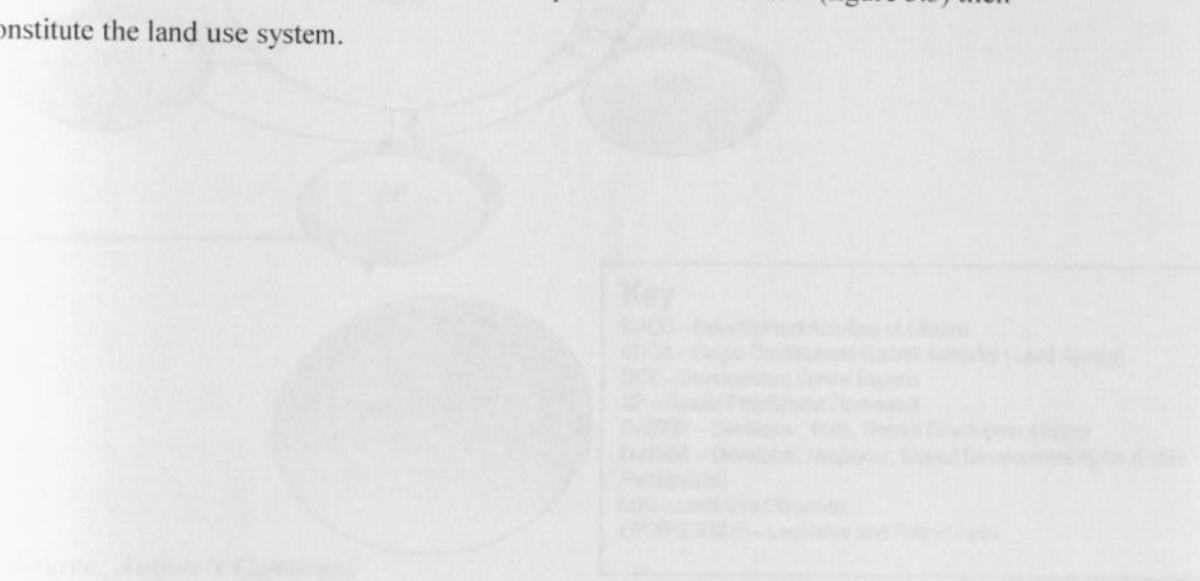
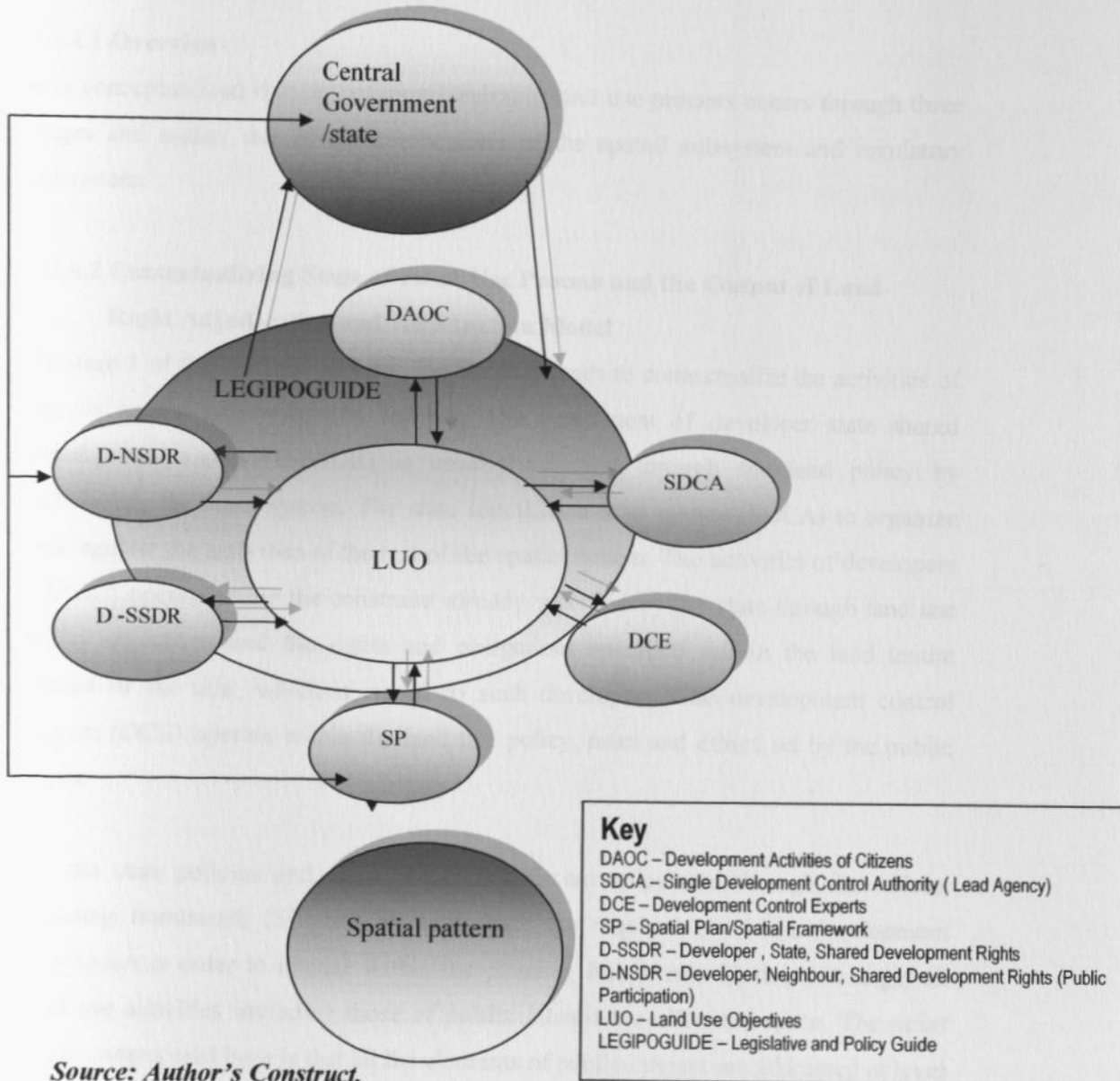


Fig. 3.3; Relationship of RESUS and SPASUS in a land use system



Source: Author's Construct.

Comment-The question which is remaining to be answered is: how then can a desirable/optimum land use pattern be obtained and what components can those in authority manipulate when seeking to achieve optimality in a land use pattern? This brings us to the point of optimum/desirable land use process which then produces

optimal/desirable land use patterns. A land use system where desirable land use patterns can be obtained is conceptualized below.

3.4.4 Conceptualized Optimum/Desirable Land Use Process and Optimum/Desirable Land Use Patterns

3.4.4.1 Overview

It is conceptualized that an optimum/desirable land use process occurs through three stages and makes use of the components of the spatial subsystem and regulatory subsystem.

3.4.4.2 Contextualizing Stage of Land Use Process and the Output of Land Right Adjudication and Registration Model

In stage 1 of the land use process, the RESUS tends to contextualize the activities of the six spatial subsystems as follows. The component of developer state shared development rights (D-SSDR) is usually achieved through the land policy by introducing the lease system. The state identifies a lead agency (SDCA) to organize and regulate the activities of the rest of the spatial system. The activities of developers (DAOC) operate under the constraint already specified by the state through land use policy objectives and the rights and obligations specified within the land tenure system or the title, which is issued to such developers. The development control experts (DCE) operate within the land use policy, rules and ethics set by the public sector.

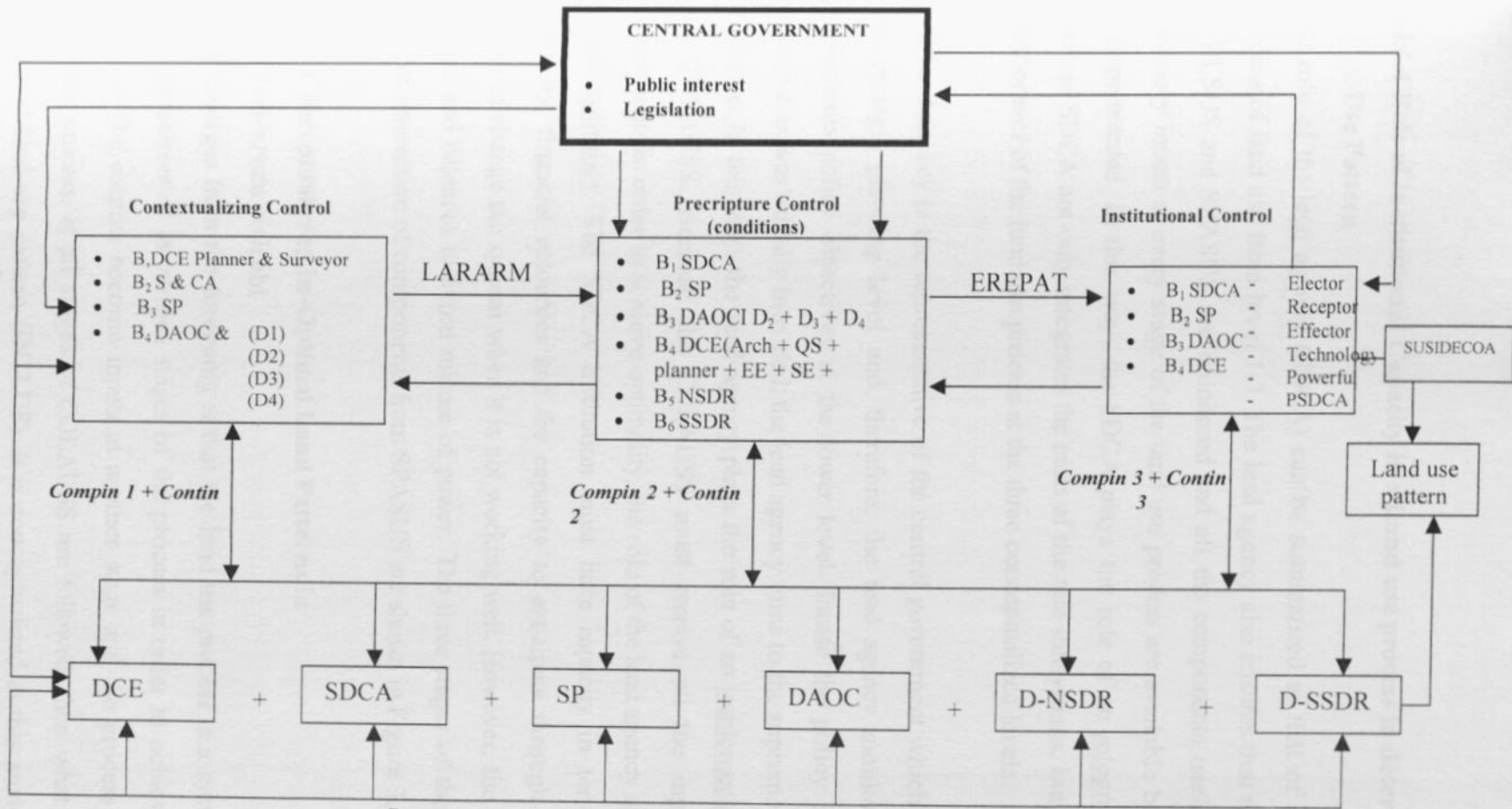
All the state policies and space use objectives are articulated through the official planning framework (SP) and all land users are required to obtain development permission in order to operate within the planning framework. During this stage, all land use activities including those of public interest are allocated space. The point being underscored here is that all the elements of public interest are addressed in level 1 of the land use process and all the components of SPASUS are contextualized and realigned to achieve their objectives and those of the public interest in the composite land use system (COLAUSS). This process is carried out on a plain surface and the land use planner and the land surveyor are needed at this level. The land use process

at this level produces the output of land use rights adjudication and registration model (LARARM).

3.4.4.3 Prescriptive Level of Land Use Process, Space Use Standards and the Output of Erection of Controlled Physical Artifacts.

The second level of the land use process (LAUP) is the prescriptive stage. At this level, the two subsystems of RESUS and SPASUS must interact in order to obtain optimality of land use. At level 2 of LAUP, the variable (input) that is considered to be critical towards the optimal land patterning process is again formed through inputs of the six spatial subsystem components that combine with the inputs of LEGIPOGUIDE from the RESUS during the second level of the composite land use system. The prescriptive land use stage is intended to ensure that every development activity on space conforms to the requirements of the spatial plan (SP) that was prepared and used to contextualize development at the first level.

The product that comes out when the components of the two subsystems combine during the input-output process at level 2 is called the controlled erection of the physical artifact (CEREPAT). During this stage of the land use process, the land use system creates a physical artifact, which is spearheaded by the activities of citizens (DAOC) whose motive may be economic or social. However, the physical artifact must be erected according to the spatial framework (SP) in order to avoid conflicts in space use and to respect health considerations and harmony. However, the activities of DAOC during this level are motivated by the economic motive which is often at odds with the public interest motive. If the activities of the DAOC and even those of DCE and SDCA are not followed closely, the land use process can be weakened by the strong profit motive or corruption. To achieve optimality at this level of the land use process, there is need to follow the SP, have SDCA, and have strong legal framework and a strong capacity of monitoring and evaluation. The process of interaction of RESUS and SPASUS components to produce outputs in a land use system are shown (Figure 3.4)



Source: - Author's construct

- KEY**
- DCE – Development Control Experts
 - SDCA - Single Development Control Authority
 - SP – Spacial Plan
 - DAOC - Development Activities of Citizens
 - D-NSDR – Developer Neighbor Shared Development Right
 - D-SSDR – Developer State Shared

3.4.4.4 Role of Institutional Capacity in a Land use process in determining the land Use Pattern

The role of the lead agency (SDCA) can be summarized as that of an overseer of the process of land use from level 1-3. The lead agency also ensures that the two subsystems of RESUS and SPASUS are monitored and all the components needed to produce the necessary inputs at every stage of the land use process are available before development is implemented. In this way, the SDCA plays the role of an integrator of the system because SDCA not only integrates the parts of the two subsystems, but also integrates the components of the land use process at the three conceptualized levels.

The lead agency is the representative of the central government which initiated policy at the strategic planning level and, therefore, the lead agency monitors, evaluates and implements policy objectives at the lower level. In case the policy is not working or effective as was initially intended; the lead agency turns to the supreme agency for policy guidance. In this way, the lead agency plays the role of an implementer and monitor of the COLAUSS. Because the COLAUSS must receive all the inputs from all the components in order to achieve optimality, the role of the lead agency again becomes that of an optimizer. The SDCA institution must have capacity in terms of manpower, authority, financial resources and the capacity to anticipate through research and the power to change the system when it is not working well. However, the SDCA must have checks and balances to avoid misuse of power. The three stages of the land use process and the interaction of components from SPASUS are shown in Figure 3.4 above.

3.4.5 Conceptualizing In-Optimal Land Patterns in Peri-urban Nairobi

What emerges from the foregoing is that the land use process is a system where inputs must be converted at various stages of the process in order to achieve certain critical outputs. The outputs become inputs at another stage and the process loops back in a feedback process. If all stages of COLAUSS are followed, then what comes out is an integrated land use pattern (INTLUP). It is conceptualized in this study that in-optimal land patterns in peri-urban areas of Nairobi are then caused by land use processes which

are in-optimal. The question then is: if figure 3.4 shows the ideal land use process where an optimum land use pattern can be obtained, to what extent do land use processes in peri-urban Nairobi conform to or deviate from the ideal model. This question is answered in chapter 7 of this study.

SECTION III

3.5.0 Theories of Peri-urban Formations at the Rural Urban Interface

If the two spatial systems are considered as mutually exclusive (Boeke, 1953; Higgins, 1954), which implies that there is a line which divides the urban and rural space at the interface, what then creates peri-urban areas? In other words, what factors cause movements from the urban sector to the RUI? This question is essential because it is the movements between the two spatial systems which then result into development at the RUI which make the rural area to cease to be rural in order to be categorized as suburbia. There is growing concern in academic circles as to what actually motivates people to move to the rural urban interface even when plenty of space remained unutilized in the inner city areas (Adell, 1999). The knowledge regarding this outward growth in cities is crucial for sound planning of the metropolis in general (Boyce, 1971). Theories that explain how peri-urban areas evolve at the rural-urban interface are few and insufficient as can be inferred in the review that follows below.

3.5.1 Definition of the Rural-Urban Interface and Peri-urban Areas

The urban fringe is a place where urban and rural categories converge (Adell, 1999). Secondly, it is a place where urban and rural land use activities are mixed (Carter, 1981). Land use activities that take place at the rural-urban interface are, however, brought about by forces which emanate from the inner city (Carter, 1981; Thomlinson, 1969). Because of the strong linkage between the Rural-Urban Interface (RUI) and the urban areas, there exists a strong socio-economic relationship between the two settlement patterns (Thomlinson, 1969).

In order to delineate the peri-urban area, the first criterion is to identify those activities in the rural urban interface, which have such socio-economic linkages with the inner city. Some of the activities, which would give an indication of the area to be described as the peri-urban, include:

- Areas within the rural urban interface (RUI) which form the catchments zone of the circulation of daily newspapers from the city
- Areas of the RUI which are covered by express or other special bus, train or streetcar service between the inner city and the peri-urban at commuter hours.
- Number of passengers arriving inside in the central city in the morning between the hours of 7.30-9.30 from each outlying area which is considered as peri-urban
- Traffic surveys showing commuting distances (Bogue et al, 1953:17, cited in Thomlinson, 1969).

The peri-urban area is resided by Mobile middle class families who are oriented to the city and who are dominated by urban lifestyles (Pahl, 1965, cited in Thomlinson,1969). In this study, the rural urban interface (RUI) refers to the area of contact between the rural and urban land-use systems. Peri-urban area refers to the space where development activities of mixed nature evolve over time to separate the contact between the purely rural and the purely urban land use systems. In Kenya, just like elsewhere in LDCs, development approaches are dichotomized between the rural and urban space. The dual land use arrangements in Kenya were the creation of the colonial policies of racial segregation as discussed earlier in Chapter 2 and Chapter 6

Summary-What is important in this section is the fact that peri-urban formation at the RUI is brought about by forces emanating from the city. The two zones of urban and RUI have strong socio-economic linkages. People who reside in the RUI have allegiance to the city and not the rural areas where their homes are located.

3.5.2 Theories on Migration and Peri-urban Formations.

In this section, theories which explain peri-urban formation are analyzed to assess the extent to which such theories can explain peri-urban formation in the context of the urban character of Nairobi

3.5.2.1 Pull-Push Hypothesis and Peri-urban Formations

The laws on migration are based on the hypothesis of origin- destination economic differentials as the primary determinants of people's movements between two spatial systems (Ravenstein, 1885, cited in Oucho, 1998). Ravenstein's theory made distinctions between urban and rural population's propensities to migrate and, further, the theory postulates that the propensities of rural people to migrate exceed those of urban residents (cited in Oucho, 1998:P2).

Thomas (1935, cited in Oucho, 1998) adds the dimensions of sex, age, and education as a factor to influence migration besides the already known economic differentials. Lee (1966, cited in Oucho) argues that at both the origin and the destination points are plus and minus factors, which either repel migrants in the former or attract (pull) them in the latter. Studies related to the subject of migration have, however, established the primacy of economic factors in influencing people's movements (Todaro,1984;Oucho, 1998). Migration is seen as an investment in which migrants incur costs in order to reap benefits which include higher incomes and improved living conditions in a socially and physically more congenial environment at the destination (Oucho, 1998: p 5).

However, the factors advanced by Todaro (1984) and Oucho (1998) explain labor migrations and therefore they cannot be used to explain why developers who are profit-motivated decide to move to other locations. What factors then can explain the movements of profit-motivated developers from one location to another?

3.5.2.2 Gravity Models and Peri-urban Formations.

Zipt (1964, cited in Oucho, 1998) explains that migration is directly related to the mass between two places and inversely related to the distance between them (Carrothers, 1965a, 1965b; cited in Oucho, 1998:3). However, if population at the RUI is assumed to emanate from the city, then the gravity models would point to the fact that people should migrate from the peri-urban to the urban areas where the mass (population) is higher and not vice versa. The gravity model and the theory on migration cannot suffice to explain

peri-urban formation especially if the phenomenon of migration is considered from the point of view of developers.

3.5.3 Descriptive Theories and Peri-urban Formations

Three models, which fall in the category of descriptive theories, are discussed below.

3.7.3.1 Concentric Zone Theory and the Evolution of the Rural Urban Interface

Burgess (1925) developed a model of urban structure, which he derived from empirical observations of the city of Chicago. He found out that at the center of the arrangement was the central business district, followed in order by the zone of transition. Other land uses, which followed the zone of transition, included the zone of working man's homes, the zone of better residences and the commuter zone (Figure 3.5).

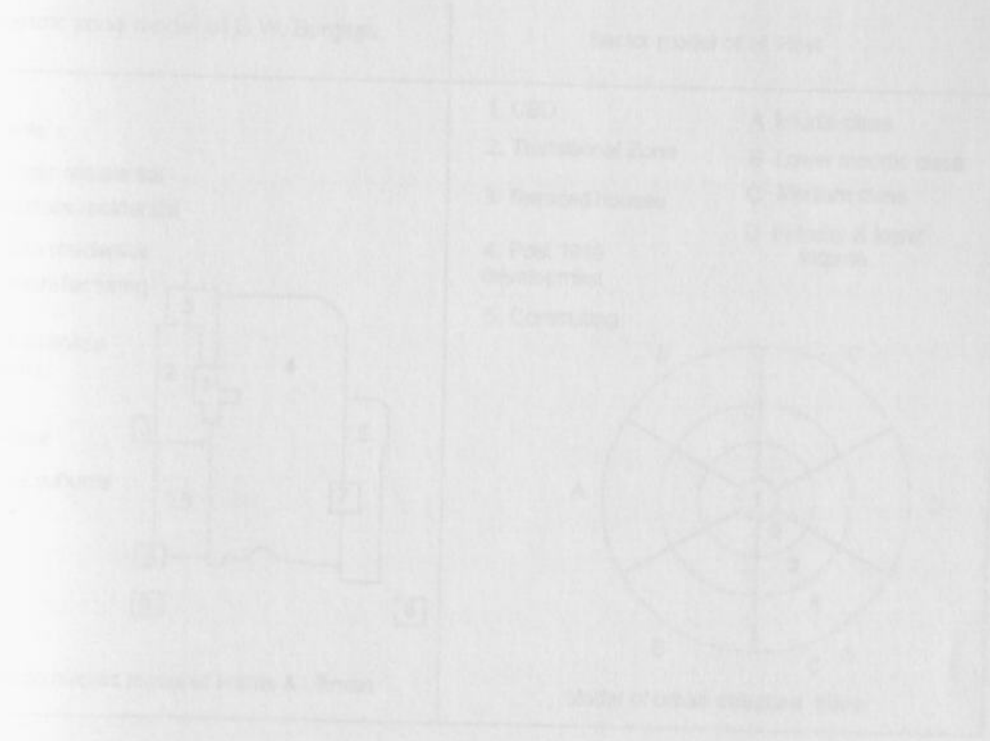
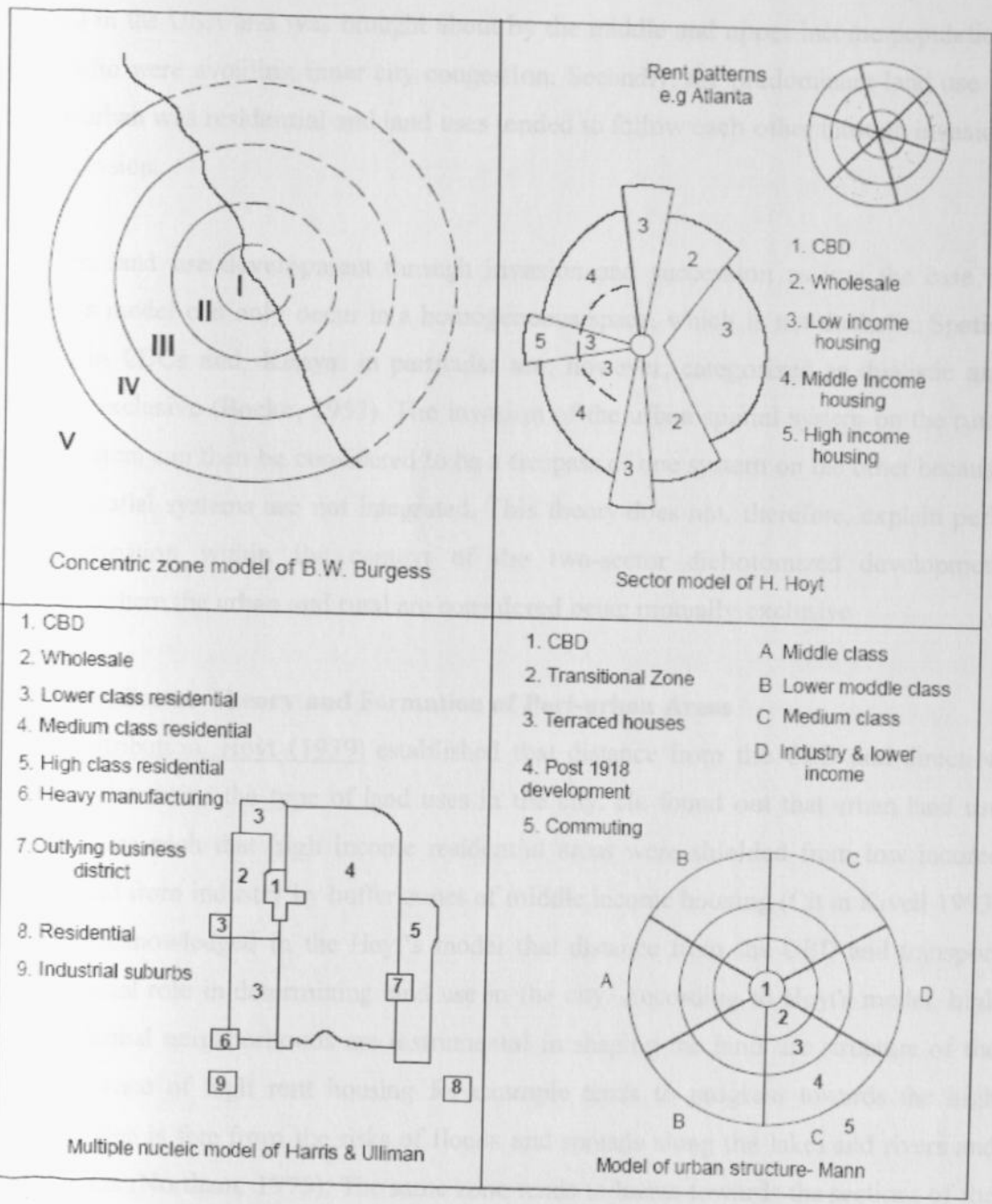


Figure 3.5: Concentric Zone Theory and the Evolution of the Rural Urban Interface

It is observed that land use location in a city is decided by the prices of land. The rich and middle class population occupies the suburbs...

Figure. 3.5; Models of Urban Structures and Periurban Formation.



Source: Chapin and Kaiser, 1979

Burgess (1925) observed that land use formation in a city tended to take the pattern of concentric zone wherein the rich and middle class population occupied the outlying location.

Comment- It is clear from this theory that the first creation of the peri-urban space was observed in the USA and was brought about by the middle and upper income population groups who were avoiding inner city congestion. Secondly, the predominant land use in the peri-urban was residential and land uses tended to follow each other through invasion and succession.

However, land use development through invasion and succession as was the case in Burgess's model can only occur in a homogeneous space, which is not dualistic. Spatial systems in LDCs and, Kenya, in particular are, however, categorized as dualistic and mutually exclusive (Boeke, 1953). The invasion of the urban spatial system on the rural spatial system can then be considered to be a trespass of one system on the other because the two spatial systems are not integrated. This theory does not, therefore, explain peri-urban formation within the context of the two-sector dichotomized development paradigm where the urban and rural are considered being mutually exclusive

3.5.3.2 The Sector Theory and Formation of Peri-urban Areas

In his contribution, Hoyt (1939) established that distance from the CBD and direction tended to determine the type of land uses in the city. He found out that urban land use patterns were such that high income residential areas were shielded from low income districts and from industry by buffer zones of middle income housing (Cit in Kivell 1993; 19). It is acknowledged in the Hoyt's model that distance from the CBD and transport play a crucial role in determining land use in the city. According to Hoyt's model, high rent residential neighborhoods are instrumental in shaping the land use structure of the city. The zone of high rent housing for example tends to progress towards the high ground which is free from the risks of floods and spreads along the lakes and rivers and ocean fronts (Northam, 1975). The same zone tends to locate towards the sections of the city which is beyond the edges and away from 'dead ends and it also tends to agglomerate around land uses such as banks, office buildings and retail stores.

Hoyt also postulated that high value residential land uses tend to develop along the fastest existing transportation lines and continue in the same general direction for a long period

of time (Northam, 1975). The high rent neighborhoods in developing, with particular reference to transportation activities, tend to develop a sector or a wedge shape zone. **Comment-**This theory, however, does not effectively explain the process of peri-urban formation and as the concentric theory, it assumes that the urban and rural relationship is that of a continuum and not that of a dichotomy.

3.5.3.3 The Multi-Nuclei Model and Peri-urban Formations

The third model of Harris and Ullman (1945) accepted Hoyt (1939)'s assertion that the Central Business District (CBD) was not the only nucleus. The two scholars also developed the concept of multi nuclei model, which incorporates the elements from Burgess and Hoyt models, but the multinuclei model was more flexible than the other two. The multi nuclear theory postulates that the city has a cellular structure within which a number of specialized areas develop. The model recognizes that different levels of retailing do not all seek central sites because some land use activities prefer sub-urban locations closer to their market. The model also allows for the agglomeration economies and both negative and positive externalities which cause certain firms or households to cluster together. Certain activities require specialized facilities such as maximum accessibility, a waterfront or large amounts of land. Other land use activities group together because they profit from cohesion, such as financial and office building districts (Northam, 1975).

Certain incompatible activities such as industry and high rent residential districts are detrimental to each other and, therefore, they tend to separate their locations. This theory does not have succession as an integral part as does the two previous theories but it does allow for areal growth of each of the zones and of the entire urban area (Northam, 1975:191).

Comment-The multi nucleus theory of Ullman and Harris (1945) varies slightly from Hoyt's model and that of Burgess because the Ullman and Harris model introduces the concept of multi-nuclei in the city structure. It nevertheless concurs with the previous two models that the outlying districts of the cities tend to attract high-income residential

neighborhoods. However, suburban formation of cities in the USA attracted the rich in society. The Peri-urban areas of Nairobi are of mixed land-uses and mixed income groups. This model does not explain the variations that are observed in Nairobi's peri-urban process.

3.5.4 The Ocean Wave Analog and The Evolution of Peri-urban Areas

An analog, as observed by Boyce, is a form of inference in which it is reasoned that if two or more things agree with one another in one or more respects, they will probably agree in yet other respects (Boyce, 1971). Boyce (1971) uses the ocean wave analog to explain how peri-urban areas evolve at the urban-rural interface through activities, which like the ocean waves, originate from the inner city. Boyce seeks to explain that what occurs in the rural urban interface is brought about by turbulence in the inner city, the same way turbulence in the ocean also pushes waves and pebbles to the edge of the ocean.

Boyce identifies three ocean-like features of peri-urban formation at the rural-urban interface: a recession wave, a precession wave and tidal wave. In a recession wave situation, inner city residents begin to migrate to the peri-urban but the process of peri-urban formation at the rural-urban interface is often unnoticed during this stage. The migrating population is driven from the inner city by unfavorable factors such as congestion, blight in the inner city and crime. Boyce argues that the process of urban renewal is usually an attempt to reverse this kind of population recession from the inner city to the peri-urban. In a precession wave zone, there is considerable turbulence in land use within the RUI with land values rising dramatically while land ownership changes hands.

Finally, peri-urban formation can be seen in the context of the oceanic waves analog which takes the form of a tidal wave. It is argued that this is the only wave that is noticed by a casual observer in the form of urban sprawl (Boyce, 1971). Boyce concludes that population explosion in the inner city leads to additional space requirement, which result

in the excess population that cannot be housed in the city being forced out to the urban fringe (Boyce, 1971).

Discussion-However, the ocean wave analog does not adequately explain peri-urban formation in the rural-urban interface of Nairobi. This is because, as it was argued earlier, there is plenty of space within the city which is still underutilized. Peri-urban formation in Nairobi, therefore, was not as a result of inner city congestion as postulated in the ocean wave analog theory. Again, the ocean wave analog theory could be viable in a country, where space economy is not dualistic because the dichotomy in the Kenyan case creates a barrier to outward city growth. This means that the theory which can sufficiently explain the real factors for peri-urban formation in the Nairobi case is yet to be found.

3.5.5 Urban Communication Overloads Theory and the Evolution of Peri-urban Areas

Deutsche (1971) conceptualizes a metropolis as a huge engine of communication or a telephone switchboard, which enlarges the range of individual social choice at a lower cost. Deutsche argues that people come to cities because in the cities they are able to find a wider range of individual choices within their individual social limitations. Every city resident, however, struggles to access the inner city in order to maximize his/her individual choice and this leads to peak overloads or recurrent overloads (Deutsche, 1971). In a situation of recurrent overloads, the arteries (roads, telephone) connecting the cities become congested and this tends to blight the areas within the city. Deutsche then refers to this kind of problem as the disease of the cities (Deutsche, 1971). The consequence is that people tend to withdraw to the suburb which offers partial surcease (Deutsche, 1971:223).

Comment-In the context of Deutsche's postulation, the formation of the peri-urban space in the rural-urban interface is brought about by inner city population running from congestion. Since the opportunities which individuals pursue in the city are created in the areas within the city, Deutsche does not, however, explain how those who retreat to the peri-urban are able to fulfill their individual choices and perhaps this is where the theory

is weak. Secondly, how does retreating to the peri-urban then resolve the communication overloads if the opportunities in the city are not relocated to peri-urban areas? However, the theory explains that those who retreat to the peri-urban tend to create peri-urban formation or sprawl.

3.5.6 Other Determinants of Peri-urban Formations.

What determines land use and how can such determinants explain the formation of the peri-urban space?

3.5.6.1 Economic Determinants of Land Use and Peri-urban Formations

All land is viewed as being in the market competing for the consumer's money and, therefore, decisions to buy or sell land are prompted by the opportunities for maximizing returns from a transaction in the market (Chapin, 1972:8). Since the developer is seeking the most favorable return in the market, the price such developer is willing to pay is the net worth of what the development would have based on the developer's anticipated profits (Chapin, 1972). Equally true is the fact that the developer's decision to proceed with the investment in the enterprise will depend upon the relationship of the hypothetical initial net worth of the proposed land development and the necessary or actual total capital cost of acquiring the land and erecting the building (Chapin et al, 1979). Thus, to the economist, land is pressed into use by the existence of a value as established by the alternatives of land development. The use of a particular parcel is finally determined in the operations of the market forces by the price paid and the decision as to what alternative will yield the highest return (Chapin, 1972; Chapin et al, 1979).

The value of land will also be influenced by its location because certain locations are preferred due to their proximity to schools, health centers, shopping centers or areas of communication. Users of land bid for sites in accordance with what will maximize their profits and minimize their costs. This then brings us yet to two other questions: what categories of developers go to the peri-urban and what profit maximizing activities are they engaged in? What creates variations in value for land (source of customers) at the RUI and is the value at the RUI higher than that of the inner city?

Comment-Seen from the context of land value and the need for developers to bid for higher value locations in order to maximize profits, one can note that the inner city has a higher value than the rural urban interface. These variations in land values then would ordinarily make the areas within the city better destinations for the developer. Secondly, if developers are assumed to come from the city, then the distance from the inner city to the RUI again makes the peri-urban a less likely investment destination unless the customers that patronize the areas of investment in the peri-urban do not originate from the inner city. From the foregoing observations, the economic factor as a determinant of peri-urban formation cannot singularly be used to explain the phenomenon of peri-urbanization at the rural urban interface in the cities of Kenya.

3.5.6.2 Social Determinants of Land Use and Peri-urban Formations.

Firey (1953, cited in Chapin, 1972) argues that land use activities are also determined by factors which can be categorized as social in nature. Firey observes that cases where the population from one area of the city invades another area can be seen as a social phenomenon. The invasion can also be seen in the context of one residential category of high value houses or associated with one income, racial or ethnic group penetrating an area occupied by another. The term is also used to describe shifts in land use as, for example, when business penetrates into residential areas or when apartment districts take over areas of single-family houses (Firey, cited in Chapin, 1972:27).

Since developers who occupy the peri-urban area are not homogeneous, therefore, they cannot be driven by social factors. The invasion and succession concept cannot work in the context of the Nairobi scenario because of the urban and the rural dichotomy. As argued in Chapter 1, those who were developing the peri-urban space could be considered as coming from various backgrounds, and most of them did not have a previous relationship with each other. This means also that movements to suburbia cannot be explained within the context of the social factors because the migrants do not know each other unless seen from the context of those who bought land in cooperatives.

3.7.5.3 Zoning as an Instrument Determining Land Use and Suburban Formations.

While guided by tenets of man's economic and social behavior in the community, the city planner must also view land use in the context of health, safety and general welfare considerations in what is termed as the public interest (Chapin, 1972:39). The task of the city planner is to develop land use schemes suitable to the needs and sensitive to the wants of the urbanite in both an economic and social sense. The core elements of the public interest have been identified as follows: -

Health and safety: Government regulations are intended to prevent or ameliorate conditions injurious or hazardous to the physical well-being of the people of the community (Chapin, 1972:42). Convenience is a derivative of the location arrangements of land use and the relationship that each functional use bears to each other. Thus, convenience can be judged in terms of home-to-work and home-to-recreation (accessibility). Convenience is measured in kilometers or blocks of walking distances or more normally and in the modern day sense in minutes of transportation time. Economy: considerations in land use planning can be associated with efficiency in land use pattern and their public cost implications. Cost considerations are in terms of municipal expenditures or cost to the urbanite in general. Amenity/ Aesthetics considerations in planning which are also an element of public interest refers to the pleasantness of the urban environment as a place in which to live, work and spent one's leisure time. It relates to the perceptual aspects of urban surroundings, their aesthetic appearances to the eye and the comfort and enjoyment offered to other senses

Synthesis-This section explains that certain land uses are consciously predetermined through land use planning. The analysis was to find out whether peri-urban formation can be explained within the context of planning intervention. However, land use planning was found to be ineffective in the peri-urban area and, therefore, the evolution of the peri-urban space cannot be seen as an effort that results from planning.

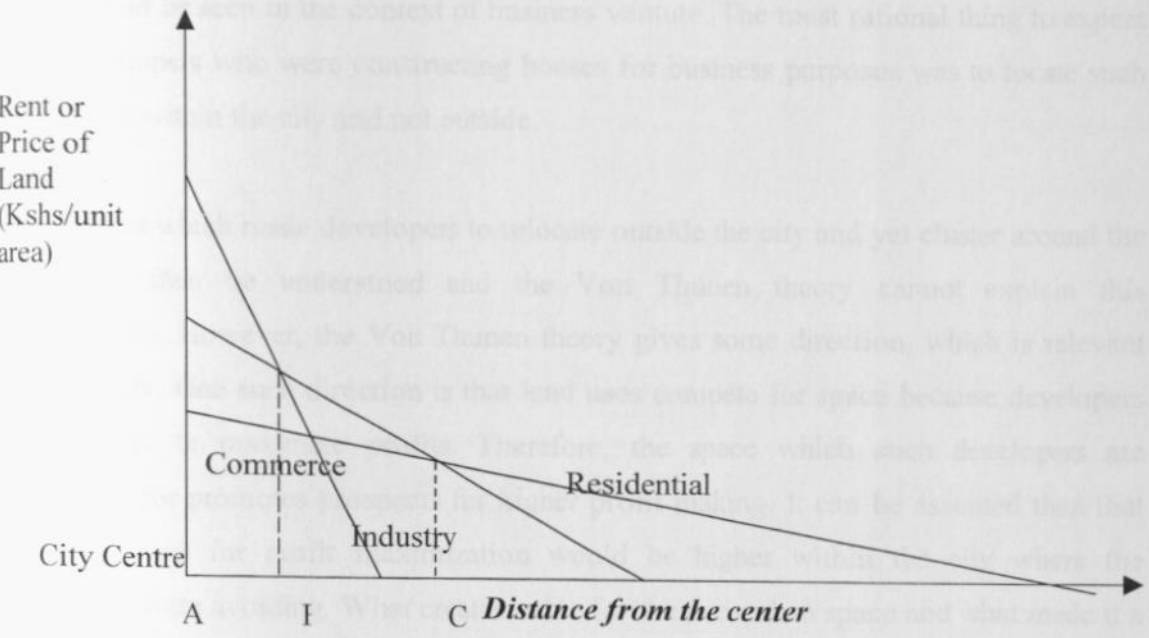
3.5.7 Bid Rent Theory and the Formation of the Peri-urban Space

The bid rent models are based on the assumption that land use activities have different needs to locate close to the center of the city and will, therefore, bid for land closer to the

city center accordingly. These models are attributed to the work published by Von-Thunen in 1826 although it is Hurd (1903) who is given credit for applying the theory to the urban areas (cited in Kivell, 1993:18). Others who further researched the bid rent models include Isard (1956), Beckman (1957), Wingo (1961), Alonso (1964), Muth (1969), Mills (1972) and Miyao (1981) (cited in Kivelli,1993) and their findings agree with Von Thunen.

Since land use activities need to locate near the city center, their ability to access central locations is a factor which will be determined by the nature of the activities themselves, their ability to take advantage of the highly priced central sites and their sensitivity to transport costs (Kivelli, 1993). Commercial activities for example have space requirements that can best be satisfied at the centre where transport facilities are available, labor, customer flow and proximate linkages (Kivell, 1993, pp 18). The commercial sector will, therefore, be prepared to pay for higher rents (prices) and thus will have a steep gradient. The need for industrial activities to locate in the center is less than that of commercial sector use and they are less sensitive to small variations in accessibility. Their rent curve gradient is less steep and they cannot compete successfully for the very central sites. Residential uses would prefer to be at the center but cannot be able to bid for the high prices (rent) in the CBD. Residential land use also requires a lot of land, which is scarce in the CBD. Residential user is, therefore, consigned to the locations, which are far from the center. This theory provides for the rationale for the arrangement of land uses and values as below.

Figure. 3.6; Urban Land Use and the Bid Rent Model.



Source: Kiveli (1993:19)

It is argued in the bid rent models that land use determines land value (Kivell, 1993:18). At point, A, commerce dominates and industry at a lower level and even residential land use survives in zone A but at a very subordinate level. For all activities, there will be a trade off between the high cost of central area land and the high costs of transport incurred by locating further out.

Synthesis: In this model, therefore, one can explain that in an urban setting, residential land uses will take the outmost zone because they cannot be able to compete for the high priced land in the city center. This can be understood in the case of land use arrangements within the areas of the inner city. However, this model does not explain why other land uses relocate to the areas outside the city in the context of the rural-urban dichotomized economy. Again, if residential land use were the only activity which were found to be relocating to suburbia because of the inability to afford central locations, this could be understood. However, other residential land uses, which could be categorized as being constructed for business purposes, are also found in the peri-urban and some of them

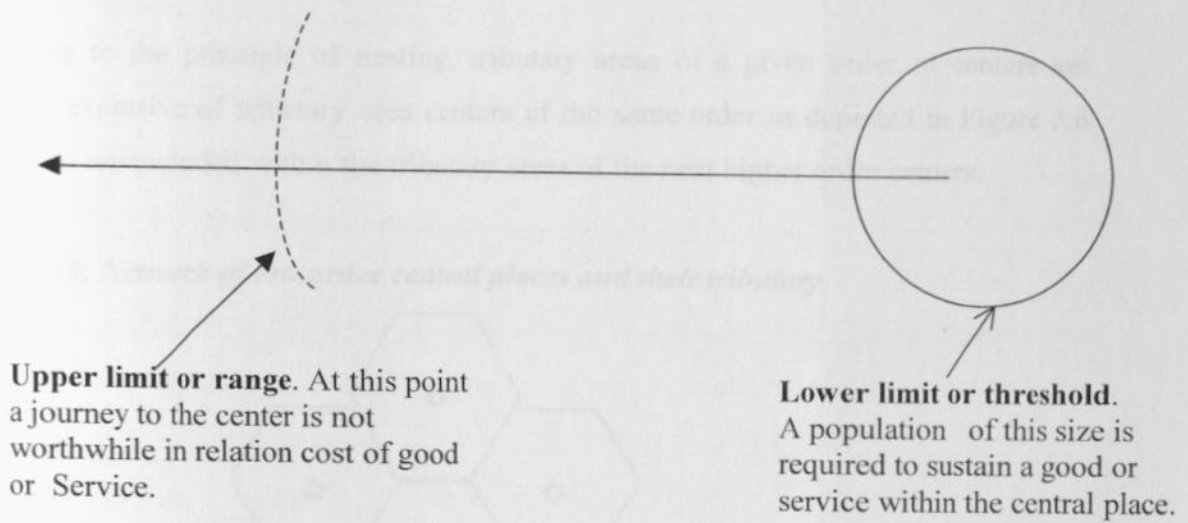
included houses for sale and houses for rent. Land speculation was also rife in suburbia which could be seen in the context of business venture. The most rational thing to expect from developers who were constructing houses for business purposes was to locate such investment within the city and not outside.

The factors which made developers to relocate outside the city and yet cluster around the city must then be understood and the Von Thunen theory cannot explain this phenomenon. However, the Von Thunen theory gives some direction, which is relevant to this study. One such direction is that land uses compete for space because developers would want to maximize profits. Therefore, the space which such developers are competing for promotes prospects for higher profit making. It can be assumed then that such prospects for profit maximization would be higher within the city where the developers were avoiding. What creates value for the peri-urban space and what made it a better central place than the inner city? The central place theory is briefly discussed below and how it relates to the formation of the peri-urban space.

3.5.8 Central Place Theory and Peri-urban Formations.

The central place theory is attributed to Christaller (1933) who sought to establish whether there could be laws that determine the number, distribution and sizes of towns. In constructing the theory, Christaller assumed that towns act as central places for the countryside and they come into being to carry out at a central accessible place tasks that the life of the countryside creates (Carter, 1981:60). In order for the central place to be viable, there is need for a certain minimum demand. This minimum demand is created by the number of people available to purchase the goods or services at a particular central place. The viability to create a central place can also be determined by the amount of income available with the people and Christaller refers to this concept as the threshold population. The range is the maximum distance over which people travel to purchase a good and acquire a service that is offered at a central place.

Figure 3.7; Delimiting the Threshold Population and the Range From a Central Place)



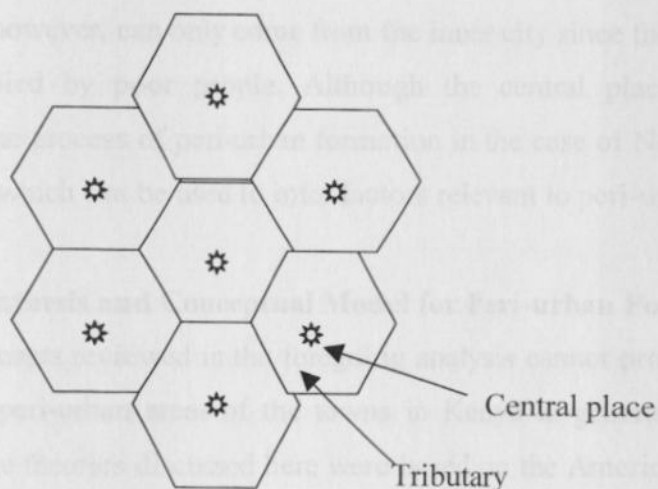
Source: Carter, 1981

Cities are, therefore, seen as trade and service centers to some extent. There is, therefore, an interaction between points of origin of goods and services in the urban centers and the resident population of the center itself and that of the surrounding tributary areas (Northam, 1975:12). When a particular town or central place starts as a new center, the number of goods and services offered are limited, thus the numbers of functions performed are also limited. At the lower level of an urban center evolution process, each of the functions offered in such a central place have a relatively low threshold and range. Centers evolve, therefore, according to hierarchy depending on the level of goods and services offered. High order or low order centers, therefore, indicate extremes in the performance of the central place functions. When one considers a region in which there is a functional order of central places identified simply as 'A', there likely would develop a functional order identified as 'B'. The 'A' center will have the minimum number of functions say six, while the 'B' level of centers will have all the functions of 'A' level centers as well as them being in the next highest order. Therefore, the 'C' level center would also develop which will have the functions of the 'A' level centers, those of the 'B' centers plus an additional group as well. It follows that each added function or group

of functions calls for an increased threshold and an extended range (Northam, 1975: p 124).

According to the principle of nesting, tributary areas of a given order of centers are mutually exclusive of tributary area centers of the same order as depicted in Figure 3.8 below, but are included within the tributary areas of the next higher order centers.

Figure 3.8; Network of low order central places and their tributary



Source: Carter, 1981

Synthesis: The central place theory brings to the fore some important factors, relevant to this inquiry. One such factor is the concept of threshold population which makes the evolution of a central place viable. The peri-urban areas of Nairobi had several satellite centers and there were people who resided there together with developers who could be seen as profit motivated. This shows that the peri-urban space could be seen as a central place or some sort of magnet which attracted residents and business. In other words, the satellite centers in peri-urban areas could be seen as dispensing goods and services to the resident populations and that of the tributary found in peri-urban areas. The existence of the peri-urban space and the satellite centers can be attributed to two possibilities. The peri-urban can emerge as a central place on its own only related to Nairobi in terms of spatial settlement hierarchy. In this case, people residing in peri-urban areas only go to Nairobi to buy higher order goods but they consume lower order goods produced at the

areas of the RUI. Alternatively, the peri-urban could be an appendage of the inner city in terms of goods consumed and in terms of the peri-urban residents supplying labor to the city.

However, there were no discernible areas of employment in the peri-urban to create the observed threshold that made peri-urban formations viable. Seen in the context of the central place theory, the evolution of the peri-urban space then seemed to depend on some borrowed threshold and the source of the threshold is yet to be established. The borrowed threshold, however, can only come from the inner city since the rural space was dispersed and occupied by poor people. Although the central place theory cannot sufficiently explain the process of peri-urban formation in the case of Nairobi, the theory gives some direction which can be used to infer factors relevant to peri-urban formation.

3.5.9 Theoretical Synthesis and Conceptual Model for Peri-urban Formations

The theories and concepts reviewed in the foregoing analysis cannot provide explanation of the formation of peri-urban areas of the towns in Kenya in general and Nairobi in particular. Most of the theories discussed here were based on the American experience of peri-urban formation. The American cities, however, extended boundaries along the model of city-rural continuum and not dichotomy as is the case in Kenyan cities model of peri-urban formation. Suburban formations in the case of USA are caused by the rich who relocated to peri-urban areas and this is not the case in Kenyan. However, the theories have provided certain conclusions which are useful for this study. One major conclusion is that developers are profit motivated and, therefore, the land spaces they bid for including those of the peri-urban can be assumed to be capable of providing the opportunity to make profit (Von Thunen, 1826; Chapin, 1972; Chapin and Kaiser, 1979). However, between the inner city and the peri-urban, better opportunities to make more profit exist in the inner city.

The study seeks to establish why developers avoided the inner city to invest in the peri-urban areas. In other words, if space value is what motivates developers, the relocation of developers to the RUI would then imply that the value at the RUI was higher than that of

the city. This then defeats the known logic and therefore there is need to explain this contradiction. However, most of the satellite centers had no sources of employment and it is not clear where those who resided in the peri-urban were earning their living, which gave them the expected purchasing power that made investment in the peri-urban viable. Even areas which had factories such as Athi River and Kitengela, could not be seen as having the expected threshold to spur growth in peri-urban because the incomes earned from those factories were low since the factories employed the low-income workers.

In the absence of clear theories to explain peri-urban formation in the Kenyan context, it was conceptualized in this study as follows. It has been established that development control outside the urban areas of Nairobi city was ineffective (Mwangi, 1994; Simiyu, 2002). Harvey and Clark (1971) argue that if public policy makes land use in the city more stringent, this shall impel developers to construct housing units outside the controlled area. Peri-urban formation in Kenya can be assessed in the context of the two-sector development paradigm. In the two sector development approach, the urban area is zoned and land use is controlled through planning while the rural area is either not planned or development control is ineffective (Mwangi, 1994, Simiyu, 2002).

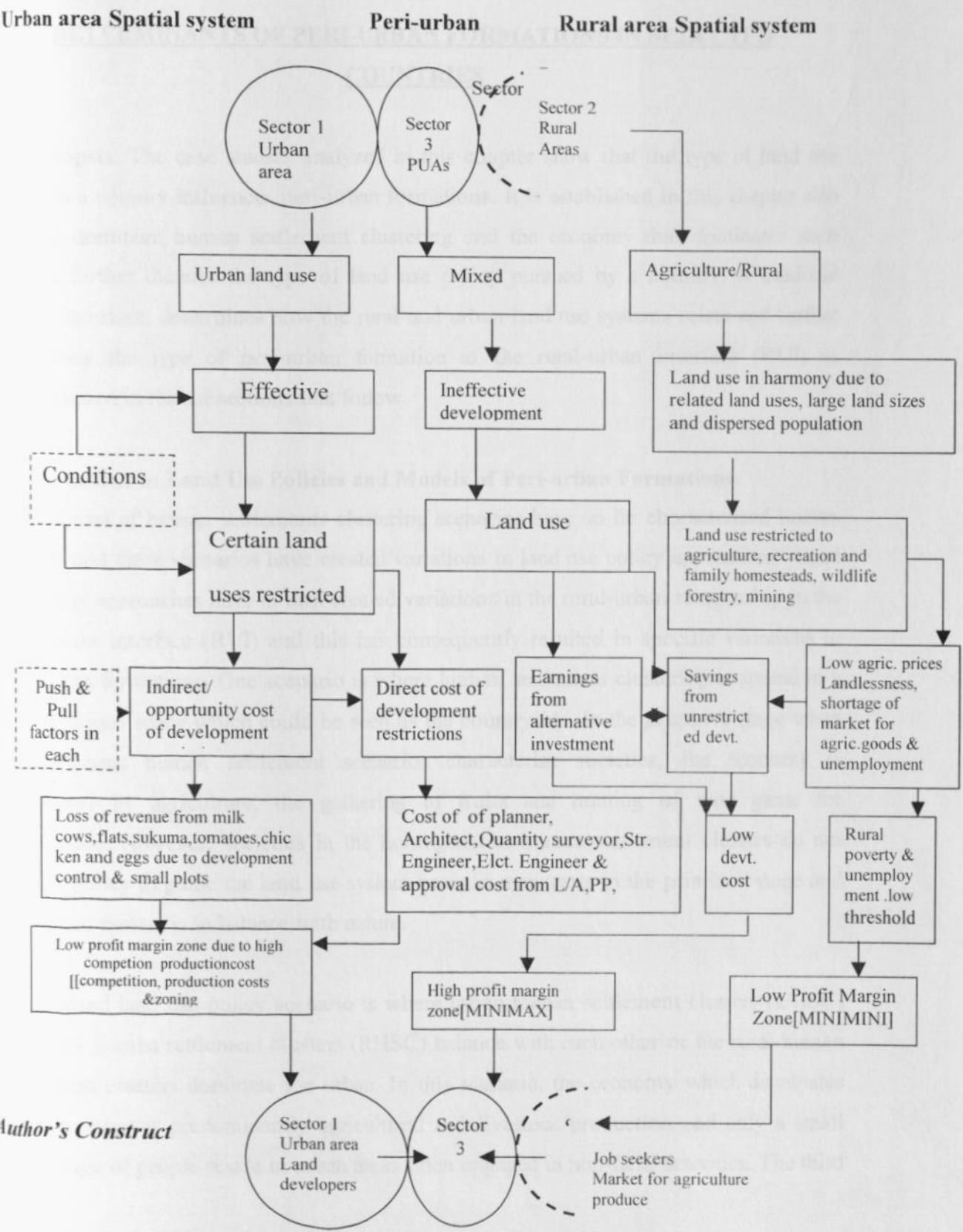
Based on the discrepancies in development control between the rural and urban, peri-urban formation can then be conceptualized as follows. Since the peri-urban areas do not offer sustainable employment opportunities compared with those of the inner city, the resilience seen at the rural urban interface can be assumed to emanate from the following conditions in the rural-urban interface. People who reside in the rural-urban interface areas could be part of the inner city if seen from the systems theory and within the context of the central place theory. If this assumption is found to be valid, then the capacity of the rural urban interface and that of the inner city to generate income would be the same or there would be no significant variations. This means that those who reside in peri-urban areas could be part of the city threshold contributing labor and consuming goods that are produced in the city. Residents of the peri-urban area can be seen as those residing in the areas of the city such as Buruburu or Umoja.

In such circumstances, developers who intend to invest would be indifferent between the two locations of urban and rural on the basis of similar threshold levels (ability to generate sales or income). If there were no significant variations in total revenue (TR) between the inner city and the rural-urban interface (RUI), then zoning and development control in the city would bring variations in total cost. This would then make developers to opt for areas at the RUI where development cost is low and yet threshold levels between the city and inner city would be the same. The profit motivated investor who seeks peri-urban locations will not go further than the locations closer to the inner city (the rural-urban interface), because the population living further away from the RUI is dispersed or relatively poor that they cannot support the dispensing of the goods and services produced by the investor. The peri-urban area, therefore, would tend to be an area of optimum or equilibrium location and the ideal destination for the speculative developer. This postulation tends to be in agreement with others who argue as follows.

Investors leapfrog in seeking locations where they can achieve a 'minimax zone. A minimax strategy refers to areas or locations where investment costs are low but with high revenues (Greenhurt, 1956, Alonso 1971). Because the peri-urban area is not regulated, it therefore happens to be a zone where the minimax strategy can be achieved. Developers from the city would relocate to the RUI to invest. The activities, which occur in this zone, will not, however, be of the former rural character although occurring in the rural zone. The former rural land use activities will therefore be juxtaposed with those of the urban character and this zone would evolve into a mixed land use character which can be viewed as urban or rural.

The evolving mixed land use sector would then be seen as a third sector because of the existing duality between the rural and urban as discussed in Chapter 1. There would emerge three sectors; the first sector would be the central place itself (inner city), seen as sector 1, and the third zone would be that of maximum 'minimax strategy', the zone of optimum location, the zone of equilibrium distance, which is the peri-urban area, seen as sector 3. Finally, the former rural area or satellite in the two-sector development model would be seen as sector 2.

Figure 3.9; Conceptual model 3; movement of developers to RUI and formation of sector 3 (The periurban).



CHAPTER 4

DETERMINANTS OF PERI-URBAN FORMATIONS IN SELECTED COUNTRIES

4.1 Synopsis: The case studies analyzed in this chapter show that the type of land use policy in a country influences peri-urban formations. It is established in this chapter also that the dominant human settlement clustering and the economy that dominates such clusters further dictates the type of land use policy pursued by a country. A land-use policy, therefore, determines how the rural and urban land use systems relate and further determines the type of peri-urban formation at the rural-urban interface (RUI) as demonstrated in the subsections that follow.

4.2 Variations in Land Use Policies and Models of Peri-urban Formations.

Three forms of human settlements clustering scenarios have so far characterized human habitats and these scenarios have created variations in land use policy approaches. Land use policy approaches have in turn created variations in the rural-urban relationship in the rural-urban interface (RUI) and this has consequently resulted in specific variations in peri-urban formations. One scenario is where human settlement clustering is spread in a homogeneous space which could be seen as the countryside. In the primitive stage when homogeneous human settlement scenarios characterize societies, the economy is dominated by agriculture, the gathering of fruits and hunting of wild game for subsistence. However, societies in the homogeneous human settlement clusters do not expend policy to guide the land use system because man starts in the primitive stage and the spatial system is in balance with nature.

The second land use policy scenario is where urban human settlement clusters (UHSC) and rural human settlement clusters (RHSC) balance with each other or the rural human settlement clusters dominate the urban. In this scenario, the economy which dominates such societies is predominantly agricultural and livestock production and only a small percentage of people reside in urban areas often engaged in non-farm activities. The third

scenario is where urban human settlement clusters dominate those of rural and the economy is dominated by urban or non-farm activities.

However, it can be argued that the second and third human settlement cluster scenarios have had more influence on land use policies. Therefore, the second and third human settlement cluster scenarios have had more impact on the RUI than the first scenario which was characterized by homogeneous and purely rural human settlement clusters. Although policies pursued in the two human settlement clustering scenarios were intended to address either the rural space or the urban space or sometimes the policies were trying to strike a balance between the urban and the rural, the end result has been that such policies have ended up either inadvertently or purposefully determining the way peri-urban areas have evolved at the RUI. The two human settlement clusters can therefore be seen as having dictated the land use policy models which have in turn resulted in different models of peri-urban formations as discussed below.

4.2.1 Rural Dominant Human Settlement Clusters, City-Rural Dichotomy Policy

Model and Appended Urban Sprawl Model of Peri-urban Formation.

In countries where the majority of the people live in rural areas or where those who live in rural areas and urban areas almost balance with each other, the tendency is to embrace both urban and rural development approaches. However, because such countries have rural dominated human settlement clusters (RDHSC) in place as opposed to urban dominated human settlements clusters (UDHSC), the policy bias is usually to protect the rural areas where the majority of the people reside and to promote the rural agriculture economy.

Because of the need to promote agriculture, countries, which have RDHSC tend to have a rural development bias and, therefore, policies are enacted which create a dichotomy between the urban and rural space economies. Such dichotomy may not be overtly meant to block the urban from the rural, but it is a dual land use policy approach which promotes different objectives within the rural and urban land use systems. As a result of the existing dichotomy between rural and urban, peri-urban formation of the RUI takes

place by "jumping" the fence between the rural and the urban. However, land use activities which evolve in the RUI in economies which have such a dichotomy are often caused or triggered by factors originating from the inner city (Thomlinson, 1969; Carter, 1981).

The land use characteristics which dominate peri-urban formation in dualistic economies often appear more of urban character than rural. Since land-use activities at the RUI within the rural-urban dichotomy policy model are of mixed nature or more urban, the model of peri-urban formation could, therefore, be seen as an appended urban (Apurban) meaning that the emerging peri-urban formation is actually urban in character. Yet, the mixed land use which appears more of urban character than rural would be located in the rural space as a result of the dichotomy and this is the reason why this study refers to the model of peri-urban formation in the CIRUDIPOM as an urban area which is suspended or appended (Apurban) in the rural space. However, although the city and the rural interface remain dichotomized, the area between the Apurban and the rural space remains porous. This creates a model of peri-urban formation which keeps eating into the purely rural spaces and therefore causing sprawl. Since the sprawl is caused by the undeterred Apurban, then the type of sprawl here can be seen as Apurban sprawl.

The city-rural dichotomy policy model (CIRUDIPOM) which brings about Apurban model of peri-urban formations can be classified into two sub-models. These sub-models are the planned city rural dichotomy policy model (PLACIRUDIPOM) and the sporadic city-rural dichotomy policy model (SPOCIRUDIPOM). The two policy sub-models have also led to the evolution of two sub-models of peri-urban formation referred here as planned-Apurban (PLAPURBAN) model of peri-urban formation and sporadic Apurban model of peri-urban formation (SPOAPURBAN). The two models of peri-urban formations and the policy models that bring then about are discussed below.

4.2.1.1 Rural Dominant Human Settlement Clusters, Sporadic Rural-Urban Dichotomy Policy Model and Sporadic Model of Peri-urban Formation; The Case of Dar esaalam.

In this section, peri-urban formation in the city of Daresaalam is discussed. The aim is to establish which model of peri-urban formation describes peri-urban formation in Daresaalam. Studies have shown that in the Tanzanian capital city, Daresaalam, suburban formation occurs without being regulated by relevant authorities. Recent studies have also shown that housing construction in PUA of Daresaalam city is proceeding rapidly without official regulation (Fekade, 2002, p142, cited in Kombe, 2005).

Informal construction of houses in PUAs of Daresaalam city has been found to take place in three phases. The first stage of informal housing development is referred to as the Infancy or starting stage where prospective homeowners convert peripheral agricultural land to residential use (Kombe, 2005). The second stage is referred to as the booming stage. During this phase of housing construction, the land market heats up and begin to attract the high and middle-income households (Kombe, 2005).

The last stage of peri-urban formation in the city of Dar-es-salaam has been conceptualized as the land market saturation stage. During this phase, land for residential development gets depleted and developers begin to increase development through densification and by acquiring space from the open lands located further to the rural sphere. It is observed that between 50% and 80% of the urban population in Tanzania live in such informal settlements which are located in PUAs (Kombe, 2005). Over 70% of Dare-er-salaam's 2.4 million populations live in informal settlements which are largely in the RUI of the city (Kombe et al 2000, cited in Kombe, 2005).

4.2.1.2 Factors Contributing to Apurban Model of Peri-urban Formation in Dar-es-saalam City.

It has been observed that informal peri-urban formation at the RUI of the city of Dar-es-saalam is a result of escalating poverty (Kombe, 2005, p 2). In order to meet the demands of the low income groups, therefore, informal land and housing delivery are carried out in

PUA (Rostin et al, 2002, cited in Kombe, 2005). Kombe's study however raises two issues of concern in this study. It would appear that informal land delivery at the rural urban interface is resorted to because land in the city may not be affordable to the poor and the implication is that the informal land delivery at the RUI could be cheaper than that which is found within the city. Alternatively, land at the RUI could be available free of charge which is unlikely. However, what could make land at the RUI of the city of Dar-es-salaam cheaper than the one within the city? It is argued in this study that if the poor can be able to purchase informal land at the RUI as acknowledged by Kombe (2005), then the real factor for relocating to peri-urban may not be due to poverty, but as a result of cost differentials in land values between the inner city and the RUI. In this case, the cost of land could be higher in the city than that of RUI (Affordability).

Kombe (2005) acknowledges in his study (2005) that during the second phase of land conversions in PUAs, the prospective developers who are attracted to the RUI include the middle and high income groups. If the middle and high income groups of the population also resort to the peri-urban areas, poverty may not be a factor which motivates such developers to relocate to the peri-urban areas of the city of Dar-es-salaam. The real factor which motivates developers to settle in the peri-urban areas of the city of Dar-es-salaam can be attributed to cost differentials precipitated by the different land delivery models and different development control models in the dichotomized rural and urban land use systems in most African cities.

The study carried out by Kombe (2005) further establishes that those who occupy the PUAs of the city of Dar-es-salaam were found to practice poultry and market gardening and their produce is sold in the nearby city. The peri-urban dwellers also practise plantations of pineapples, cassava, bananas and other fruits that are on high demand in the nearby city (Kombe, 2005). It can be inferred that the migrants who settle in the PUAs of Dar-es-salaam city are not necessarily the poor but particularly those who seek market opportunities created by the proximity of the RUI to the city. The peri-urban formation in the city of Dar-es-salaam is a result of the city rural dichotomy policy that

has created variations in land administration systems which promote land speculation at the RUI.

The policy of city rural dichotomy in the case of Tanzania was not designed to create a barrier and therefore the rural urban divide can be considered to be a result of sporadic city-rural dichotomy policy model (SPOCIRUDIPOM). The model of peri-urban formation here was not anticipated either and therefore it can be viewed as being a sporadic appended urban (SPOAPURBAN) model of peri-urban formation.

4.2.1.3 Efforts to Resolve Apurban Model Land Use Problems in Dar-es-salaam

In order to resolve land use problems within the SPOAPURBAN zone of Dar-es-salaam, Kombe's study (2005) recommends that peri-urban settlements be integrated with the formal urban structure. Kombe argues that the integration of the informal peri-urban and the city can be carried out by providing such areas with basic community infrastructure and by regulating land subdivisions within the peri-urban areas. However, local governments' resource capacities for undertaking such tasks have been insufficient and conventional tools such as master plans and structure plans have been found to lack the potency to regulate land use at RUI (Habitat, 1996a, b; Fekade, 2000:128; Kreibich, 2000:121,cited in Kombe,2005).

It is further argued that those who are in positions of authority including bureaucrats and politicians see the informal settlements in the peri-urban areas of the city of Dar-es-saalam as a transient phenomenon due to economic hardships. They, therefore, argue that problems related to peri-urban land use will ease once the performance of the national economy improves (Kombe, 2005). However, studies have shown that informal settlements in peri-urban areas of the cities of Tanzania have been expanding and accelerating the spatial segregation between the formal and informal cities (Kombe, 2005).

The study concludes that the existing dichotomy between the 'informal and formal city' will persist because there is no policy to address the peri-urban development problems

(Kombe, 2005). The quantity of informal housing is also likely to grow since it is accommodating the poor who constitute the majority of the peri-urban population (Kombe, 2005).

Synthesis: Peri-urban formation in Dar-es-salaam can be seen in the context of sporadic Apurban formation model (SPOAPURBAN), which is brought about by SPOCIRUDIPOM. It is demonstrated in the following sections that cities in Britain passed through a similar trend of sporadic rural-urban dichotomy policy model (SPOCIRUDIPOM) and the process by which peri-urban formation tended to occur at the rural urban interface was also sporadic APurban peri-urban formation (SPOAPURBAN). However, the British government has since changed the model of peri-urban formation from that of SPOAPURBAN to that of PLAPURBAN. The change of peri-urban formation model in the UK was brought about as a result of change in land use policy from sporadic city rural dichotomy (SPOCIRUCIPOM) to that of planned city rural dichotomy model (PLACIRUDIPOM).

4.2.2.0 Rural Dominant Human Settlement Clusters, Sporadic City Rural

Dichotomy Policy Model and Sporadic Appended Urban Periurban formation in the UK

Cities in Britain were earlier dichotomized between the rural and the urban space. However, in 1915, Patrick Geddes noticed the trend of peri-urban formation (PUA) in the area of rural-urban interface (RUI) and used the term conurbation to refer to what he considered as a new type of urban form (Brenikov, 1965). The term conurbation was used by Geddes to describe a new phenomenon of urban formation which comprised of small satellite centers at the rural-urban interface which also coalesced with the inner city (Brenikov, 1965). In his findings, Geddes further observed that peri-urban satellite centers had close economic linkages with the inner city. This then can be seen as a period in the UK history when Apurban formation was precipitated by the sporadic city rural dichotomy policy model (SPOCIRUDIPOM). However, this policy approach was prompted by the presence of the RDHSC and the dominant rural agricultural economy.

However, the Apurban model of peri-urban formation in the UK had the following problems.

4.2.2.1 Problems of Sporadic Appended Urban model of Peri-urban Formation and UK's Policy Approaches

Since housing was the dominant land-use within the Apurban, development tended to create visual monotony and accompanying auxiliary services were not provided. Those who resided in the peri-urban traveled long distances to their places of work which were located in the city and there was a lot of wastage of agricultural land. How then did Britain address the problems at the rural urban interface? The Apurban areas were considered to be part of the city and therefore they were integrated with the inner city.

However, further Apurban formation was curtailed using the green belt concept; the concept of relocating people to new towns and by expanding other towns to absorb excess population. Because of the presence of the threshold at the RUI in the form of greenbelts, cities in Britain cannot expand along the lines of sprawl or metropolitanization as practised in the USA and Latin America. The excess population, which was to lead to sprawl relocated to new towns or to small towns, which had not attained optimal levels. Britain moved from the policy of sporadic city rural dichotomy to that of planned city rural dichotomy as discussed below. Consequently, this changed the model of peri-urban formation from that of SPOAPURBAN to that of planned Apurban formation (PLAPURBAN).

4.2.2.2 Urban Dominant Human Settlement Cluster, Planned City Rural Dichotomy Policy and Planned Appended Urban Model of Periurban Formation in UK

During the industrial revolution, most people in Britain relocated from rural areas to the urban areas to seek employment and this changed the human settlement clusters from those of RDHSC to that of UDHSC. This means that the policy of rural urban dichotomy had to change in order to allow urban areas to accommodate more people and the economy changed from that of rural agriculture to urban non-farm activities. The new land use policy removed the dichotomy between the rural and urban land use systems and

instead created a unified land use system (UNICOLAUSS). However, policy approaches still created a planned dichotomy between the city and the rural by use of greenbelts. Nevertheless, there was a tendency of city migrants to move out of the city to settle in areas beyond the greenbelts. Those who settled in the peri-urban areas are from the city and therefore the model of peri-urban formation could still be considered as Appended urban (Aurban) which, however, was being formed beyond the area of the greenbelt instead of the city fringes as it was the case during the SPOCIRUDIPOM that formed SPOAPURBAN.

To reinforce the greenbelt policy of curtailing the SPOAPURBAN model of peri-urban formation at the RUI, all land tenure systems both in the urban area and in the rural areas were harmonized through leaseholds (Hobbs et al, 1981). The development of both urban and the rural areas was carried out through statutory plans. Further, all the institutions of planning were brought under the ministry of Urban and Country Planning. All planning related matters were coordinated by one single authority (SDCA); the secretary of state in charge of the environment.

In chapter 3, the concept of composite land use system (COLAUSS) was discussed and in chapter 6, the study considers the land use system in Kenya as having two composite land use systems. The two composite land use systems are the urban composite land use system (URBACOLAUSS) and the rural composite land use system (RUCOLAUSS). Seen in the context of the Kenyan COLAUSS which is considered as dual (UCOLAUSS and RUCOLAUSS), it can be argued that UK removed the second COLAUSS and created a unified COLAUSS where the rural and urban were integrated into a unified single composite land use system (UNICOLAUSS).

Three sets of spatial frameworks were introduced in Britain, which were designed to strengthen the UNICOLAUSS; the national planning framework (NPF), the regional planning framework (RPF) and the local planning framework (LPF) (Hobbs et al, 1981). The NPF was coordinated by the Secretary of State in charge of the Environment; the RPF was coordinated by the county councils while the LPF were coordinated by the local

councils at city level or borough level. However, land use planning within the three institutions was administered by the ministry of Town and Country Planning (TCP).

The planned city-rural dichotomy policy model (PLACIRUDIPOM) was able to reduce land speculation outside the greenbelts and the policy further rationalized land administration between the city and rural. Some of the disparities which had earlier created the dichotomy between the urban and the rural were different land rights adjudication and registration models (LARARM) and different development control models. All developers including those at the RUI beyond the greenbelt were required to seek development permission and, therefore, development outside the greenbelt that was considered undesirable or illegal was refused development permission.

However, if development happens to take place within the locations beyond the greenbelt, and such development is brought about by activities from the city, the density of such development may make the area more of urban character than rural. This then would mean that the Apurban model may continue to be in place beyond the greenbelt. Nevertheless, because developers obtain development permission, and development is redetermined, the type of Apurban model of peri-urban formation in the planned city rural dichotomy policy model (PLACIRUDIPOM) would be the planned type that cannot be found in the sporadic Apurban model of peri-urban formation, which had formed earlier.

The model in PLACIRUDIPOM is, therefore, referred to here as Planned Apurban model of peri-urban formation (PLAPURBAN). The following discussion also shows that the USA followed a similar policy trend which created a similar trend of peri-urban formation at the RUI through the sporadic city rural dichotomy policy model (SPOCIRUDIPOM) and periurban formation was also characterized by the SPOAPURBAN.

4.2.3 Rural Dominant Human Settlement Cluster, Sporadic City Rural Dichotomy Policy Model and Sporadic Appended Urban Model of Peri-urban Formations in the USA

In 1910, the Bureau of Census of the USA recognized that there existed a considerable urban population which resided outside the urban boundaries but which was not recognized as part of the urban population (Goheen, 1971). Peri-urban formations in the USA during this time could be seen in the context of sporadic city-rural dichotomy policy model (SPOCIRUDIPOM). This is because the duality between the urban and rural was not purposefully meant to create a buffer between the two land use systems. It was observed then that "the boundaries of large cities often limit the urban population which the city represents or of which it is the center" (Goheen, 1971:47). The model of peri-urban formation in the USA during this period can also be seen in the context of sporadic Appurban formation (SPOAPURBAN) because it came as a third sector within the context of the two sector (urban and rural) development approach. However, there was a land use policy shift in the USA which changed the urban and rural relationships and consequently changed the models of peri-urban formations at the RUI.

Following the recognition that there existed an area outside the city with urban characteristics, the USA introduced the metropolitan districts, which were outside the cities to its urban system classification (integration logic). Further, the USA introduced the policy of liberalized transitional boundary between the rural and the urban areas (continuum). In the USA rural-urban continuum relationship approach, there is no barrier to stop urban expansion towards the rural space. This then can be seen as an attempt to remove the sporadic city-rural dichotomy policy model (SPOCIRUDIPOM) which creates SPOAPURBAN in order to facilitate a unified composite land use system (UNICOLAUSS). The UNICOLAUSS was achieved through the city-rural continuum policy model (CIRUCOPOM). Because of the policy changes in the relationship between city and rural which created a continuum, millions of people had moved to the suburbs by 1986 and residential houses and shopping centers had replaced the empty wastelands outside the city limits (Baldassare, 1986, pp 46).

During the initial stages of peri-urban formation in the USA, most of the people who relocated from the city to the peri-urban areas were mainly whites who were family oriented and they tended to build low density houses. Later, the movements of commerce, manufacturing and branch offices were attracted by the housing development in suburbia. It is argued that in most of the metropolitan areas, nearly half of all newly hired employees go to work in office buildings located in the suburbia (Baldassare, 1986). The decision to incorporate the peri-urban population in the inner city population was justified as follows:

--- the population of the corporate city frequently gives a very inadequate idea of the population massed in and around the city, constituting the greater city...and the boundaries of large cities in few cases--- limit the urban population which the city represents or of which it is the centre---. If we have to have a correct picture of the massing or concentration of population in extensive urban areas...it is necessary to establish metropolitan districts which will show the magnitude of each of the principal population centers (USA Bureau of the Census, 1932 cited in Goheen (1971, p 47).

When the USA government decided to integrate the peri-urban within the inner cities, the aim was to widen the scope of the urban population census so that the census could capture places of industrial concentration (labor demand) and of population concentration (labor supply) (Goheen,1971). The relationship of place of residence to place of work, involving outlying counties and the county of the central city was used as a criterion to determine areas of the periurban to be included in the inner city as argued below.

“An attempt is made here to set out ecologically the labor market areas of central cities, by defining around them a set of small towns and villages and firms which comprise the area of active commuting to the central city. By recognizing this fact, one can classify workers by place of residence and place of work in a way allowing for the minimization of inter-area commuting” (Goheen, 1971,p 55).

The idea of using the criteria of labor (Residence) and place of work relationship to define the areas outside the city, which could be integrated to the city, is referred by Bogue (1971) as the concept of metropolitan dominance.

4.2.3.1 Characteristics of USA sporadic Apurban periurban Formation

Studies carried out by Smith (1937), Dickson, (1967), cited in Goheen, 1971 and, Pryor (1971) on suburban characteristics in USA concluded that decentralized suburban

residents were economically integrated to the central city. From the studies of childhood residence location, they concluded that higher proportions of residents of the fringe had an urban background (Pryor, 1971, p 64) and distance from the central city tends to be a friction factor in fringe location. The location and distance from a network of services, accessibility of an individual to work places, schools and retail centers tend to be sources of dissatisfaction to the urban fringe residents.

The urban fringe is characterized by an incomplete network of utility services such as reticulated water, electricity, gas, sewerage mains, fire hydrants and sealed roads (Pryor, 1971, p 66). The transport nodes are inadequate and this tends to influence the fringe residents to locate houses along transport routes. Because of the need to commute, the fringe people had a higher car ownership than their counterparts in both urban and rural areas. To what extent do characteristics of peri-urban in the USA model apply to the Nairobi model of peri-urban formation? We return to this question in Chapter 8 of this study.

The majorities of the urban fringe residents patronize urban retail centers and shun similar centers in the urban fringe or surrounding rural areas. It is possible in the fringe area to find mixed land uses comprising industries, commercial and residential. Most fringe residents own and live in their houses compared with the urban areas where houses are either rented or leased or being purchased. The USA has since progressed in its land use policy which has consequently determined the rural urban interface and models of peri-urban formation as follows.

4.2.3.2 Planned City Rural Continuum Policy Model and Planned Urban Sprawl

Model of Peri-urban Formation

When the USA created a land use policy based on the rural urban continuum, the type of peri-urban formation changed from that of Apurban sprawl to that characterized by urban sprawl. However, the areas where sprawl is taking place are preplanned and serviced. When urban authorities are expanding or extending their urban boundaries, which then create peri-urban formation, this extension often takes the form of 'invasion and

succession'. The CIRUCOPOM model is adopted by countries which have more people in the urban clusters than rural. Because of the UDHSC in such countries, land use policies tend to anticipate the expansion of urban areas towards the rural space and the dichotomy between urban and rural areas is removed. Over time, the planned urban sprawl model of peri-urban formation in the USA has tended to mature and the model of peri-urban formation has changed from planned urban sprawl (PLAURBASP) to that of edge city and edgeless cities urban sprawl (EDURBASP) as discussed below.

4.2.3.3 City-Rural Continuum Policy Model, Edge Cities and Edgeless Cities Sprawl

Model of Peri-urban Formation in USA

Over time, peri-urban areas in the USA stopped being appendages which depended purely on the inner city for survival. People who reside in the suburban areas are therefore independent of the inner city since they are employed in offices and factories located within the peri-urban satellite areas. Although edge cities are managed separately, they were, however, initially part of the inner cities because residents of the peri-urban went to the inner city in search of employment and services. This can be seen as the third level of peri-urban formation model in the USA case.

However, whereas the Edge city is considered as trapped (Le Furgy et al, 2003), the Edgeless cities are however characterized by urban sprawl which in this case can be categorized as Edgeless city urban sprawl (EDURBASP). There are cases in other countries where the city and the rural relate along the continuum model (CIRUCOPOM) but urban sprawl occurs differently from that of the USA model because of certain modifications of the CIRUDIPOM model as discussed below.

4.2.4 Sporadic City Rural Continuum Policy Model and Sporadic Urban Sprawl

Model of Peri-urban formation: The Case of Latin American Cities.

The sporadic urban sprawl (SPOURBASP) model of peri-urban formation is evident in countries that have adopted the CIRUCOPOM model of rural-urban policy relationship but peri-urban formation is not regulated. Land use development within the peri-urban areas therefore takes place informally and the resultant land patterns are in-optimal. In

this development model, one can find the cities of Latin America. The city-rural continuum policy model in such countries can be considered as being sporadic city-rural continuum policy models (SPOCIRUCOPOM) because the city and rural relationship is liberalized and the area of peri-urban formation is not regulated. Peri-urban formation in SPOCIRUCOPOM can be seen as that of sporadic urban sprawl (SPOURBASP) because peri-urban formation is unregulated and it occurs through invasion and succession. There exists other models of urban sprawl formation in other countries also which are discussed below.

4.2.5 Urban Boundary Growth Policy Model and Checked Urban Sprawl Model of Peri-urban Formation; The Case of the City of Riyadh.

In order to manage urban sprawl, authorities in Riyadh, Saudi Arabia use Lines which are fixed on the map of the town to indicate urban land use development limits. The development limits indicate areas in which development can be permitted and those areas where development is not permitted (Mubarak, 2004). In so doing, development in peri-urban areas is allowed to take place in areas where authorities are satisfied that there is need for development which is not driven by speculation.

This policy approach tends to create urban sprawl at the rural-urban interface but the strategy tends to control the pace of urban sprawl. The Urban Growth Boundary Policy (UGBP) also ensures that land use patterns are predetermined or planned. The cities of Saudi Arabia, including the capital city of Riyadh, can be seen in the context of the checked urban sprawl model (CHEURBASP) of peri-urban formation which is brought about by a deliberate urban growth boundary policy (UGBP).

4.2.6 Sporadic City-Rural Dichotomy Policy Model and Sporadic Apurban Model of Peri-urban Formation in Southeast Asia.

The government of Indonesia started noticing land use conflicts at the rural-urban interface and in order to establish the magnitude of the problems, studies were initiated on the Jabotabek area. Jabotabek is an acronym formed by the first syllabus of the city of Jarkata and each one of the three surrounding districts of Bogor, Tangerang and Bekasi

(Adell, 1999). The studies, which were carried out around the city of Jakarta, showed that there were several incidents of water pollution brought about by activities both from the urban and rural agricultural land uses (Adell, 1999).

The studies further established that there was unnecessary loss and degradation of prime agricultural land through urban expansion. There was also extensive loss of natural habitation owing to the activities from the inner city (Adell, 1999). Land use policies in these countries, having been created by CIRUDIPOM, peri-urban formation could also be seen as that of SPOAPURBAN. Problems associated with Apurban peri-urban formation prompted the government of Indonesia to take measures, some of which could be seen in the context of the USA and UK land use approaches as seen below.

4.2.6.1 City Rural Continuum Policy Model and Induced Urban Sprawl: The Case of Indonesia

Based on the diagnosis of the problems in periurban areas of the city of Jarkata, the development planning strategy has been to drive urban and industrial development out of the central district (Jakarta) towards selected growth poles and corridors. The land uses in peri-urban areas are mainly industries and residential development (Firman, 1997, cited in Adell, 1999). The formation of the extended metropolitan regions (EMR) has also been encouraged by a series of financial deregulation policies from the 1980's, aiming to stimulate economic growth in the EMRS.

The strategy of EMRS has resulted in blurred rural areas as industry and investment in housing have virtually penetrated the rural areas (Riggs, 1997, cited in Adell, 1999). Peri-urban areas are referred to as DESAKOTA in Indonesia and the term DESAKOTA is coined from the Indonesia words, Desa (village) and Kotaz (town)-to describe the intense mixture of agricultural and non-agricultural activities that characterize the extended metropolitan regions of the cities (Firman, 1997, cited in Adell 1999).

From 1983, all the central cities of the DESAKOTA region have been empowered to integrate counties and surrounding suburban districts (Adell, 1999 p 22). The new system

of integrating suburban cities with the core areas of the major cities has facilitated the combination of urban and rural planning. The EMR strategy also made it possible to put in place rational development approach of resources and a general readjustment of the region's industrial structure (Wang, 1997, cited in Adell). Authorities in Indonesia have managed to do this by eliminating either overlapping or shadow cores created by the traditional division between rural and urban planning (Adell, 1999).

Comment-As a result of the rural-urban dichotomy, Indonesia realized that there was a tendency for urban-based development activities taking place in the peri-urban creating land use conflicts. The model of peri-urban formation, which characterized Indonesia during this time, can be seen as sporadic Apurban. It can also be realized that peri-urban formation took place sporadically and inadvertently as a result of the sporadic city rural dichotomy policy approach. However, Indonesia and other countries of South East Asia have integrated all the areas surrounding the urban districts with the urban systems by using the concept of extended metropolitan regions (EMRs).

South East Asia has also managed to decentralize some of the activities of the inner city to the surrounding satellite centers and small towns in the peripheral areas. This then can be seen as a way of using the Apurban model of peri-urban formation as an opportunity to decongest the areas of the inner city. However, by relocating some of the land use activities to the peri-urban, Indonesia has created a unique type of urban sprawl which can be categorized as induced urban sprawl (INDURBASP).

4.3 Lessons learnt from best policy options and best models of peri-urban formations

In this section, the lessons learnt from the analysis carried above are discussed

4.3.1 Era of Sporadic City Rural Dichotomy Policy Model, Dual Composite Land use System and Sporadic Appended Urban Sprawl Model of Periurban Formation

All societies have generally passed through the sporadic city-rural dichotomy policies model (SPOCIRUDIPOM) with sporadic 'apurban' type of periurban formation

(SPOAPURBAN) (Britain, 1915; USA, 1910). Indonesia in South East Asia has also experienced a similar trend of periurban formation. SPOCIRUDICOM and SPOAPURBAN are dictated by RDHSC and therefore the policy approaches are aimed at addressing the urban and the rural separately.

The SPOAPURBAN model of peri-urban formation explains the urban development pattern of the city of Dar-es-salaam, and Nairobi today. In the earlier stages of peri-urban formation, which occurs through the sporadic city-rural dichotomy model, the logic of integrating the already sterilized and conflict prone SPOAPURBAN model of peri-urban formation appears to be the best option. This approach was pursued in the UK, USA and of late in South East Asia. The integration between the apurban and the urban areas is carried out through policies of redressing the dichotomy between the urban and rural areas to create unified land use systems (UNICOLAUSS). The creation of UNICOLAUSS is carried out by using the CIRUCOPOM approach which was used by the USA. The countries of South East Asia have also taken the CIRUCOPOM approach through the strategy of extended metropolitan regions model (EMRS). However, the UNICOLAUSS approach through the CIRUCOPOM tends to create urban sprawl.

4.3.2 Era of Unified Composite Land Use System and Variations in Periurban Formations at Rural Urban Interface

UK adopted the unified land use system (UNICOLAUSS) after the era of SPOCIRUDIPOM by integrating the rural and urban land use systems. However, the urban land use activities were given more emphasis. To avoid urban sprawl in the UK, the greenbelt concept was used to curtail further peri-urban formation and all land uses both within the city and the areas beyond the greenbelt were subjected to regulative planning. The USA removed the SPOCIRUDIPOM and replaced it with PLACIRUCOPOM which then created UNICOLAUSS through. However, the areas of peri-urban formation were left porous and therefore this has created urban sprawl. Latin America, the city of Riyadh case and Indonesia in South East Asia have all removed the dichotomy and replaced it with UNICOLAUSS through the policy of CIRUCOPOM.

However, the area of rural urban interface is managed differently and models of peri-urban formation have also varied.

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Comment-It can be argued that policy is an important component of the composite land use system and that the model of peri-urban formation is a derivative of official government policy. These findings support the study hypothesis and the postulation made in chapter 3 of this study. The study has further established that policy approaches are also dictated by the existing dominant human settlement clusters and the economy which dominates such clusters. This observation explains why spatial development policy approaches in Kenya emphasize rural development. However, the trend now is that more people have been moving to urban areas and this would change the human settlement clustering scenarios from that of RDHSC to those of UDHSC. It can be concluded that peri-urban land use patterns can be predetermined by a deliberate policy approach which manipulates the composite land use system. The question to be answered then is to what extent has policy approaches in Kenya been able to respond to variations in human settlement clustering and to what extent can the current policy predetermine desirable models of peri-urban formation? This analysis is carried out in chapter 6 of this study.

Chapter 3 and summarized here below for ease of reference.

3.1 Conflicts and In-Optimal Land Patterns in Peri-urban Nairobi

The study established that conflicts in space use and in-optimal land patterns in peri-urban Nairobi arise from the two land use systems which are mutually exclusive and whose control models are urban or rural specific. It is posited that the urban or rural specific development control models are inappropriate or ineffective in peri-urban land use in the mixed land use context. It is also argued that the lack of policy control in peri-urban land use is one of the reasons for the conflicts and in-optimality in land use. This also became the first hypothesis that this study aimed to validate.

3.2 The Evolution of Peri-urban Areas in Suburban Nairobi

The main contribution was to explain the evolution of peri-urban areas in Nairobi. In this regard, it was posited that in a scenario of rural urban dichotomy, peri-urban formation can be brought about through land use controls.

CHAPTER 5

RESEARCH STRATEGY AND METHODOLOGY

5. The Research Methodology Process

In this chapter, the methodologies and research strategies, which were used in this study to validate the two hypotheses evolved in chapter 1 are explained.

5.1 Research Issues of the Study Revisited.

The major objective of undertaking the study was twofold. Firstly, to find out why the current development control provisions are ineffective in peri-urban areas of Nairobi and secondly, to establish the forces which lead to the formation of the peri-urban space even when land in the city was either vacant or underutilized.

5.1.1 Summary of the Conceptual Process

In order to explain the two issues of research in this study, a conceptual framework was developed in Chapter 3 and summarized here below for ease of reference.

5.1.2 Land Use Conflicts and In-Optimal Land Patterns in Peri-urban Nairobi

It was hypothesized that conflicts in space use and in-optimal land patterns in peri-urban Nairobi derive from the two land use systems which are mutually exclusive and whose development control models are urban or rural specific. It is posited that the urban or rural areas-specific development control models are inappropriate or ineffective in controlling land use in the mixed land use sector. It is also argued that the lack of policy in the mixed land use zone of peri-urban explains the conflicts and in-optimality in land use patterns. This then became the first hypothesis that this study aimed to validate.

5.1.3 The Evolution of Peri-urban Areas in Suburban Nairobi.

The second conceptualization was to explain the evolution of peri-urban areas in suburban Nairobi. It was postulated that in a scenario of rural urban dichotomy relationship, peri-urban formation can be brought about if zoning and land use controls

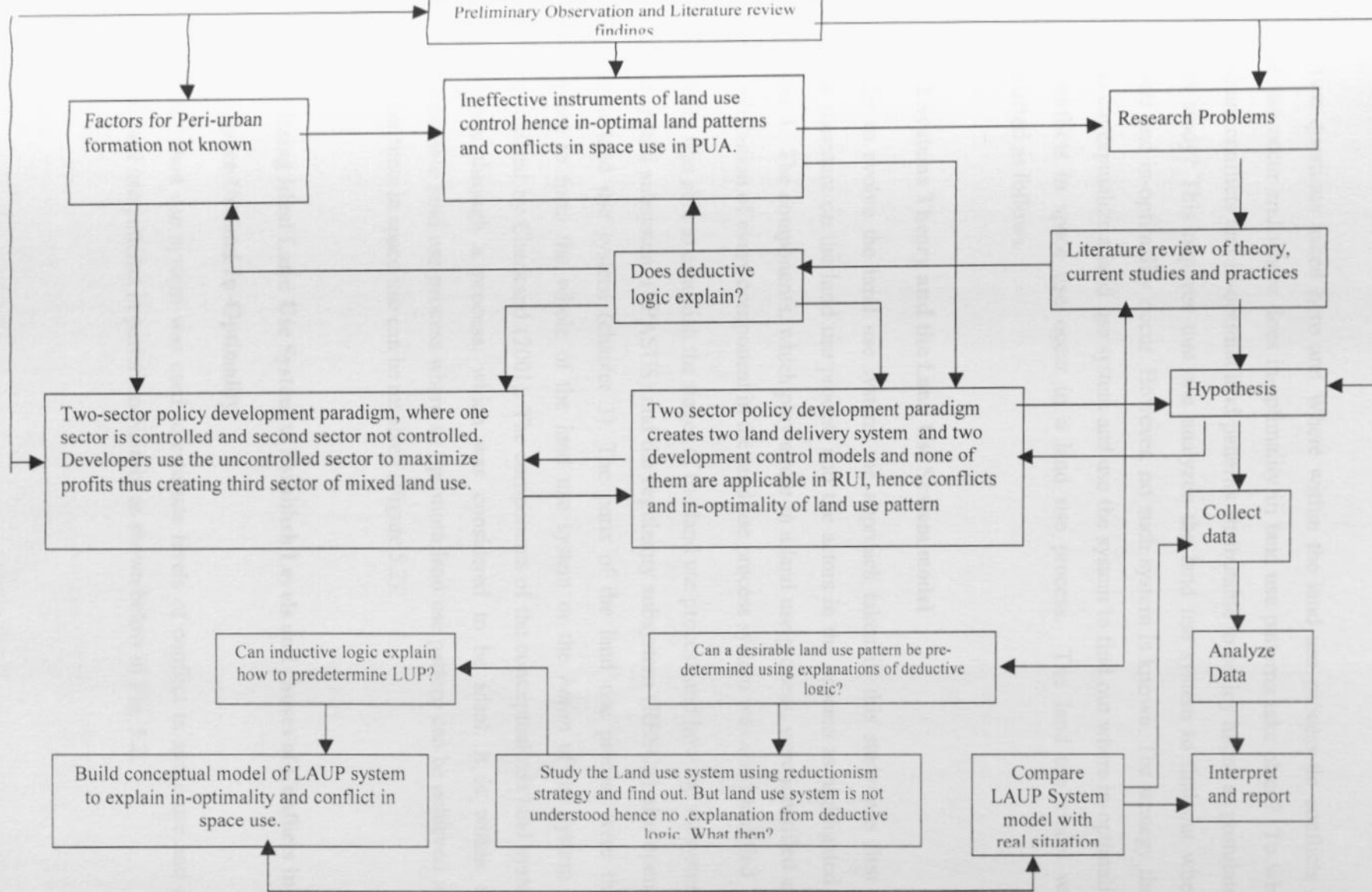
are applied in one sector but not applied in the second sector or if control in the second sector is ineffective. Control in sector 1 would then make development expensive and this would impel developers to opt for areas at RUI. However, in order for this to happen, the total revenue or sales generating capacity in the two locations of urban and rural should be similar or should not vary significantly. The only consideration then on the part of the developer when choosing the location in which to invest would be the total cost (TC). The process of conceptualizing the two hypotheses and the process of testing them are illustrated in the methodology process shown in Figure 5.1.

5.2.0 The Process of Testing Hypothesis 1

5.2.1.1 Establishing the extent of Rural-Urban Duality through Desk Research

The first part of the hypothesis aims to establish the validity of the hypothesis that the land use systems (urban and rural) evolved in Kenya in a mutually exclusive manner. Secondly, the study aims to establish the validity of the preposition that in the two-sector mutually exclusive development approach, the area of overlap was ignored. In other words, the dichotomy of the two land use systems was inadvertently considered to last forever. This would mean that the mixed land use zone at the RUI cannot be regulated by the purely rural or purely urban land use control models. The following strategies were used to validate the hypothesis.

The objectives of the two land use systems were analyzed and the components that constitute the two land systems were also identified. The legal and institutional frameworks governing the two land use systems were also analyzed. If the two land use systems have variations in all the components which are mentioned then the hypothesis could be valid. This analysis was carried out using a time series approach which covered the pre-colonial, colonial and post-colonial land use systems in Kenya as highlighted in Chapter 6.



Source: Author's Construct

The two questions asked here are: Where within the land use process do conflicts in space use occur and where does in-optimality in land use patterns take place? To what extent are conflicts and in-optimal land patterns attributable to policy hiatus as postulated in this study? This requires that one analyzes the land use system to find out where conflicts and in-optimality occur. However, no such system is known. The strategy then was to conceptualize a land use system and use the system to find out where in-optimality and conflicts in space use occur in a land use process. The land use model was constructed as follows.

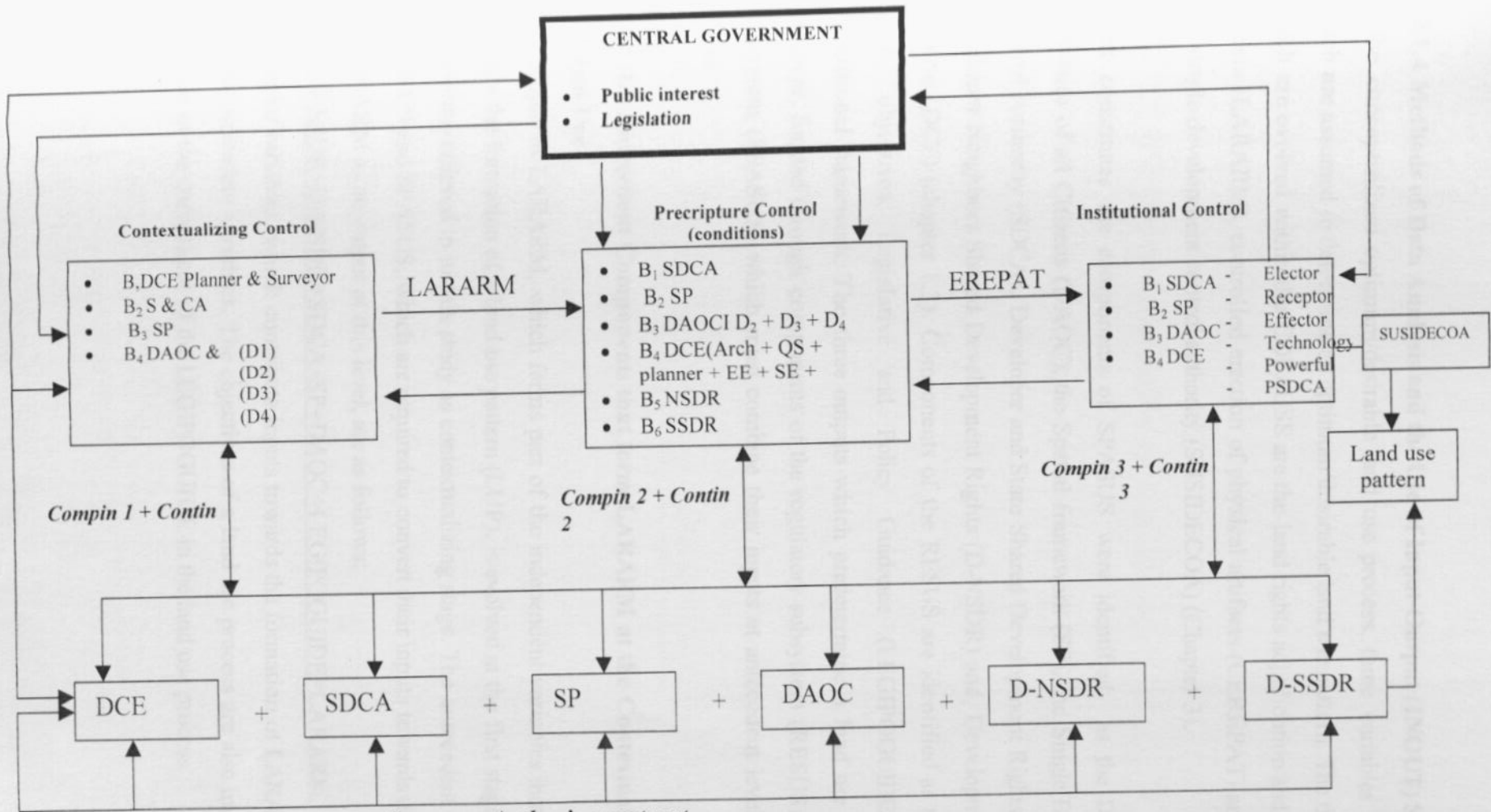
5.2.1.2 Systems Theory and the Land Use System model

In order to evolve the land use system, the approach taken in this study was first to review literature on the land use process and the actors in the process as highlighted in Chapter 3. The components, which play a role in a land use process, were identified and the contribution of every component in the land use process system was also identified.

The study was able to establish the stages of the land use process and how the subsystems of the spatial subsystem (SPASUS) and the regulatory subsystem (RESUS) also operate within a land use system (chapter 3). The parts of the land use process were then connected to form the whole of the land use system or the *holon* of the system as conceptualized by Checkand (2001). The components of the conceptualized land system often pass through a process, which was considered to be ideal. It is within the ideal/desirable land use process where an optimum land use pattern can be achieved and where conflicts in space use can be resolved (Figure 5.2).

5.2.1.3 Using Ideal Land Use System to Establish Levels and causes of Conflicts in Space Use and In-Optimality.

The ideal land use system was used to estimate levels of conflict in space use and in-optimal land use patterns in periurban Nairobi as shown below in Fig. 5.2.



Source: - Author's construct

KEY

DCE – Development Control Experts

SP – Spacial Plan

D-NSDR – Developer Neighbor Shared Development Right

SDCA - Single Development Control Authority

DAOC - Development Activities of Citizens

D-SSDR – Developer State Shared

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5.2.1.4 Methods of Data Analysis and the Use of Input-Output (INOUT) Strategy

In the conceptualized optimum/desirable land use process, three variables are evolved which are assumed to determine an optimum/desirable land use pattern. The three outputs which are evolved within the COLAUSS are the land rights adjudication and registration models (LARARM), controlled erection of physical artifacts (CEREPAT) and sufficient and single development control authority (SUSIDECO) (Chapter 3).

What constitutes the components of SPASUS were identified as the Development Activities of all Citizens (DAOC), the Spatial framework (SP), the Single Development Control Authority (SDCA), Developer and State Shared Development Rights (D-SSDR), Developer Neighbors Shared Development Rights (D-NSDR) and, Development Control Experts (DCE) (chapter 1,3). Components of the RESUS are identified as the land use policy objectives, Legislative and Policy Guidance (LEGIPOGUIDE) and the institutional framework. The three outputs which predetermine a land use pattern are, however, formed through components of the regulatory subsystem (RESUS) and spatial subsystem (SPASUS) which must combine their inputs at antecedent levels as shown below.

5.2.1.4.1 Antecedent Components that form LARARM at the Contextualizing Level of Land Use

The output of LARARM, which forms part of the independent variables that contributes towards the formation of a land use pattern (LUP), is evolved at the first stage of the land use process referred to in this study as contextualizing stage. The antecedent components of RESUS and SPASUS, which are required to convert their inputs towards the formation of LARARM as an output at this level, are as follows:

$$\text{DCE} + \text{D-SSDR} + \text{D-NSDR} + \text{SDCA} + \text{SP} + \text{DAOC} + \text{LEGIPOGUIDE} = \text{LARARM.}$$

The seven variables, which contribute inputs towards the formation of LARARM, can be seen as antecedent variables. The objectives of a land use process are also implied by the presence of the component of the LEGIPOGUIDE in the land use process.

5.2.1.4.2 Components Needed in the Formation of CEREPAT during Prescriptive

Level of land use

In order to obtain the output of controlled erection of a physical artifact (CEREPAT), eight components are required. These components are SPASUS, LEGIPOGUIDE from RESUS, LARARM which results as an output during the contextualizing stage of the land use process and six components of SPASUS.

$$\text{LARARM} + \text{DCE} + \text{D-SSDR} + \text{D-NSDR} + \text{SP} + \text{DAOC} + \text{SDCA} + \text{LEGIPOGUIDE} = \text{CEREPAT}$$

The eight components can also be seen as antecedent variables.

5.2.1.4.3 Components Needed to Form SUSIDECOA During Institutional Capacity

Land Use Level

In order to attain the output of SUSIDECOA, the six components of the spatial subsystem (SPASUS) would combine with sufficiency (SU), LEGIPOGUIDE, LARARM, and CEREPAT (10 components) as follows (Chapter 3).

$$\text{LARARM} + \text{LEGIPOGUIDE} + \text{CEREPAT} + \text{DCE} + \text{SDCA} + \text{D-SSDR} + \text{D-NSDR} + \text{SP} + \text{DAOC} + \text{SU} = \text{SUSIDECOA}$$

The three outputs which are formed through the interaction of various antecedent variables of SPASUS and RESUS would then predetermine or contribute to a land use pattern as follows:

5.2.2 Optimality in a Land Use Patterning Process and Desirable Land Use

Patterns

A desirable land use pattern can then be obtained if the land use process is optimized at the three levels of the land use process to produce the optimized three outputs

$$\text{OPTMUMLUP} = \text{COLAUSS} = \text{RESUS} + \text{SPASUS} = 3 \text{LEVELS OF COLAUSS}$$

$$\text{CONTEXTUALIZING LEVEL} + \text{PRESCRIPTIVE LEVEL} + \text{INSTITUTIONAL CAPACITY LEVEL} = \text{LARARM} + \text{CEREPAT} + \text{SUSIDECOA}$$

However, it is assumed in this study that the coefficient of determination from the three variables of LARARM, CEREPAT and SUSIDECOA have an equal weight on the

formation of a LUP. The contribution of all the antecedent components towards the formation of three variables is also taken to be of equal weight.

If developers follow the land use process as conceptualized in this model (5.2), the land use pattern would then positively optimize at 95% and this would be considered as a fairly desirable land use pattern. The model was used, therefore, to diagnose land use patterns in peri-urban Nairobi using the four land tenure clusters as case studies (Chapter 7).

5.2.3 Justification of Input-Output Data Analysis Approach

Since the conceptual model derives from the systems theory, the aim was to establish the contribution of every component in the land use system towards the levels of land use patterns. The conceptual land use process is considered as desirable/optimal; hence can show which components of the peri-urban land use system are unable to contribute inputs and therefore the causes for space use conflicts and in-optimality. This approach is justified as follows.

Thomlinson (1969) argues that social behavior cannot be fully understood simply by ascertaining that A causes B which in turn causes C which then brings about D which influences E, which has an input on F, which makes possible G and so on. The land use process in PUAs does not take place on a linear model, hence cannot be analyzed using the deductive logic approach, which is already used to test hypothesis 2 of this study. As a result, input-output analysis approach as seen in the systems view was chosen as an appropriate method of analyzing peri-urban land-use activities.

Echenique (1971:198, cited in Mochache, 1990) argues that the city cannot be understood by the study of its elements in isolation because such elements are in a complex interrelated system. Mochache (1990) used the input-output analysis approach to establish the location requirements of the informal sector by looking at the informal

sector economy as a system which can only operate optimally within the precincts of a formal economy.

Peri-urban land use activities can then be seen as taking place within a complex land use system, where activities or components relate in various ways and at various stages of the land use process to produce a spatial pattern. But the peri-urban space of Nairobi is known to produce land use patterns, which are undesirable. It means then that the components that comprise the peri-urban land use systems are disjointed. The challenges which face those in authority and those who seek to change and rectify the undesirable land use patterns in periurban areas is to understand the dynamics of the system. Such questions as which components in the peri-urban land use system are disjointed and at what stage the system is likely to be disjointed and why are critical to the understanding of the land use system. One cannot manipulate and control the land use system towards a desirable land-use pattern if the parts are not understood together with the way the components of the system interact during the land use process.

5.2.4 Sampling Design

This section is aimed to show the units of analysis and the process of sampling the units of analyzing the study. The study seeks to verify the extent to which land use processes in peri-urban Nairobi follow the procedures of land uses considered as ideal in the conceptual land use model (Figure 5.2). This means that the developer who undertakes land development is the main unit of analysis. However, development takes place on land and as it has been observed earlier in this study (Chapter 3), land tenure is one of the main components in a land use process and one of the main determinants of a land use pattern.

5.2.4.1 Factors influencing the Sampling Procedure/Design

The question then which this study endeavors to establish is: to what extent and in what way does land use tenure influence land use patterns? The extent to which it could be established whether desirable/optimum land use processes obtain in peri-urban areas

were, therefore, tested using the land tenure cluster approach and using the categories of land developers who were identified for this study. The focus of the sampling process was therefore the category of developers within each land tenure cluster as shown below (Figure 5.3).

Figure 5.3: Sampling areas and sample units

DISTRICT	DIVISION	LAND TENURE	SAMPLING UNIT
1. Kiambu	Kiambu municipality	<ul style="list-style-type: none"> • Freehold ▪ Cooperative /Company land ▪ Trust land ▪ Leasehold/Government Land 	Developer category (HOBUSE, HOBURE, HOBUHOM, LASPE) within a Land
2. Kajiado	Ngong-Ngong-Isinya/Kitengela Division	<ul style="list-style-type: none"> ▪ Government land (Leasehold) ▪ Trust land ▪ Cooperative/ Company Land ▪ Freehold land 	Developer category (HOBURE, HOBUSE, LASPE, HOBUHOM) within a Land Tenure Cluster
3. Thika	Ruiru division	<ul style="list-style-type: none"> ▪ Government Land/ Leases ▪ Trust land • Coop/Company land • Freehold land 	Do
4. Machakos District	Kangundo Division Mavoko Division	<ul style="list-style-type: none"> ▪ Trust land ▪ Cooperative/company ▪ Freehold ▪ Government/Leasehold land 	Do

Source: From literature review and Reconnaissance Survey (2006)

Reconnaissance survey carried out by the author of this thesis showed that there were four main categories of housing and land developers in peri-urban Nairobi. These developers were: the land speculator (LASPE), who delivers land for residential development, the house builder to house family (HOBUHOM), the house builder to rent (HOBURE) and the house builder to sell (HOBUSE).

5.2.4.2 Homogeneous Data and the Need for Case Study Approach in Peri-urban Land Use Analysis.

As shown in Figure 5.3 and using evidence from the reconnaissance survey, all districts in the peri-urban areas of Nairobi had clusters of homogeneous land tenure systems. For

example, the four land tenure clusters; GLTC, TLTC, FHLTC and CLTC were found in every district that was bordering Nairobi. The only exception was Kajiado District, which had Group Ranches; a form of communal land tenure. However, the communal land system in Kajiado had already been converted to other forms of land tenure. The existing land tenure system in Kajiado was therefore either trust land or freehold land tenure systems. The four categories of developers; HOBUHOM, HOBUSE, HOBURE, and LASPE were also found in every district of peri-urban Nairobi and within every land tenure cluster. It was considered in this study, therefore, that since land tenure clusters were homogeneous and the developers were the same, it was not necessary to cover all the three districts in peri-urban Nairobi. A case study approach was then taken as a strategy using the land tenure cluster approach for the detailed analysis of the development process.

Reconnaissance survey carried in peri-urban areas of Nairobi had also shown that the pressure in development was being felt most in Ngong, Kiseriani, Ongata rongai and Kitengela areas of Kajiado district. Other areas where fast development was taking place in peri-urban Nairobi include Kangundo, Mulolongo and Mavoko Municipality areas of Machakos District. It was, therefore, considered that land use processes investigations towards the direction of Kajiado and Machakos districts would yield more interesting information regarding land use dynamics in suburban Nairobi. The category of developers who were identified were four but could be found in all the land tenure clusters. The two districts of Kajiado and Machakos were, therefore, selected purposefully for the case study analysis because of the observed pressure on land use development towards that direction.

5.2.4.3 Determining the Sample Frame and Obtaining the Sample Size

The reconnaissance survey established that the four land tenure clusters of GLTC, FHLTC, TLTC, and CLTC exist in particular locations of peri-urban Nairobi both in Kajiado and Machakos. Ngong town in Kajiado district and Athi town in Machakos district for example had Government Land tenure clusters (GLTC). Ongata Rongai in

Kajiado district had clusters of trustlands managed by the county councils of Olkejuado and allocated to individual developers on leases or as paper certificates/ allotments. Government Land in Mulolongo of Mavoko municipal council was managed by the local Authority and not the Commissioner of Lands as often is the case with Government Land Tenure Cluster (GLTC). The GLTC in Mulolongo was, therefore, considered in this study to be trustland just like that of Ongata Rongai because the land was managed by the Mavoko Municipal Council.

Ngong-Ngong in Kajiado district and Katani areas in Machakos district had freehold land tenure clusters (FHLTC). Kitengela areas of Kajiado district and Syokimau areas of Machakos district had cooperative/company land tenure clusters (CLTC). Areas within the two districts of Machakos and Kajiado which had similar concentration of the identified land tenure clusters were taken as case studies to analyze the land use process in peri-urban Nairobi. The director of Physical Planning prepared statutory plans to guide development in Ngong town, Athi river town, Mulolongo, Ongata rongai and Ngong-Ngong. The Physical Development Plans were then used as sampling frames to obtain appropriate samples for investigation in this study. Areas which were not covered by physical development plans were divided into blocks in order to facilitate convenience in sampling process.

Because of the similarity in land tenure clusters, it was possible not only to investigate the land patterning process within every cluster, but possible also to compare the land use patterning processes in different land tenure clusters in a district. The study was also able to compare land use processes between similar land tenure clusters of the two districts of Kajiado and Machakos.

5.2.5 Data Sources and Methods of Data Collection

This section of the hypothesis testing process mainly relied on secondary data which was collected through desk research approach. However, the components which constitute the

optimum land use process are known as conceptualized in Figure 5.2. It was easier therefore to collect the data from the statutes, policy documents and government offices using the guidelines in Figure 5.2. The data was analyzed using descriptive approaches and the findings are reported in Chapter 7 of this study. More data was collected from key informants through interview guides and observations. The details of the data matrix and the methods of data collection are shown in Appendix ii of this thesis. Household survey questionnaires were not conducted while validating this hypothesis because all the required data were collected through other methods as mentioned above.

5.2.6 Dual Land Use Systems and the Case for an Appropriate Land Use Process Model for Peri-urban Nairobi.

The land management approaches in the rural areas were distinct from those of the urban areas and land use planning which is practiced in the urban areas, often, was not undertaken in the rural areas. However, desirable/optimum land use patterns depended on which sector (urban and rural) one is considering and the land use process which is employed in the analysis. The question asked at this juncture is: which land use process was then appropriate for analyzing the mixed land uses in peri-urban areas ?

The land use system evolved in this study (5.2) was, however, based on western land use models and applied in Kenya's urban areas and the scheduled Highlands during the colonial rule. The same model (western) is being applied now throughout the country using the Physical Planning Act (Kenya, 1996, Cap 286) albeit without success (Chapter 6). Against this background, it became difficult to decide whether the rural area development land use system or the urban area land use process could be used in this study to analyze the land use activities of the peri-urban sector. This is because the RUI was a zone of mixed land use character that could not be considered as being part of either the urban or the rural land use system.

In order to identify the ideal land use process model for peri-urban Nairobi, it was argued in this study that peri-urban development as seen today would definitely last in the medium term and probably in the long run. Other studies also indicate that peri-urban formation tends to unfold in stages where the mixed land uses finally become more of urban character (Kombe, 2005). The 'arrow of development' in the peri-urban areas of Nairobi then tends to point towards the urbanization development model. Even if the arrow of development in land use processes of periurban Nairobi were today indeterminate, the current development trend at the peri-urban was already seen to be in-optimal. This then means that the rural area land use process, which, hitherto was used to regulate land use processes at the rural urban interface had already proved ineffective. Consequently, there is need for a different land use approach. The urban area land use process model which is conceptualized in Chapter 3 of this study and shown in Figure 5.2, page 97, therefore, was adopted in this study as an ideal land use process which could be used to diagnose the land use problems in the peri-urban areas of Nairobi.

5.3.0 Explaining Peri-urban Formation and the Process of Testing Hypothesis 2

This section explains the procedure of testing hypothesis 2.

5.3.1 Linkages between Development Control in the City and Peri-urban Formations at Rural Urban Interface

In the second hypothesis, it was postulated that faced with a choice of where to locate business, land developers would be indifferent between sector I and sector 3 because the two sectors are linked and tend to share the threshold population. However, zoning and development control in the inner city would make the uncontrolled PUA a zone of minimum cost but maximum (MINIMAX) profit. This would be the zone which developers would, therefore, tend to seek in order to widen investment opportunities and maximize profits. However, this would lead to the formation of the third sector of mixed land uses. It was again argued that for this to occur, the following preconditions must be in place.

(a) Similar revenue earning capacities in the two locations

The revenue earning/or sales generating capacity at the area of RUI and that of the city should be the same or at least should not have significant variations.

(b) Variations in total cost (TC)

Secondly, the total development cost (TC) between the two locations must have significant variations in which case that of the city should be higher than that of the RUI. This then would mean that investors would opt for peri-urban locations to maximize profits (TR-TC) since TR between the two locations would be the same.

(c) Linkages between the city and rural urban interface.

It is postulated that similar revenue generating capacity between the urban and the rural can only be possible if the RUI is part of the city threshold since there were no centers of employment in peri-urban areas. This study then sought to validate the three postulations.

5.3.2 The Sampling Process

A number of case studies were selected both from the inner city and the peri-urban for analysis. From the inner city, four residential estates located at the fringe areas within the Eastland part of the city were selected. These were Kayole, Satellite, Zimmaman and Embakasi (sector one).

The four clusters from the inner part of the city were selected purposefully because they were located at the peripheries of the inner city and were occupied by the African population who again were the majority that had relocated to the peri-urban areas. The aim of this analysis was to establish the threshold levels between areas within the fringe zones of the inner city and those that are located outside of the city. Another set of residential clusters were selected from the peri-urban areas of Kajiado and Machakos. The peri-urban clusters which were covered in this study included Ngong town, Ongata-Rongai, Ngong/Ngong and Kitengela in Kajiado district. Finally, the clusters selected from Machakos within Mavoko municipality were Athi River, Syokimau, Mulolongo and Katani.

Samples of 30 households were randomly selected from every cluster in peri-urban areas. In the land tenure clusters where physical development plans were used as sampling frames, stratified random sampling approach was used in order to cover households within the low density, medium density and high density residential houses. In the land tenure clusters such as CLTC and FHLTC where houses are not stratified through planning, systematic random sampling approach was used based on identified blocks.

5.3.3 Sources and Methods of Data Collection

Information that was needed to establish the functional relationship between the sectors 1 and 3 was obtained through the use of questionnaires administered to the households. The questionnaires were however administered on the HOBUHOM category of developer only because he/she was the only developer residing in suburbia. However, information on rent levels, value of house, value of land which concerned the remaining three categories of developers were collected from the district valuation offices of Nairobi, Kajiado and Machakos and from the latest newspaper reports of market property surveys. Similar data were collected from real estate agents in Nairobi, Ngong town, Kajiado, Athi River and Machakos.

Data related to cost of land delivery (COLARD) in different land tenure clusters were collected as follows. COLARD in GLTC was collected from commissioner of lands, district land officers and from Government lands Act (Kenya, Cap 280). COLARD on FHLTC and CLTC were collected from land control boards, district land registrars and from Registered land Act (Kenya, cap 300). COLARD data on TLTC was collected from county council of Olkejuado and Mavoko.

The cost of hiring the services of development consultants in Nairobi was estimated through the help of the Architectural Association of Kenya experts (Quantity surveyors). Since most consultants levy 6% of the total cost of a house as their consultancy fee, it was possible to estimate the cost of hiring all the required development consultants. In Machakos and Kajiado, the cost of hiring development consultants was estimated by interviewing developers and agents who presented building plans for approval. The cost

of obtaining development permission was obtained from Nairobi city council, Olkejuado county council and Mavoko municipal council. Details of sources of data and interview guides are shown in Appendix iv and Appendix vii.

5.3.4 Methods of Data Analysis and the Choice of t-test

5.3.4.1 Measuring Cost Levels

The three categories of costs already mentioned above were: the cost of land registration and delivery (COLARD), cost of hiring development consultants and the cost of obtaining development permission (CODEP). The three categories of land development cost were referred to as C1, C2 and C3. The total development cost in Nairobi was tabulated into averages and a similar process was carried out on the Kajiado and Machakos development costs. The Nairobi average development costs were compared to those of Machakos using the t-test and a similar process was carried out on the Nairobi and Kajiado average development costs.

5.3.4.2 Measuring Threshold Levels

Threshold levels were measured using the variable of rent value (REVA), house values (HOVA) and land values (LAVA). The Nairobi threshold (TR) measured in LAVA, REVA, and HOVA were tabulated into averages and a similar process was carried out to establish the Machakos and Kajiado TR averages. The Nairobi TR averages were compared with the TR averages of Machakos and Kajiado separately.

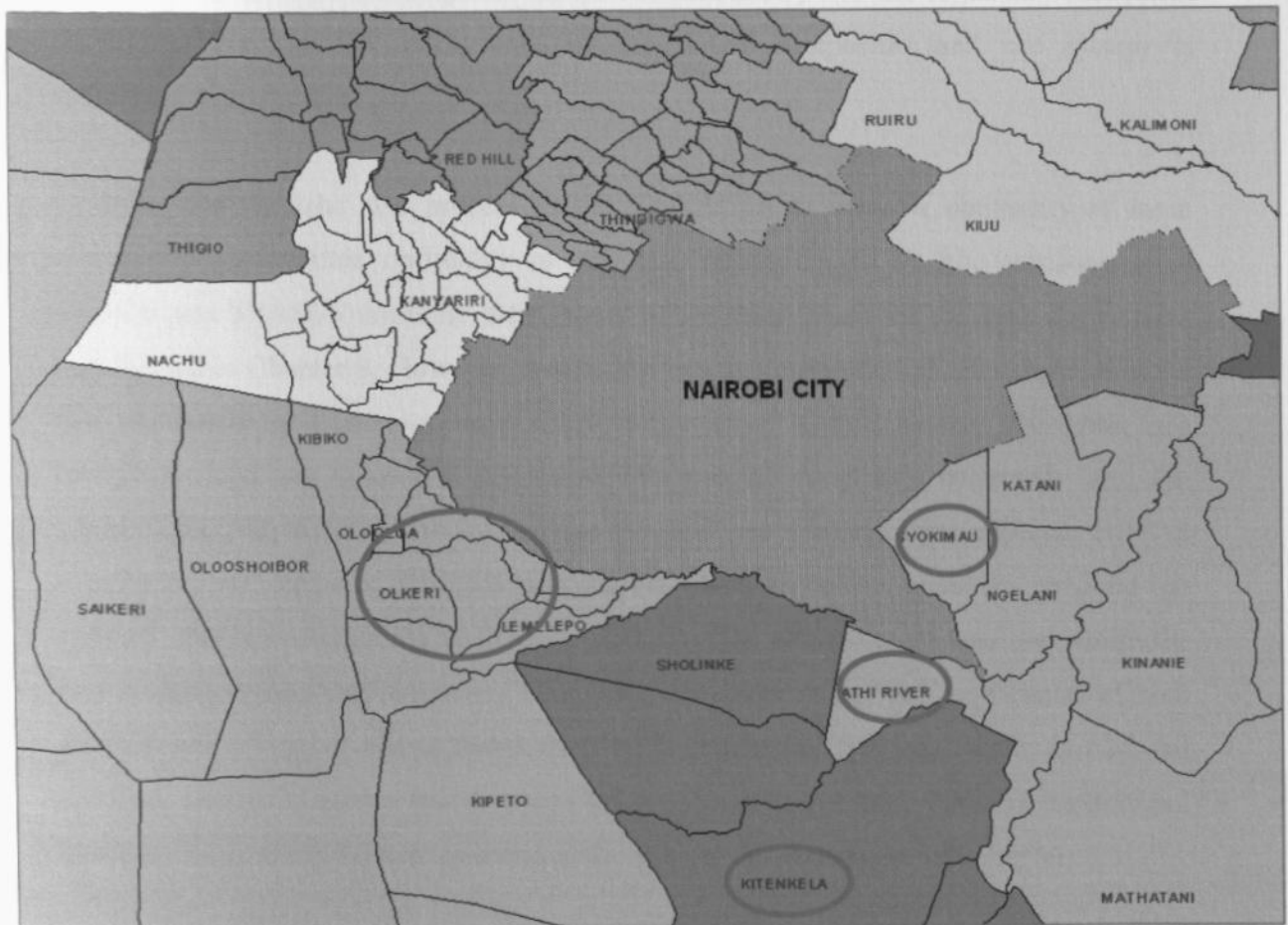
5.3.4.3 Establishing the Linkage between Sector 1 and Sector 3

In order to find out the level of linkages between sectors 1 and 3, the following variables were used to validate part of the hypothesis:

- a. Who were the home seekers at the RUI and their income levels, previous home of origin and, educational level? (Background indicators)
- b. Where did they go for shopping? (consumption indicators)
- c. Where did they go for work? (productive indicators)
- d. Where did they go for socializing activities? (social indicators)
- e. Where did they go for recreation activities? (Recreating indicators)

- f. Where did children go to school? (Educational indicators)
- g. Where did their families seek basic services such as police care, post office, water supply, sewerage connections and banking services? (Service indicators).
- h. Peri-urban people are known to keep cattle for zero grazing that produce meat and milk. They also keep poultry for chicken and eggs and grow vegetables. Where between sector I, the urban area subsystem and sector ii, the rural area subsystem did they export their goods to? (Marketing indicators). It was assumed that by following the activity system of the households, one could be able to establish the extent to which the third sector can be said to be part of sector I as hypothesized in this study (Chapter 1). Map 5.1 shows the location of sampled areas in peri-urban areas of Nairobi

Map 5. 1: Study Area Regional and Local Context



Notes: Sampled areas around metropolitan of Nairobi

Source: Survey of Kenya.

CHAPTER 6

LAND USE POLICIES IN KENYA AND THEIR APPLICATION TO PERI- URBAN FORMATION IN NAIROBI

6.1 An Overview

This chapter seeks to validate part of the hypothesis which postulates that the rural and urban land use systems have evolved in Kenya and the two land use systems are mutually exclusive. The specific question which this study aims to answer is: are the rural and urban areas significantly different in their components which then qualify them as distinct land-use systems? If the rural and urban land use systems are found to be distinct, are there policy provisions for a smooth transition between the two? In Chapter 3, the study identified two land use subsystems that constitute the composite land use system (COLAUSS). These are the spatial subsystem (SPASUS) and the regulatory subsystem (RESUS). The RESUS component of the larger composite land use system is spearheaded by the state.

In order for the land use process in the COLAUSS to achieve optimality of input conversion to facilitate optimality in land use patterning (LUP), the components of RESUS and SPASUS combine their inputs at the three levels of the land use process highlighted in Chapter 3. However, the analysis carried out in this chapter shows that the two composite land use systems (COLAUSS) exist in Kenya, namely, the urban area composite land use system (URBCOLAUSS) and the rural area composite land use system (RUCOLAUSS). The two composite land use systems have different RESUS subsystems and different SPASUS subsystems, which, therefore, mean that the land use systems also have variations in LEGIPOGUIDEs. The objectives of land use within the two composite land use systems (COLAUSS) are different and the components of both RESUS and SPASUS are different from each composite land use system (urban and rural). It, therefore, means that the two COLAUSSs in Kenya have different institutional frameworks as would be demonstrated in the subsequent sections of this chapter.

The study therefore traces how land use processes in the two COLAUSS have evolved over the past years. The study also examines the structures and objectives of the institutional frameworks within the two subsystems in the dual composite land use systems of URBCOLAUSS and RUCOLAUSS. The study also verifies how the two land use systems have influenced spatial patterns in each sector over the years. Since the two systems interact, the thrust of the investigation was to establish whether there was any effort to harmonize the land use objectives and the institutional framework within the two land use systems at the RUI.

6.2.0 Pre-Colonial Era Land Use Systems and Land Use Patterns.

Prior to colonial rule, all land in Kenya belonged to the community (Okoth-Okombo, 1991, Nyangito et al, 2002). The rules that governed the use of land resources were mainly informal or what is commonly referred to as customary laws (Nyangito et al, 2002). The land use system during this period was homogeneous, meaning that it was not polarized between the urban and rural land use systems.

6.3.0 Evolution of Urban and Rural Composite Land Use Systems in Kenya.

6.3.1 Background Situation

Colonial settlers came to Kenya purely to exploit the natural resources needed in Europe during the industrial revolution (Okoth-Ogendo, 1991). When they arrived in Kenya, colonial settlers began a system of urban settlements for purposes of facilitating bulking and collection of the required raw materials (Obudho, 1974). In order to facilitate the exploitation of resources from the mainland, the Kenya-Uganda railway was constructed and land for its use was acquired compulsorily through the provision of the Indian Land Acquisition Act (1882).

6.3.2 Colonial Policy of Racial Segregation and Formation of Rural Land Use Systems.

The colonial settlers divided the country's space economy into rural and urban. The rural land use system was further sub-divided into the African reserves and the so called

European scheduled areas. The evolution of the African rural reserve is discussed in the subsection that follows.

6.3.2.1 Evolution of African Areas Rural Land Use Subsystem during the Colonial Era

White settlers preferred to live separately from Africans and to achieve this objective; they recommended that Africans be grouped into definite reserves which should be far removed from European centers (Okoth-Ogendo, 1991). During the period of colonial rule, other tribes such as the Maasais were also taken into outlying districts through treaties which were made between the settlers and the Maasai tribal leaders (Okoth-Ogendo, 1991). During the time of making such treaties, the Maasai leaders, it is alleged, agreed to remove their people, flocks and herds into definite reservations away from any land designated for European settlements (Okoth-Ogendo, 1991). This marked the emergence of dualistic land use systems in Kenya. The Africans lived in the rural areas while the white settlers lived in urban areas and the scheduled Highlands respectively. As the settlement clusters spread between the urban and the rural, there was need for two policy and legislative guides to address the two land use systems.

6.3.2.2 The Regulative Subsystem within the African Areas

The racial segregation was not only based on distance but also on land use policies and land tenure systems. The 1915 Land Ordinance provided for land lease systems applicable to the white settlement areas (urban and the scheduled Highlands). In order to advance racial segregation between white settlers and Africans reserves, it was specified in the Act that for one to obtain land in the urban or the scheduled areas, such land had to be auctioned and it was to be allocated only to the highest bidder. However, in order to ensure that Africans did not obtain land in the European areas, the time and place of auction had to be specified through public notice and the lowest price for such auction had to be fixed to show how the leased plot will be sold (Okoth-Ogendo, 1991). The lease certificate given as proof of land ownership to the white settlers had special conditions. The conditions specified that such land would not be used as a place of residence any Asiatic or a native (Okoth-Ogendo, 1991).

“In every lease which is sold, it was subject to the conditions that the plot shall not be used as a place of residence for an Indian or other Asiatic or native and in every renewal of such lease, there shall be inserted a clause to that effect. If at any time it shall be proved to the satisfaction of the Commissioner of Lands that any such plot or part is used solely or partly as a place of residence of an Asiatic or native not being a domestic or caretaker in the employment of the occupier, the Commissioner of lands may declare the lease to be forfeited” (Okoth-Ogendo, 1991, 34).

The 1938 Native Lands Trust Ordinance also required that Africans be restricted in rural areas and, further, Africans be restricted from occupying land that belonged to other tribes. These restrictive conditions ensured that white settlement areas remained in the hands of the whites only.

This arrangement created congestion in the African areas which forced the indigenous African population to agitate for land rights in the early 1950s. In order to pacify the Africans, the Swynerton Committee (1954) was appointed to examine the grievances in the African reserves. Among the recommendations of the Swynerton plan was the restructuring of the land ownership in African areas.

Following the recommendations of the Swynnerton plan, a system of land tenure similar to the one in the European areas was recommended in order to confer permanent land ownership to the Africans. It was argued that this arrangement will reduce disputes in the African reserves, lead to increased land productivity and stop the Africans from agitating for land redistribution from the whites (Okoth-Ogendo, 1991). As a result, the 1959 Native Lands Ordinance (NLO) was enacted which vested freehold tenure on Africans. The purpose of the NLO was to protect the uninitiated peasants from improvident use of their land rights under the new tenure system. It was claimed that some individual Africans had already entered into a state of indebtedness as a result of the individual land tenure systems (Okoth-Ogendo, 1991).

6.3.2.3 Land Use Management within the Native Reserves

In the African reserves, the main objective to control land use was related to the need to conserve water supplies, forests, and land reclamation (Okoth-Ogendo, 1991). The resting and reconditioning of eroded and worn out areas and the improvement of farming

methods were the areas of concern in the African areas. Compulsory labor was common for bench terracing and water furrowing. The Native Authority's Ordinance (NAO) was amended in 1940 to give local chiefs and headmen the power to issue orders for purposes inter-alia of requiring the able bodied male adults to work for the purposes declared as minor communal duties (Okoth-Ogendo, 1991).

6.4 The European Urban Areas and the Scheduled Areas Land Use System

The development of the land which was allocated to settlers in the rural areas was controlled through development conditions. For example, every settler was required to maintain 10% of his land in perpetuity as forest reserve (Okoth-Ogendo, 1991). In cases where less than 10% of the land was already under forest, the holder was required to plant enough trees to bring the total area of land up to 10% of forest cover. The landowner was also required to bring another 10% of the land under crops every year for the first three years of settlement. He/she was also required to keep all cultivated lands in good order and conditions until he/she acquired a final certificate. Finally, the landowner within the white settlements areas was, within a period of six months from the date of sale agreement, required to erect a living house of reasonable permanent character (Okoth-Ogendo, 1991).

The 1915 ordinance empowered the Governor to make rules for the regulation, control or prohibition of land breaking or clearing for any purpose whatsoever. The rules prohibited the grazing or watering of livestock, burning or clearing of vegetation in all areas in which this was necessary for the preservation of soil and its fertility. These prohibitions were also extended to the preservation and formation of the gullies, the maintenance of bodies of water and the protection of contour banks or terraces. When the rules were operational, the Director of Agriculture (DA) was empowered to issue a wide range of orders requiring compliance with measures relating to land conservation. The rules also prohibited the cultivation of land within a specified distance from a watercourse and the grazing of livestock on slopes.

Comment-The European urban settlement and the scheduled Highlands were unified as a single land use system (UNICOLAUSS). Land use planning was carried out within the

urban areas and rural areas using the Town Planning Act (Kenya, 1931, Cap, 134). The European urban and scheduled areas as well as the African rural areas remained mutually exclusive. The white settlers used the rules and ordinances to keep the Africans in their rural areas except those who had permits to work in urban areas and on the European farms.

During the colonial era, there was no policy to address the rural-urban interface since the white settlers did not anticipate the formation of the peri-urban area at the RUI nor did they anticipate that the two land use systems could merge. The dual spatial systems, therefore, remained during the colonial period. However, the European scheduled and urban areas remained well managed with land use patterns, which had a better visual impression than African reserves. This is because of the variations in the rules of land use management discussed above.

In sharp contrast to the European settlements, the African reserves were neglected in terms of modern infrastructure services including roads and housing. The African reserves were characterized by congestion of livestock and people and the type of houses which they constructed are those which were made of informal and substandard building materials. Roads within the African areas were narrow and all these circumstances generally created a bad visual impression within the African locations. It can be argued also that whereas there are three land use determinants; the economic, social and public interest in the conceptualized desirable/optimum land use model (chapters 3), it appears that within the African areas, the land use determinants were only two and still is the case; the social and economic. However, within the European areas, the three land use determinants were available and this shows why land use patterns between the two settlement locations were different.

6.5.0 Land Use System and Land Use Patterns in Post-Colonial Kenya.

In this section, the study aims to establish the land use policy objectives in post-colonial Kenya and the way the composite land use systems of urban and rural were organized to achieve the objectives. The analysis is carried out as discussed below.

6.5.1 Dual Composite Land Use Systems and Component Variations within Regulatory and Spatial Subsystems.

6.5.2 Introduction

After independence, the biggest challenge which faced the new government was how to create employment for the majority of the poor people who resided in the rural areas. It became difficult for the government; however, to decide which between the two sectors of urban and rural could be better used to promote the desired objective of creating employment in the rural areas (Kenya, 1965; 1978, p 60). This dilemma in policy approaches led to some of the debates, which are discussed in the following subsection.

6.5.3 Theoretical Debate and Dual Land Use Systems in Post-Colonial Kenya

Policy makers and academicians were divided between the urban biased development school of thought, the rural biased development school of thought and the neutral development school of thought. Those who supported public investment in the rural areas argued that such a strategy would promote agriculture and benefit the majority of the rural population. It was argued that rural development would lead to a reduction in the rural to urban exodus (Kenya, HSS, 1978).

Others argued that public investment needed to be concentrated in urban areas as this would rationalize the allocation of resources and populations in the rural areas hence increase productivity within the rural areas. The urban biased development approach school of thought further argued that since some service provisions would need a higher population threshold, the urban areas were the ideal location for services such as education; health and other amenities (Kenya, 1978). There were a group of policy analysts who happened to fall between those who advocated for increased government resources in the rural areas and those who advocated for investment within the urban areas. Policy analysts who were falling between the two schools of thought can be categorized as the neutral school of thought. The 'neutral school of thought' argued that the development of urban areas would widen the existing disparities between the urban and rural sectors (Kenya, HSS, 1978). It was also argued that rural sector development

would demand large capital investment since the population in the rural areas was dispersed.

According to the neutral school of thought, therefore, it was critical to view both the urban and rural areas as inter-related systems as argued below.

“ Farms, homesteads, market towns, intermediate centers and major cities should be developed as continuum from rural to urban in which complementary action is required to make the best use of national resources. Any strategy of urban development should therefore form a central part of, rather than being peripheral to any strategy of the rural development” (Kenya, 1978 p 62).

Although the arguments advanced by the various schools of thought were not resolved, the government, finally decided that as a key strategy, it was necessary to direct an increasing share of the total resources available to the nation towards the rural areas (Kenya, HSS, 1978). The development approach taken by the government after independence can be understood because the government had just attained independence and majority of the Africans for which independence was being sought were residing in rural areas. Land use policy approaches taken in post-colonial Kenya could then be seen in the context of being an affirmative action aimed at ameliorating the deteriorating living conditions within African rural reserves.

6.6 Need for Agricultural Policy and Continuity of Rural Land Use

System.

It is argued below that the retention of the rural areas during post-colonial era was aimed at promoting agriculture production.

6.6.1 Rural Land Use Policy Objectives in Post-Colonial Kenya

The need to promote agriculture became the main development objective within the rural areas in post-colonial Kenya. The government also realized that rural people needed essential community services and facilities. Secondly, it was also realized that the goods that were to be produced in the rural areas also needed markets and exports. The two aims of providing community facilities and promoting the marketing of rural agriculture

were to be achieved through the implementation of the Service Centre Strategy (SCS) and the Growth Centre Strategy (GCS) respectively (Kenya, HSS, 1978).

6.6.2 The Spatial Land Use Subsystem (SPASUS) in Rural Areas After Colonial

Rule

In order to increase the agricultural productivity of the rural areas, the Registered Land Act (Kenya, RLA, Cap 300) was amended to facilitate the issuance of freehold titles. The issuance of freehold titles in the rural areas was aimed at enabling peasant farmers to access credit from the banks so that they could use the capital to promote agricultural production. In order to ensure that the rural dwellers did not fear getting loans because of the complications involved in acquiring a title, a simple system of land registration was introduced in the rural areas under the Registered Land Act (RLA) (Kenya, RLA, cap 300; Kenya, SSP, 1965; Lawrence Committee, 1965).

The land survey system in the rural areas was also made simpler than the deed plan system which prevailed in the urban areas. The Registered Index Maps (RIM) survey system which applied in the rural areas for example made use of hedges and natural boundaries. The natural boundaries under the RLA (Kenya, Cap, 300) were considered sufficient for land registration purposes and for the issuance of title deeds to land owners (Lawrence Commission, 1965). A simple mutation plan, which was prepared by a land surveyor, was also considered sufficient in the rural areas for land registration purposes (Lawrence Commission, 1965). This approach gave rise to the Deed Registration System (Kenya, RTA, 281, GLA, CAP, 280, LTA, CAP, 282) which was applied in the urban areas and former scheduled areas and the Registered Land Act (Kenya, RLA, Cap, 300), which was applied in the African freehold land tenure areas. The variations in land administration systems between the rural and urban areas then created different institutional frameworks within the urban areas and rural areas as shown below.

6.6.3 The Regulatory Land Use Subsystem In Rural Areas and Legislative and Policy Guides

In post-colonial Kenya, the following legislations were put in place to guide the rural land use system.

6.6.3.1 The Land Control Boards under the Land Control Act

The Land Control Act (LCA) applied to agricultural land as defined in the Act:-The Act relates to "land that is not within the municipality, township or trading center" (Kenya, cap 302). The Minister for Lands has powers under the Act to apply the provisions of this Act to any area he/she considers expedient. The role of the LCB shall be to regulate sale, transfer, lease, mortgage, exchange, partition or other disposal of land. In deciding whether to grant or refuse consent in respect of a controlled transaction, a land control board shall:-

Have regard to the effect which the grant or refusal of consent is likely to have on the economic development of the land concerned. The LCBs shall also consider the maintenance or the improvement of the standards of good husbandry.

Comment: As can be observed, these objectives were those which applied to the rural areas during colonial rule and again they were continued during post-colonial period to promote agriculture. The emphasis of land use control in the rural areas is on the economic use of the agricultural land and good husbandry and both objectives were designed to promote agricultural production and not land use planning as seen from the British model which was applied in the urban areas.

It can be argued, therefore, that in the post-colonial era, the main determinants of land use in rural areas were the social and economic motives but the agricultural economic motive was moderated by the Land Control Boards (LCBs). The economic motive in agricultural promotion was strengthened by the government through the LCA (Kenya, cap 302) and the Agricultural Act (Kenya, cap 318). The third motive of land use determinant which spearheads the public interest motive through land use planning was not undertaken in the African rural areas but was applied in the urban areas and the rural scheduled areas.

6.6.3.2 The Minister for Agriculture under the Agriculture Act

In terms of the Agriculture Act (Kenya, cap 318), the Minister of Agriculture (MA) has powers to ensure that soil conservation is undertaken by farmers. The Minister also has powers to ensure the prevention of adverse effects of the soil in any land. In consultation with the central agriculture board, the Minister may make rules prohibiting the clearing of land for purposes of cultivation, grazing or watering of livestock.

In the rural areas, the Director of Agricultural (DA) was therefore the main authority in land management and since his/her role was advisory, the director is the main development control expert (DCE). The Director of Agriculture provides technical advice on methods of soil conservation, strip farming and the use of appropriate types of crops.

6.6.3.3 Chief's Authority Act

Chiefs and village elders were also actively involved in the resolution of land disputes in the rural areas using the Chief's Authority Act (CAA). In the absence of fixed survey in the rural areas, land disputes were numerous and therefore chiefs together with village elders were very effective in resolving such disputes.

6.6.3.4 Local Government Act and Area Council Representatives.

The small urban centers are represented by area councilors and these urban centers are managed by county councils. The councilors are the people's representatives in the rural areas and, therefore, market centers were the lowest linkage between the local government and the rural communities. Market centers provide services that benefit the rural population within the catchments range of that particular town, hence these categories of centers promote rural development.

The area councilors together with the public health officials allocated plots in such centers and the council only ratifies the allocation by issuing letters of allotments which usually are in the form of cycle styled papers (Yahya, 1976). The plots are often allocated without proper planning and, therefore, the African market centers are characterized by land use patterns which are either conflicting or in-optimal. It can be argued that in the

market centers, land use determinants were the economic and social motive because the third land use determinant of public interest through land use planning was not followed and this has tended to be the practice to date.

6.7 Efficiency and Economy in Rural Service Provision as Justification for Urban Land Use System

The urban land use system started during colonial era to advance colonial interest, was retained in post-colonial era for different purposes as shown below.

6.7.1 Objectives of Urban Area Land Use System and Service Center Strategy

During the post-colonial era, it was considered that if the quality of life in the rural areas was to be improved as desired by the government, then the people in the rural areas had to be provided with basic services such as health, markets, sanitation, water, power and education (Kenya, HSS, 1978). However, it was also considered that the amount of financial resources required providing these facilities within the rural areas were limited and the dispersed rural population compounded the problem of service provision in the rural areas. There was need therefore to concentrate the facilities needed by the rural population within certain locations instead of dispersing them in order to promote the efficient use of the limited resources (Kenya, HSS, 1978 p 67; Kenya, 1965; SP No, 10).

It was also argued that concentrating such facilities in one center would enable individuals to save on time, energy and money when they combine journeys to one center. Such a strategy was aimed at promoting convenience on the part of the population who resided in the rural areas. Secondly, clustering these facilities and services would be more economical in that water supply, sewers and power lines could be installed to serve all these facilities more cheaply. It can therefore be argued that besides the objective of promoting equity considerations within the rural land use system, there was a second objective of promoting efficiency and economy as an element of public interest from the point of view of those who were charged with the responsibility of providing such services. However, the second set of objectives of efficiency and economy aimed at

promoting rural development were advanced through the urban land use system (URBCOLAUSS).

6.7.2 Integrating Rural Agriculture with Urban Agro-Based Industries through A Growth Center Strategy

The government also aimed to induce growth functions in a few strategically selected larger centers which had potential for one or more specialized growth functions (Kenya, HSS, 1978). It was considered that agricultural production in the rural areas would need market in the urban areas and export to other countries. The urban areas had to be developed not only as service centers as seen in the context of service center strategy (SCS), but also as market and export outlets.

Urban areas in the category of growth centers were to be provided with certain basic infrastructural facilities to attract investments in agro-based industries which would then create employment. It was also envisaged that agro-based industries would in turn create markets for agricultural raw materials (Kenya, HSS, 1978). The urban and rural sectors were therefore considered to have a symbiotic relationship. As an element of public interest, this strategy was also addressing social equity in the rural areas because the focus was to promote development in rural areas where the majority of the people live. It was proposed in the human settlement strategy that the service and growth centers be connected through a hierarchical system of transportation network.

Comment: The Growth and Rural Service Center strategies tended to retain the duality between the rural and the urban areas which emerged during the colonial rule. The strategies also strengthened the urban land use system because all essential community facilities were located in urban areas due to cost consideration. However, a different regulative land use subsystem was applied in the urban areas just as it was the case during the colonial era as discussed below.

6.8.0 The Urban Regulative Subsystem in Post Colonial Kenya

It is argued below that land use Planning in post-colonial era had an urban bias just like during the colonial rule.

6.8.1 Town Planning Ordinance

This Act provides for the use, control and development of Government Land in Kenya. There were two sections that were relevant; section 23 and section 24. Section 23 dealt with the preparation of development plans on Government Land outside the municipalities and townships. Government land outside the municipalities and townships could not be made available for alienation for building purposes without a planning framework (SP). The same land could not be sold or leased out for more than six months until the Commissioner of Lands (COL) approved a plan on which such alienation was based.

No land within any municipality or township could be divided into lots except in accordance with the provisions of a town-planning scheme approved under this ordinance by the Commissioner of Lands. If no approved plans exists, the Act requires that the subdivision should be in accordance with another plan approved by the Commissioner of Lands. Regulative planning was applied both in the urban subsystem and the rural areas subsystem which were categorized as white highlands both of which were combined as a unified composite land use system (UNICOLAUSS).

Comment-The strategy where urban areas and the white highlands are combined into a unified land use system through planning was begun during colonial period and it was retained in post-colonial Kenya. However, planning in the scheduled highlands in post-colonial Kenya was ignored because land was being converted from the requirements of Registered Titles Act (Kenya, RTA, cap 281) to the requirement of RLA (Kenya, cap 300) ostensibly to promote rural agriculture in line with post-colonial rural area land use policy. Because land use planning was applied in the urban areas and the scheduled highlands, spatial patterns were predetermined and besides the social and economic motive, the motive of public interest was also added through land use planning. This explains why land use patterns vary between the urban areas, scheduled Highlands and the African rural settlements.

6.8.2 Urban Planning Authorities and Provisions of the Local Government Act

Section 166 of the Local Government Act (Kenya, 1998; cap 265) states that: "every municipal council, county council or town council may, subject to any other written law, prohibit and control the development and use of land and buildings in the interest of the proper and orderly development of its area". The jurisdiction of the municipal councils and town councils is clear because such towns have boundaries. The area of authority of county councils is also specified as follows. Every county council shall have power to prohibit and control shops in rural areas. *"Provided that no county council shall exercise such powers in any area to which the Land Planning Act (LPA) has been applied"* (Kenya, LGA cap 265, section 159).

In order to strengthen the role of local authorities in land use planning within their areas of jurisdiction, the Act further clarifies as follows: No land could be registered in any land titles registry unless and until a certificate under the hand of the clerk of the local authority was produced to the registration officer.

Synthesis: Land use planning and control both under the Town Planning Act (TPA) and Local Government Act (LGA) were based in the urban areas and the scheduled areas respectively. The zones immediately outside the urban areas were under the jurisdiction of the Land Planning Act (LPA). The areas at the rural urban interface were not considered in the institutional arrangements contained in the TPA and LGA and therefore the two Acts had no force in the peri-urban and the rural areas respectively.

Immediately after the three miles peri-urban strip, land use control was under the Land Control Boards (LCBs) (Kenya, Cap 302; Kenya, cap 300) and, therefore, local authorities under the Local Government Act (Kenya, cap 265) and the provisions of TPA had no jurisdiction over rural areas either. Urban land was managed by the Commissioner of Lands (COL) (Kenya, cap 280) and Local Authorities (LAs) (Kenya, cap 265) at different stages of the urban land use process. However, land use controls by the two institutions were all linked by a regulative subsystem, which required consultation between the two institutions (Kenya, LGA, Cap; 265). However, the provisions of LCA (Kenya, cap 302) and RLA (Kenya, cap 300) show a duality in the institutional

frameworks where one institution is in charge of the rural areas (LCBs) and the other in charge of the urban areas (Kenya, LGA, Cap 265; Kenya, 1931, TPA, cap 134)

6.8.3 Conflicts in Space Use at Rural Urban Interface and Provisions of Land

Planning Act.

Because of the duality between the rural and urban areas, signs of land use conflicts began to appear at the RUI. The LPA (Kenya, Cap, 303) was enacted to address land use conflicts at the three miles peri-urban strip and 400 feet from the center of trunk roads where development had created ribbon land use patterns. The LPA created a zone referred to as an interim planning area (IPA) to which these regulations applied and the institution of an interim planning authority (IPAA) which was to be in charge of the IPA. The IPAA was defined in the LPA as an authority appointed by the minister in charge of planning to carry out planning and control of development in the designated IPA. Section 4 (1) of part 11 of the land-planning Act states:

“ Where an area plan or town plan has been prepared and approved for a local authority area -----and if it appears to the minister to be expedient in the interest of securing the proper control of such area, he may with the agreement of that local authority by order published in the gazette constitute that local authority as the interim planning authority for that area or part thereof” (GOK, 1968,LPA cap 303).

The use of the LPA (Kenya, Cap, 303) as an instrument of land use control within the areas that were defined as IPA (Three miles peri-urban strip and 400 feet within the center of trunk roads) became ineffective (Shibira, 1978). The designation of IPA and appointment of IPAA was at the discretion of the Minister. It was not clear, however, who was in charge of land use planning since the Commissioner of Lands (COL) and the Director of Physical Planning (DPP) who were the land use control authority and plan preparatory authorities respectively under TPA were in the Ministry of Lands and Settlement. Local Authorities which were to be designated as IPAA within the IPA were in the Ministry of Local Government under another minister. It became difficult therefore to determine who between the minister in charge of lands where the COL and the DPP were housed and the minister in charge of local government where local authorities were housed was in charge of planning under the LPA (Kenya, 1968, LPA, Cap 303).

This confusion made the LPA a moribund piece of legislation during the time it was operational and therefore it became ineffective as an instrument of land use control. Since the TPA (Kenya, cap 134) and Local government Act (Kenya, cap 265) were only applicable to the urban areas, it was assumed that the LPA (Kenya, cap 303) was to be applicable within the three miles peri-urban strip and the 400 feet within the center lines of major trunk roads. The LCBs (Kenya, cap 302) were to be in charge of rural areas and therefore the three legislations had already succeeded in compartmentalizing the country into three parts (Kenya, cap 303); the urban, the peri-urban and the rural area.

Synthesis

The three zones, which were created by the existing legislation, can be categorized as the urban area zone, the peri-urban and rural zones. The urban areas zone land use systems were under the management of the Commissioner of Lands (Kenya, Cap 280), the TPA (Kenya, 1931 cap 134) and the Local Government Act (Kenya, cap 265). The second zone within the country was the three miles peri-urban strip and the 400 feet space from the centers of trunk roads which was referred to as Interim Planning Area (IPA). This zone was to be managed by an Interim Planning Authorities (IPAA) which was to be appointed by the minister in charge of planning under LPA (Kenya, cap 303).

The third zone is the area beyond the three miles peri-urban space and the area beyond the 400 feet of the center of trunk roads which could be seen as being under the land control boards (LCBs). The third zone can further be classified as the rural area proper and the rural market centers which county councils manage. However, the two zones in the last category are put together in one category which is generally rural. The emerging three zones tend to agree with the three sector conceptual model developed in chapter 3 of this study which categorizes the country into the urban proper, the peri-urban and the rural sector.

Since the LPA, which was aimed to cover the three miles peri-urban zone, was found to be ineffective (Shibira, 1978), it can be argued that the peri-urban was not regulated during the regime of LPA and the area therefore remained as a shadow without a

particular development control authority. However, the shadow area of the peri-urban cannot be seen as a land use system in the context of the model developed in this study (Chapter 3) since the two subsystems of SPASUS and RESUS are either not in place or they are ineffective. Moreover, the land use process in the peri-urban area cannot be traced within the three conceptualized stages of land use process (Chapter 3 and chapter 7).

6.8.4 Integration of the Dual Composite Land Use System through the Physical Planning Act

6.8.4.1 An overview

The need for land use planning in all areas of the country including the peri-urban became necessary and the existing instruments of land use management had all become ineffective except the TPA (Kenya, 1931, cap 134). The TPA was only applicable to the major urban areas and the scheduled areas. As a result, the Physical Planning Act (PPA) was passed by Parliament in 1996 and came into force in 1998. The PPA created four institutions and assigned various roles to the authorities as follows. The Director of Physical Planning (DPP) in the Ministry of Lands and Settlement was assigned the role of preparing all regional and local physical development plans. The Minister in charge of Physical Planning (MPP) was assigned the role of approving all the plans whether structure plans, local plans or regional plans which are to be prepared by the DPP.

Earlier, land use plans which were prepared by the DPP were approved by the COL. The power of the Commissioner of Lands to approve physical development plans under the Governments Lands Act (Kenya, Cap 280) was, therefore, transferred to the minister in charge of Physical Planning under the new arrangements of the PPA. Local authorities (LA) were appointed under the PPA to oversee the control of land use and the implementation of physical development plans in all areas of the country both in the municipalities, townships and the regions. Earlier, local authorities were only empowered to manage land within urban areas under the provisions of Government Lands Act (Kenya, cap 280), the provisions of the Local Government Act (Kenya, cap 265) and TPA (Kenya, 1931, cap 134). The land use management in the areas beyond the urban

areas was an additional responsibility of the local authorities. Finally, PPA extended planning to all areas of the country and within all land tenure systems because hitherto, land use planning was just carried out within major urban areas which had Government land.

Synthesis

The responsibilities of local authorities to regulate land use under PPA (Kenya, 1996, cap 286) beyond the urban areas had two implications which could affect the existing institutional arrangements in Kenya. In order for the Local Authorities to control land use in the urban, peri-urban and rural areas, the Land Planning Act (Kenya, cap 303) which was covering the three miles peri-urban strip had to be disbanded or repealed and powers hitherto under the Act be transferred from the interim planning authorities (IPAA) who were authorized to be in charge of the interim planning area under the provisions of LPA to LAs. Although the LPA was repealed, it was not explicitly specified that powers which were contained within the LPA were to be transferred to Local Authorities.

However, even if such powers were to be transferred to LAs, it was not clear whether it should have been transferred to county councils or Municipal councils. Even if the powers were to be given to any of the local authorities, again there would be another problem of defining the jurisdictional boundaries between the County Councils and municipal Councils. The second institutional transformation which was required to make local authorities effective in land use management in the country was to disband the Land Control Boards which are in charge of zone three and transfer the powers currently exercised by LCBs (Kenya, Cap 302) to LAs. The powers hitherto with LCBs could be transferred to LAs in a modified form and there was need to amend the Local Government Act (Kenya, cap 265) under which LAs operate in order to reflect the new changes.

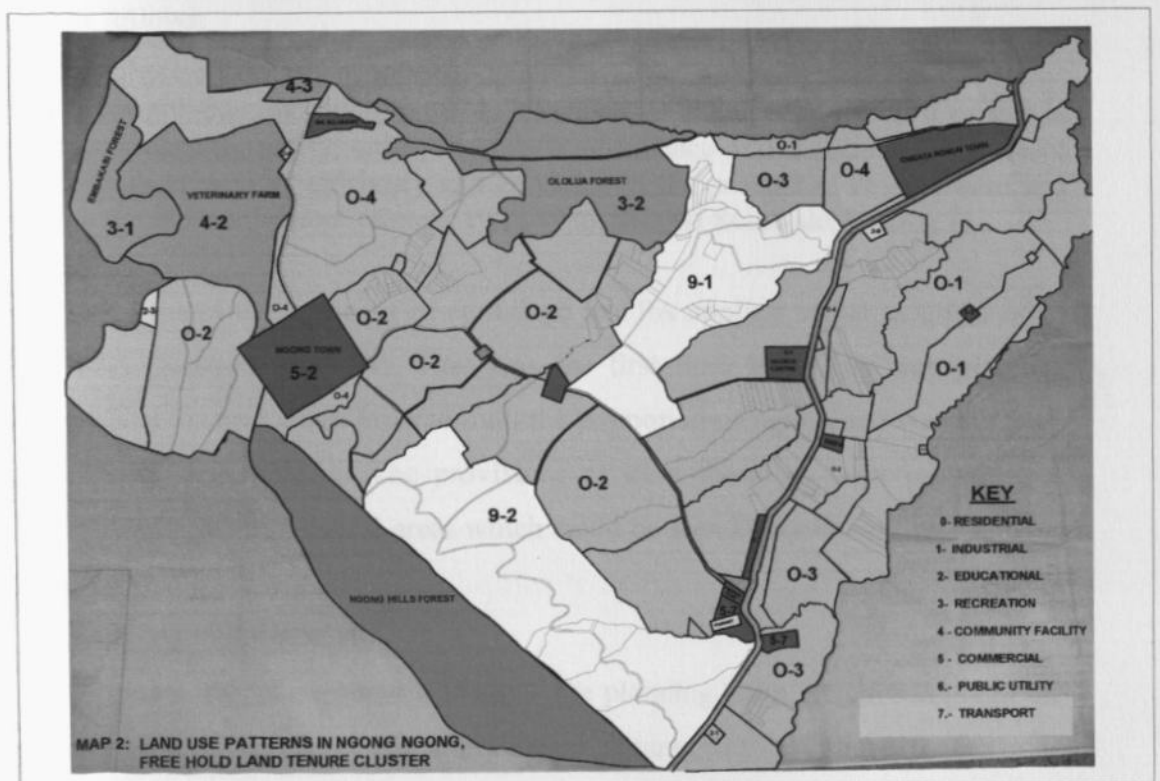
The foregoing analysis then prompted one question: that since there was no institutional transformations, to what extent can PPA be able to regulate land use within the three stages of land use processes as conceptualized in this study (chapter 3)? To answer this

question, two case studies are used to demonstrate that the PPA as an instrument of land use control cannot be effective to regulate land use in the rural areas and at the peri-urban areas in particular.

6.8.4.2 Application of the Physical Planning Act in the Case of Ngong-Ngong Zoning Plan in Per-urban Nairobi

The author of this thesis was involved in the preparation of the Ngong-Ngong zoning plan in the year 2002 which covers a division within Kajiado district located in peri-urban Nairobi. Some of the issues that the planning process was trying to address were the sporadic and unplanned commercial nodes and incongruous land uses, which took place within the residential areas. It was common in the Ngong-Ngong area to find high-density houses (flats, landies' Bandas) built and marooned together with bungalows and maisonnetes (See map 2).

MAP 2: Land Use Patterns in Ngong Ngong, Free Hold Land Tenure Cluster



Source: Kajiado District Physical Planning Office.

Butcheries and beer dens were found in the same neighborhood with residential houses. The planning team wanted to resolve the land use conflicts using the provisions of PPA since none of the previous land control instruments could be effective in controlling this category of land use development within the rural areas.

The first task which was undertaken by the planning team was to establish the statutory requirements for the preparation of the two plans for Ngong-Ngong and Ongata Rongai. For areas which fall within urban areas, the mandate to prepare local plans is specified in the PPA as follows:

“ The Director of Physical Planning may prepare with reference to any Government Land, trust land or private land within the area of the authority of a city, municipal, town or urban council or with reference to any trading or marketing center, a local physical development plan ----- for the general purpose of guiding and coordinating development of infrastructural facilities and services for the area referred to in subsection (1) and for the specific control of the use and development of land or for the provision of any land in such an area for public purposes” (Kenya, PPA cap 286, section 24 (1) (3)).

The objectives of the intended zoning physical development plan were also clearly mentioned as follows:

“Every local physical development plan shall have for its general purpose orderly, coordinated, harmonious and progressive development of the area to which it relates in order to promote health, safety, order, amenity, convenience and the general welfare of all its inhabitants as well as efficiency and economy in the process of development and improvement of communication” (Kenya, PPA 1996, Second Schedule, Section 1).

The objectives of land use planning as contained in PPA applied earlier to urban areas under the TPA (Kenya, Cap 134). This was the first time these land use planning objectives applied to rural areas. Prior to that, the promotion of agriculture was the main objective of rural development. The provisions of PPA therefore were promoting a second set of objectives in the rural areas which could be seen as the second set of public interest in rural land use planning.

In order to separate the incongruous land uses, the planning team which was given the task of preparing the plan used the approach of zoning strategy. Since the existing residential land uses were dominant (See map 2), the planning approach which was taken by the team was to zone some part of the Ngong-Ngong area as high density residential

(lower income), medium density (middle income) and low density (high income) residential. The types of houses to be built in each sub-zone were also specified in the zoning plan together with minimum plot sizes, minimum road widths and plot coverage and plot densities.

In order to restrict housing development from sprawling towards fragile areas such as water catchments areas and rivers, the zoning approach also separated such areas and declared them unsuitable for human settlement. Other areas were categorized as riparian reserves in order to protect the rivers. The third land use problem in the Ngong-Ngong area were the missing community facilities which included police posts, shopping centers, health centers, recreational areas, waste disposal sites and, churches. Roads in peri-urban areas were found to be narrow (4m or 6m wide) and the emerging land use density at the RUI required wider roads. As a result, the planning team proposed the widening of some roads. The proposals were depicted in the zoning plans for implementation (See map 2).

6.8.4.3.0 Lessons Learnt from the Implementation of the Plan

Some of the lessons learnt from the application of the Physical Planning Act are summarized below.

6.8.4.3.1 Contextualizing Land Use Level, Land Use Control and the Need for

Land Reforms

The areas that were set aside for road widening and buffer zones were already owned previously. If such land were to be available for the purposes for which it was zoned for during the planning process, then voluntary surrender and subsequent registration in the name of the new user (Road reserve) was necessary. The power to acquire land for public interest needs policy and legislative guidance (LEGIPOGUIDE) from the state. This kind of requirement was not provided for within the LEGIPOGUIDE of RLA (Kenya, Cap, 300) nor was it there in the PPA (Kenya, 1996, Cap 286). This requirement does not exist even within the provisions of the Land Control Act (Kenya, cap 302). All the areas which were zoned for road widening, buffer zones, and water catchments areas remained in

freehold title as private property and the user remained that of agriculture and not the newly proposed use of road widening or water catchments as zoned in the Ngong-Ngong plan. In order to facilitate land surrender for purposes of public interest, there is need for land reforms and this can be done through policy and legislative guide (LEGIPOGUIDE).

6.4.3.2 Land Use Regulation In Rural Areas, and Ambiguous Provision for a Lead Agency in the Physical Planning Act

The PPA specifies that LAs be the land use controllers of all types of development in all their areas of jurisdiction, part of that development category being the subdivision of land in the rural areas as seen below.

“ Subject to the provisions of this Act, each local authority shall have power:

- a) To prohibit or control the use and development of land or building in the interests of proper and orderly development of its area.
 - b) To control or prohibit the subdivision of land or existing plots into smaller areas.
 - c) To consider and approve all development applications and grant all development permissions
 - d) To ensure the proper execution and implementation of approved physical plans
 - e) To reserve and maintain all the land planned for open spaces, parks, urban forests and green belts in accordance with the approved physical development plan
- (Kenya, 1996, PPA, Part v, section 29 (a-f))

Subsection (a) of the PPA specifies that each LA shall have power to control development in its area of jurisdiction. It was therefore assumed that the rural area where peri-urban formation was taking place was also part of the jurisdiction of LAs and therefore LAs are supposed to use following provisions as found in the PPA to control land use.

“No person shall carry out development within the area of the local authority without a development permission granted by the local authority. Any person who contravenes subsection (1) shall be guilty of an offence not exceeding one hundred thousand shillings (100,000) or to an imprisonment not exceeding five (5) years or both” (Kenya, 1996 PPA 286, section 30(1) (2)).

It is assumed that if one contravenes the above requirement, LAs can use the above provision to penalize those who violate land use regulations. One of the land use developers who are to be regulated at the level of contextualizing land use stage is the land speculator (LASPE) category of developer.

Findings: The LASPE developer just proceeds to the District Surveyor (DS) and the District Land Registrar (DLR) to have his/her land subdivision mutations registered. The Land Survey Act (Kenya, Cap 299), the LCB Act (Kenya, cap 302) and RLA (Kenya, cap 300) specifies that LCBs are the land use approving authorities within the rural areas. The LCBs do not require land subdivision schemes to be in conformity with physical development plans such as the one prepared for the Ngong-Ngong area. The Local Government Act (Kenya, LGA, CAP, 265) which regulates the activities of LAs also specifies that the area of jurisdiction for local authorities is within the urban areas and not in the rural areas. The LASPE category of developer obtained approval from the land control boards (LCBs) instead of LAs as specified by the PPA (Kenya, 1996, cap, 286). It means, therefore, that the RESUS did not clarify lines of authority between LAs, LCBs and Minister of Agriculture and these created confusion among the authorities who were discharging duties in the rural areas.

6.8.4.3.3 Need to Regulate Physical Artifacts and Lack of Development Conditions

Other developers within the rural areas who the planning process envisages to regulate include homebuilders, house builders for rental purposes and those who build houses for sale. It was proposed in the Ngong-Ngong zoning plan that roads in the area be widened, and the types of houses to be constructed were specified. These proposals were aimed to promote harmony and public health standards in the public interest. Under the provisions of PPA, these categories of developers were, therefore, under obligation to follow the zoning plan which was prepared by the district physical planning team (Map 2) by seeking development permission. However, the land certificate which developers in the rural areas held as a title to the use of their land did not contain any development control conditions (D-SSDR) except those required by the land control boards. Secondly, the

PPA does not clarify which between the two aims of promoting agriculture and land use planning in rural areas was to take precedence in case there was planning conflict when trying to promote the two simultaneously. Similar findings were established in the planning of Ongata Rongai physical development plan.

Comment: The conclusion reached after analyzing the two case studies of Ngong-Ngong zoning plan and Ongata Rongai Local physical development plans is that attempts to harmonize the two land use systems of urban and rural through PPA cannot be effective under the current institutional arrangements. This is because the provisions of the PPA do not address land use control in all the conceptualized three levels of a land use process (chapter 3) and the provisions of RESUS are not sufficient to address the land reforms necessary for the reconstruction of the rural land use system. The two land use systems of urban and rural therefore remained mutually exclusive even during the regime of PPA.

6.9.0 Weaknesses in the Assumptions of Mutual Exclusivity between Urban and Rural Areas

However, the rural duality approach and the assumptions on which it was based during the post-colonial era were not sustainable because it had the following weaknesses which did not exist in the dual relationship during the colonial era.

6.9.1 Assumption of Mutual Exclusivity was not Tenable in Post-Colonial Era

Post-colonial policy was based on the assumption that the two sectors of urban and rural would be mutually exclusive forever. This assumption of duality during the colonial administration was valid because the colonial government through a system of legislation, treaties and coercion managed to keep the African population within the 'native reserves'. In post-colonial periods, movements between the rural area and urban areas were not restricted and the small farms in the rural areas could not employ the African population fully in farming. Therefore, the rural dweller had to move to the urban areas and the fringe areas of the cities in search of alternative livelihoods.

Other factors in the rural areas, which can be seen as push factors, include environmental degradation as a result of land over use, small farm holdings and serious unemployment and poverty (Nyangito et al, 2002). This has led to massive rural-urban migrations because it is assumed that urban areas have some real or imagined better opportunities (Okpala, 2004). The objectives of the government in addressing social equity in the rural areas by creating jobs and food security in diminishing rural land holdings were not realized. However, the government still believes that the strategy can work and currently government investment is still biased towards rural development.

6.9.2 Service Center and Growth Center Strategies could only Work in a Command System.

The assumption made in implementing Service Center and Growth Center policies was that the two strategies would create a symbiotic relationship between the dual rural and urban land use systems. It was also assumed that if the government provided infrastructure in the selected service and growth centers, this strategy would in turn attract investors to the urban areas. However, the location of investment and the type of business to engage in is a decision made by developers who consider other factors such as the profit motive and not policy objectives as envisaged by government policies. Such developers would therefore select locations which do not necessarily fall within the concept of the growth center or service centers strategy as anticipated by the state.

The fact that the final decision to invest and where to invest was made by the developers has worked against the growth centre strategy. This means that a few centers such as Nairobi, Mombasa, Kisumu and Eldoret have continued to dominate other centers as preferred destinations for employment, communication and infrastructure. Others better explain the foregoing argument as follows.

“But reality has shown that market economy may lead to a massive drain of population from certain areas and a heavy concentration of reserves in a limited number of high-density conurbations. These factors have given rise to the planning problem of how to determine the optimal dispersion of economic activity according to policy objectives that balance efficiency and equity. These points appear to suggest that future developments in this field demand a closer integration of regional economics with distance variables and location theory” (Richardson, 1969 p 21)

It is clear that the Growth Center and Service Center strategies could not be effective in an open market economy where individuals make personal choices. However, perhaps such strategies could be effective in a command economy where decisions are made by the government.

Conclusion-The analysis in this chapter shows that the communities in Kenya moved from the single and homogenous human settlement clusters during the pre-colonial period to the urban and rural settlement clusters during the colonial era. However, the policy bias during the post-colonial era has been towards rural development and this was a result of the urban human settlement clusters (UHDSC) and the rural human settlement clusters (RDHSC). The dual policy approaches have also been dictated by the presence of two economies; the rural agricultural economy and the urban non-farm economy. However, the two-sector policy development paradigm has tended to create two land use systems; the rural composite land use system (RUCOLAUSS) and urban composite land use system (URBACOLAUSS). Because of variations in the institutional frameworks and land use policy objectives between the two land use systems, a dichotomous relationship is created at the area of interface which is mutually exclusive.

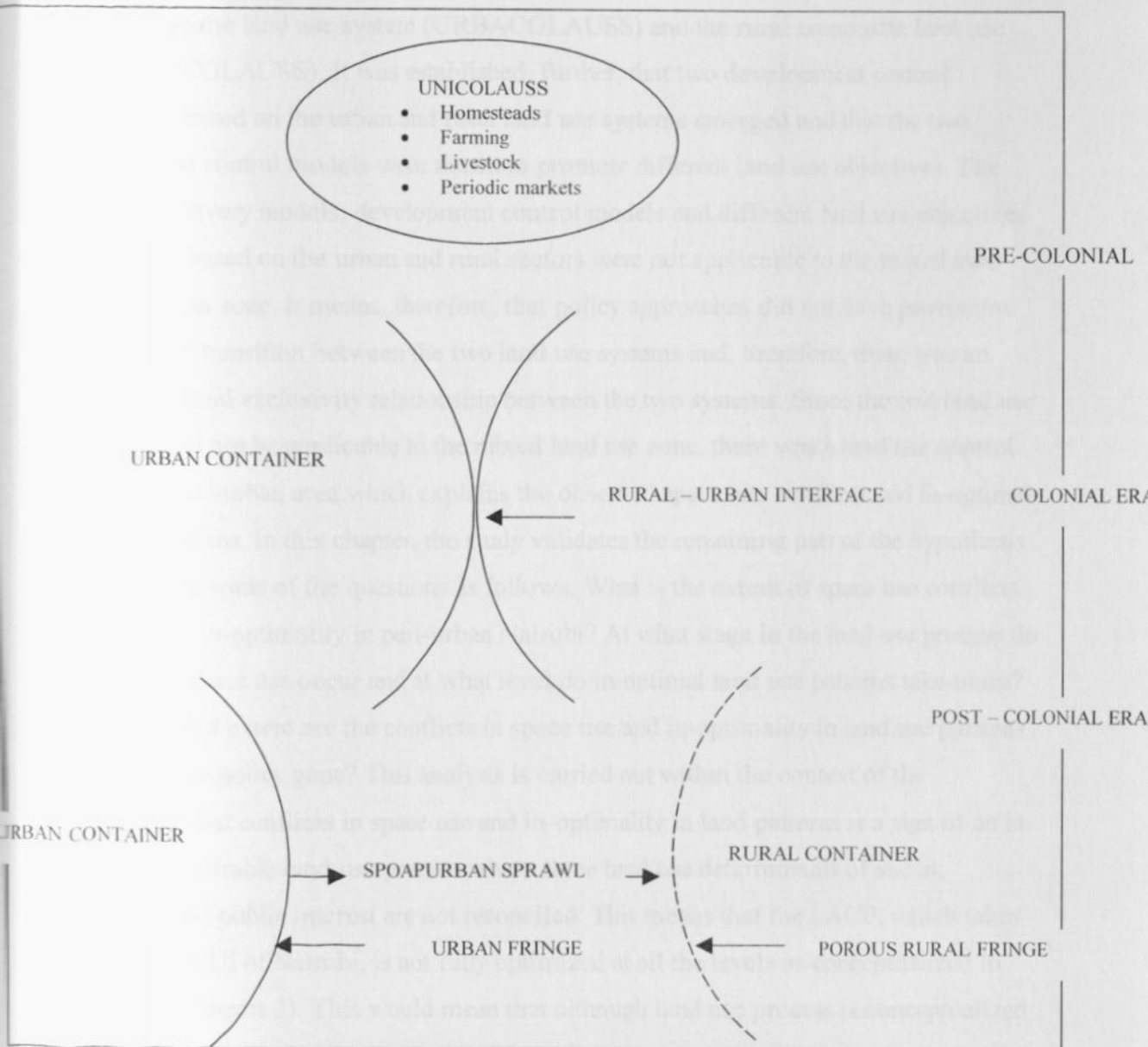
The human settlement policy and clustering on space is demonstrated in Figure 6.1. It is also demonstrated that peri-urban formation has developed over time as a result of the two sector policy assumption. However, there is evidence that Kenya would be characterized by high rates of urbanization and there is need therefore to prepare the cities for this change in HSC. This then would require a change in development policy and development paradigms. In this chapter, the study has partly validated the hypothesis that two land use systems which were assumed to be mutually exclusive have developed in Kenya overtime.

The study has also partly validated the hypothesis that the area of overlap at the rural-urban interface was not addressed by the existing policy and therefore the formation of the peri-urban area is sporadic. In Chapter 7, the study analyzes the factors accounting for the in-optimality and conflicts in land space use and the levels of such in-optimality in

land use. The study further demonstrates in chapter 8 that the differentiations in land administration approaches with variations in development control models between the two land use systems also created conditions at the RUI for the formation of the peri-urban area.

PATTERNS IN SUBURBAN NAIROBI

Figure 6.1: Land Use Processes in Kenya and Formation of Suburbia



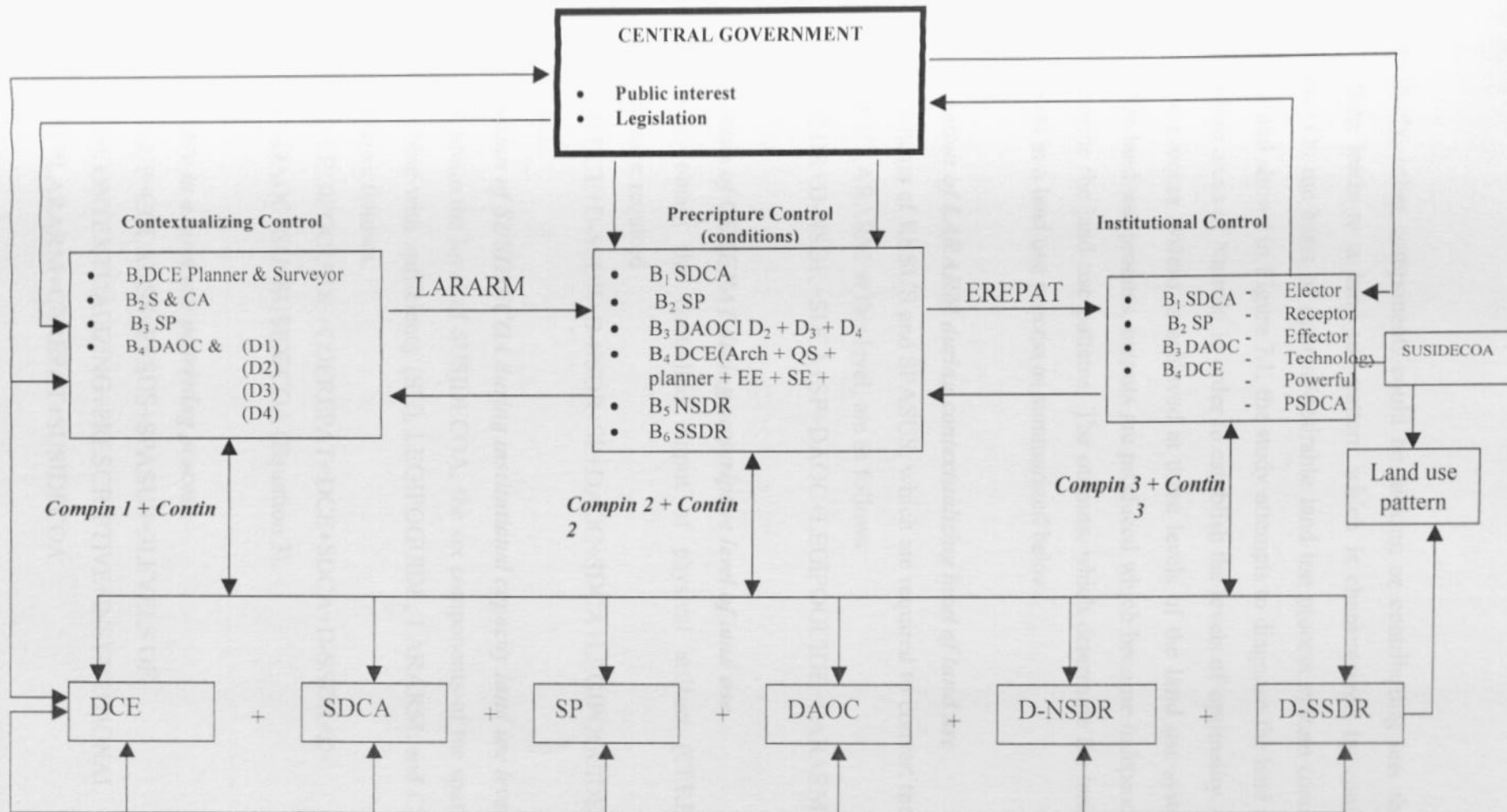
Source: Author's Construct

CHAPTER 7

FACTORS IN SPACE USE CONFLICTS AND IN-OPTIMAL LAND PATTERNS IN SUBURBAN NAIROBI

7.1 Synopsis

In Chapter 6, this study established that two land use systems evolved in Kenya; the urban composite land use system (URBACOLAUSS) and the rural composite land use system (RUCOLAUSS). It was established, further, that two development control approaches based on the urban and rural land use systems emerged and that the two development control models were meant to promote different land use objectives. The dual land delivery models, development control models and different land use objectives which were based on the urban and rural sectors were not applicable to the mixed land use peri-urban zone. It means, therefore, that policy approaches did not have provisions for a smooth transition between the two land use systems and, therefore, there was an assumed mutual exclusivity relationship between the two systems. Since the two land use models could not be applicable to the mixed land use zone, there was a land use control gap in the peri-urban area which explains the observed space use conflicts and in-optimal land use patterns. In this chapter, the study validates the remaining part of the hypothesis by answering some of the questions as follows: What is the extent of space use conflicts and land use in-optimality in peri-urban Nairobi? At what stage in the land use process do conflicts in space use occur and at what level do in-optimal land use patterns take place? Lastly, to what extent are the conflicts in space use and in-optimality in land use patterns attributable to policy gaps? This analysis is carried out within the context of the assumption that conflicts in space use and in-optimality in land patterns is a sign of an in-optimal/undesirable land use process where three land use determinants of social, economic and public interest are not reconciled. This means that the LAUP, which takes place at the RUI of Nairobi, is not fully optimized at all the levels as conceptualized in this study (Chapter 3). This would mean that although land use process is conceptualized to operate as a system at various levels where components convert their inputs into outputs to evolve a land use pattern, such process does not seem to be complete in peri-urban areas of Nairobi.



Source: - Author's construct

KEY

DCE – Development Control Experts

SP – Spacial Plan

D-NSDR – Developer Neighbor Shared Development Right

SDCA - Single Development Control Authority

DAOC - Development Activities of Citizens

D-SSDR – Developer State Shared

Alternatively, other components could be lacking or contributing less than optimum, which, then leads to a land use pattern which is characterized by conflicts and in-optimality. On the basis of optimal/desirable land use process system conceptualized in Chapter 3 and shown in Figure 7.1, the study attempts to diagnose the land use processes in peri-urban areas of Nairobi in order to establish the levels of optimality. Optimality in a land use process system is achieved at three levels of the land use system. At every level of the land use process, outputs are produced which become independent variables that determine the land use patterns. The outputs, which determine the land use pattern, are obtained in a land use process as summarized below.

(a) Formation of LARARM during contextualizing level of land use

The components of RESUS and SPASUS, which are required to convert their inputs into the output of LARARM at this level, are as follows:

$$DCE+D-SSDR+D-NSDR+SDCA+SP+DAOC+LEGIPOGUIDE=LARARM \quad (\text{Equation 1}).$$

(b) Formation of CEREPAT during prescriptive level of land use

In order to obtain the controlled output of physical artifact (CEREPAT), eight components are required

$$LARARM+DCE+D-SSDR+D-NSDR+SP+DAOC+SDCA+LEGIPOGUIDE=CEREPAT \quad (\text{Equation 2}).$$

(c) Formation of SUSIDECO A during institutional capacity land use level

In order to attain the level of SUSIDECO A, the six components of the spatial subsystem would combine with sufficiency (SU), LEGIPOGUIDE, LARARM, and CEREPAT (10 components) as follows.

$$LARARM+LEGIPOGUIDE+COEREPAT+DCE+SDCA+D-SSDR+D-NSDR+SP+DAOC+SU=SUSIDECO A \quad (\text{Equation 3}).$$

(d) Optimality in a land use patterning process

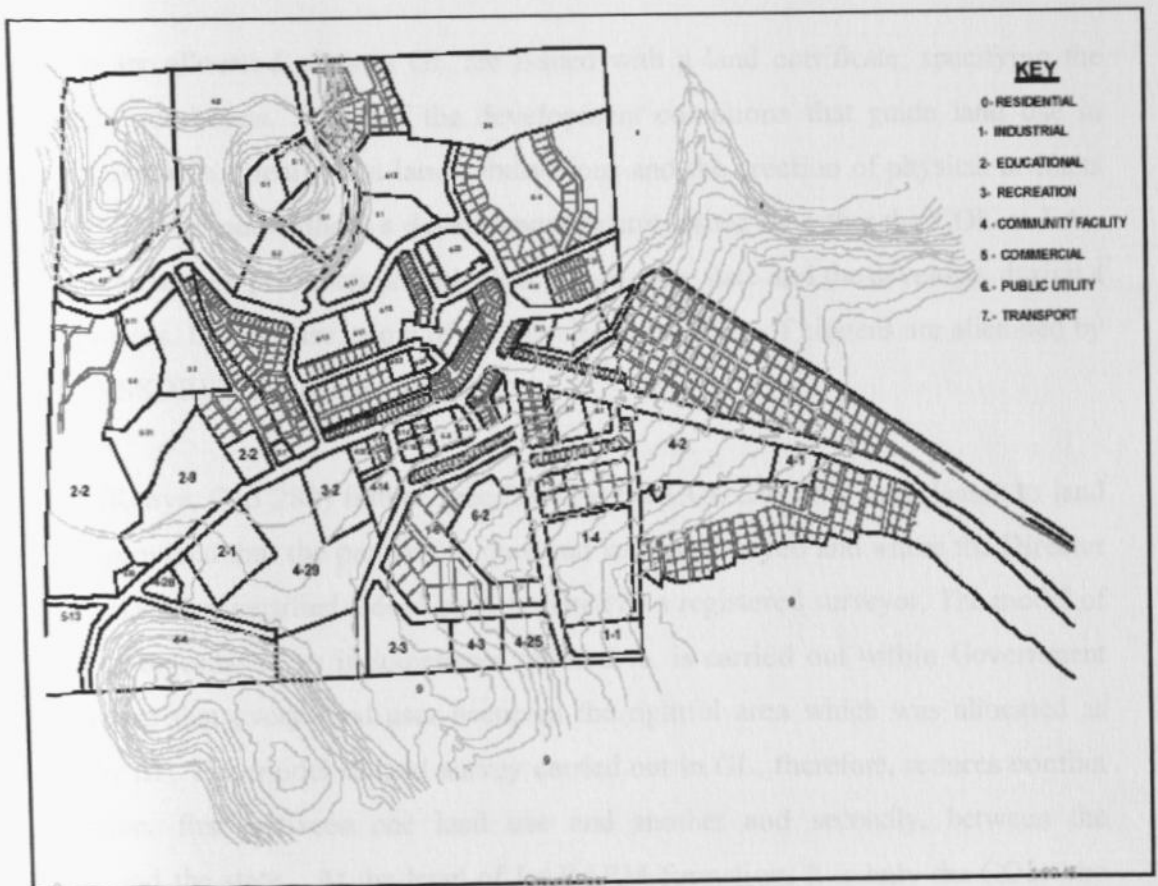
$$\begin{aligned} \text{OPTMUM LUP} &= \text{COLAUSS} = \text{RESUS} + \text{SPASUS} = 3 \text{LEVELS OF} \\ \text{COLAUSS} &= \text{CONTEXTUALIZING} + \text{PRESCRIPTIVE} + \text{INSTITUTIONAL} \\ \text{CAPACITY} &= \text{LARARM} + \text{CEREPAT} + \text{SUSIDECO A} \end{aligned}$$

The model is used, therefore, to diagnose land use patterns in peri-urban Nairobi using the case study approach of the four land tenure clusters. The land tenure clusters where this model was used to estimate land patterns include; the former Government Land Tenure Cluster (GLTC), Cooperative Land Tenure Clusters (CLTC), Freehold Land Tenure Cluster (FHLTC) and the Trust Land Tenure Cluster (TLTC).

7.2.0 Land Use Process in Government Land Tenure Cluster and Levels of Land Use Patterns; the Case of Athi River and Ngong Towns

In this section, the land use process within GLTC is diagnosed.

Map 1: Ngong GLTC Land Use Pattern



Source: Kajiado District Physical Planning Department

7.2.1 Provisions of Government Land Act and Formation of the Output of

LARARM

Both Ngong and Athi River towns are covered by Government Land (GL), which is managed by the Commissioner of Lands (COL) under the Government Lands Act (GLA) (Kenya, Cap 280). During the field survey, it was established that the land delivery model within the provisions of GLA (Cap, 280) requires that before land is availed for development, a competent authority (DCE) must prepare a plan (SP) to facilitate land alienation. The plan which is prepared by the competent authority (DCE) must be approved by the COL. This then ensures that planning is carried out on a plain surface and the land use planner identifies all space users for land allocation.

Those who are allocated plots in GL are issued with a land certificate, specifying the development conditions. Some of the development conditions that guide land use in GLTC, for example, specify that land subdivisions and the erection of physical artifacts shall not be carried out without a development permit issued by either the COL or LAs. This requirement then promotes consultation between the state and the developer during a land use process. In this case, some of the development rights of citizens are alienated by the state (D-SSDR) in the public interest.

The GLA (Kenya, Cap 280) further specifies that the COL can only issue leases to land owners on provided that the property in question land is surveyed and where the Director of Surveys (DS) has certified a deed plan prepared by a registered surveyor. The model of fixed survey or cadastre as is sometimes referred to, is carried out within Government land to ensure that every land user occupies the rightful area which was allocated as specified by SP. The model of land survey carried out in GL, therefore, reduces conflict and litigation, first between one land use and another and secondly, between the landowner and the state. At the level of LARARM formation, it is only the COL who supervises the land use development process up to the level of registration and issuance of titles.

It can be realized that at this level of the LAUP, the SP has already set minimum land sizes. The idea of minimum land sizes ensures that the land speculator can not subdivide land beyond the minimum standards unless he/she has special approval from the COL. Secondly, land use activities by the HOBUEHOM, HOBUSE and HOBURE are already predetermined at this level of the land use process and the location of their land use activities are also predetermined by the SP. The six components of the Spatial Subsystem (SPASUS) are already guided by LEGIPOGUIDE as specified in the model (7.1). The policy guide in urban areas, for example, was to protect amenity, public health, economy and efficiency (Kenya, 1931; TPA, Cap 134). The institutions, which are involved in the land use process within GL during the formation of LARARM, are also mentioned. These are the COL at the contextualizing land use stage, GLA (Kenya, Cap 280) and TPA (Kenya, 1931, Cap 134) and LAs at the levels of institutional capacity and erection of physical artifacts, LGA (Kenya, Cap 265).

7.2.2 Optimization of the Output of LARARM; Field Findings

Out of six components of SPASUS needed to convert inputs to LARARM, the component of D-SSDR was fully converted because the lease certificate incorporated development conditions. Two development control experts who are required at this level, the land surveyor and land use planner as conceptualized in this study, were involved at stage one of the land use process. All the development activities by various developers (DAOC) were fully contextualized within a SP. However, SDCA was divided into two; the COL and LAs at various levels of land use control.

The variable of spatial framework (SP) was fully converted towards the formation of LARARM because GLA (Kenya, Cap 280) requires that no land allocation should be carried out without SP. Although the law (Kenya, GLA, Cap 280) requires that GL should be advertised and be auctioned before it is allocated, the field survey established that this requirement was never applied. It was concluded in this study, therefore, that the variable of D-NSDR was not converted towards the formation of LARARM within the GLTC as required in the conceptual model.

Since each of the seven components was expected to produce an input with a value of 0.046 towards the formation of LARARM, the contribution of SDCA as a component was therefore half (.023) because of the presence of two development control authorities. The variable of D-NSDR contributed 0.046 as a negative input to the output of LARARM because there was no public consultation in GL. The final formation of LARARM after receiving the necessary inputs from the required components of RESUS and SPASUS were as follows.

$$B1LEGIPOGUIDE(0.046)+B2,DCE(0.046)+B3D-SSDR(0.046)+B4SP(0.046)+B5SDCA(0.023)+b6D-NSDR(-0.046)+B7DAOC(0.046) = LARARM(0.253).$$

If LARARM had received all the necessary inputs from all the seven components, it should have been optimized at 0.32. However, it only received 0.253 inputs because other components were not converted into outputs. The levels of positive land patterning during the contextualizing land use stage were 79.06% and the remaining (20.94%) was negative.

7.2.3 Land Use Process in Government Land Cluster during Prescriptive Level and Formation of CEREPAT.

At this level of the land use process, developers who erect physical artifacts include the HOBUSE, HOBUHOM, and HOBURE and their activities must be controlled at this level in order to predetermine a land use pattern. In order to obtain the required optimum output of CEREPAT, the following variables from SPASUS and RESUS are integrated as follows:

$$DCE+SP+DAOC+SDCA+D-SSDR+D-NSDR+LEGIPOGUIDE+LARARM=CEREPAT$$

The 8 components shown above were expected to contribute inputs with a value of 0.04 each towards the formation of CEREPAT. It was considered in this study however that in the category of DCE, the following experts were critical in advising the developer at this level. Experts who were expected to advise the developers who erect physical artifacts at this level include the architect (ARCH), the planner (PP), the electrical engineer (EE) and the public health officer (PHO). In order to control the erection of physical artifacts, other

similar experts in the public sector should also scrutinize the development proposals and the drawings submitted by experts in the private sector independently. The role of the municipal planner (MP), municipal engineer (ME) and municipal public health officer (MPHO) were therefore seen as essential inputs towards the formation of DCE. After DCE obtains all the necessary components, then it contributes an input with a value of 0.04 to the formation of CEREPAT also. The component of DCE therefore needs inputs from the antecedent variables of ARCH, PP, EE, PHO, ME, MP and, MPHO. The assumption made here is that all the components have equal weight of 0.04.

4.144 *Public Sector in Rural River Government Land Tenure Cluster*

7.2.4 Formation of CEREPAT in Government Land Tenure Cluster

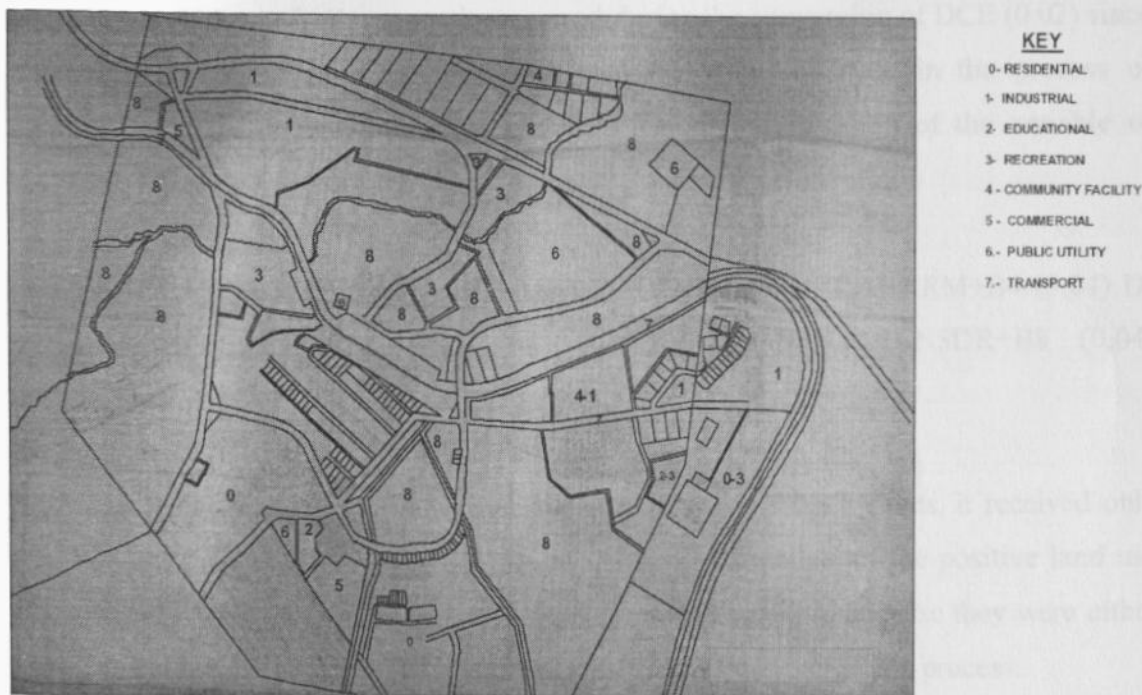
It was established during the field survey that developers who put up physical artifacts within GL cluster tended to engage only one professional expert from the private sector; the architect. It was established that both Olkejuado County Council and Mavoko Municipal Council did not specify that building plans were to be prepared by qualified or registered architects hence even draughtsmen/women could draw such plans for approval. After obtaining development permission, such developers went ahead to pick the category of Manson builders who were not even qualified in the work of building construction. For the sake of this analysis, however, it was assumed that at least the role of an architect was engaged at this level of the LAUP, even though the professional qualification of the 'architect' who was engaged was in doubt.

However, within the public sector, the following professional experts were also involved in scrutinizing development proposals prepared by architects in the private sector. These were the municipal Planner, municipal engineer and municipal Public Health Officer. It was found out that these officials were actually under the central government and not under the Local Authorities as such. But, their inputs in the LAUP were considered in this study to be part of the LAs since they had no obligation in terms of their core functions to engage in land use control. However, most of the professionals who are mentioned above had no means of transport to enable them monitor development in the field. This problem was compounded by the long distance to the areas where development took place. The development control experts (DCE) therefore had a

tendency to recommend plans for approval without ensuring that such developments were in conformity with the SP.

The two towns of Ngong and Athi River were however covered by the statutory Physical Development Plans (SP) prepared by the Director of Physical Planning (DPP). It was established that developers complied with the provisions of the existing structure plans that contextualized development and land use zones (See Map 1 and 2).

Map 2: Land Use Patterns in Athi River Government Land Tenure Cluster.



Source: Machakos District Physical Planning Office

All developers in GLTC within Athi River and Ngong towns applied for development permits as specified in their lease certificates. However, not all buildings were constructed to the original zoning requirements of the two towns since other houses had illegal extensions. It was, for example, observed that in an area specified for the bungalow type of houses, developers had constructed flats in the same compound for rental purposes. The articulation of roads and other open spaces, however, remained as

earlier specified in the zoning plan. This is an indicator that the developer has land use motives, which are opposed to the controls contained in the SP, or perhaps they were not consulted to incorporate their inputs in the land use process.

Optimization of CEREPAT; evidence from field survey

On the basis of field survey, it was noted that only four out of 8 components were able to convert all their positive inputs towards the formation of CEREPAT as an output. These components were: the SP, DAOC, LARARM and D-SSDR. As earlier observed, the inputs from the variable of SDCA were divided into half because they were shared by LAs and the COL. A similar scenario occurred during the conversion of DCE (0.02) since not all the required development control experts were involved in the process of controlling the erection of physical artifacts. The final formation of the variable of CEREPAT was as follows:

CEREPAT (0.24)=B1 (0.04) SP+B2 (0.04) DAOC+B3 (0.04) LARARM+B4 (0.04) D-SSDR+. B5 (0.02) SDCA+B6 (0.02) DCE+B7 (-0.04) D-NSDR+B8 (0.04) LEGIPOGUIDE.

Although CEREPAT should have received a maximum of 0.32 inputs, it received only 0.24, which forms a percentage of 75% towards the formation of the positive land use patterns. The remaining (25%) of the inputs remained negative because they were either not converted or were partly converted towards the land use patterning process.

7.2.5 Land Use in Government Land Tenure Cluster During Institutional Stage and Formation of SUSIDECO.

Synopsis

The optimum level (0.32) of SUSIDECO requires the following components, which should contribute a value of 0.032 each towards SUSIDECO. $SUSIDECO = SP + RESUS + SU (DC + RE + PD + TPC + PO1 + PO2 + PO3) = DCE + SDCA + D-SSDR + SP + DAOC + LARARM + LEGIPOGUIDE + CEREPAT + SU.$

To attain the level of sufficiency, SDCA must have within its establishment a department dealing with Development Control (DC), a department dealing with research (RE) (receptor), a department handling Physical Planning (PD) or the preparation of the spatial framework (SP). The SDCA should also hold regular meetings of the Town Planning Committee (TPC) to discuss issues of forward planning and any changes in the land use process. Finally, the single development control authority should have power (PO1) to control the activities of the spatial system components and power (PO2) to integrate the activities of the two subsystems at the three levels of COLAUSS.

Findings

The components that contribute to sufficiency (SU) as conceptualized in this model were absent from the two local authorities of Olkejuado and Mavoko. The two LAs required research (RE) departments to enable them monitor the composite land use system (COLAUSS) but none of them had this provision within their establishments. For example, both local authorities did not have planning departments (PD) and Town Planning Committees (TPC) was held for the sake of facilitating the allocation of plots. It was noted also that the two local authorities did not have the power (PO1) to integrate the SPASUS and the RESUS because the responsibility to control land use was shared between the Commissioner of Lands and the Local Authorities. This was against the requirements of the single development control authority (SDCA) as required in the model conceptualized in this study (Figure 7.1).

The study also noted that LEGIPOGUIDE, which comes from RESUS subsystem, was available for full conversion to the output of SUSIDECO. The two components of LARARM and CEREPAT, which resulted from the interactions between the components of RESUS and SPASUS during level one and two of the land use process, were also available. Components, which converted their inputs towards SUSIDECO, are as follows:

B_1 (0.032) D-SSDR + B_2 (0.032) DAOC + B_3 (0.032) SP + B_4 (0.032) LEGIPOGUIDE + B_5 (0.032) LARARM + B_6 (0.032) CEREPAT + B_7 (0.032) DAOC + B_8 (0.016) SDCA + B_9 (0) SU + B_{10} (-0.032) D-NSDR = 0.24.

7.2.6 The Final Land Use Patterns in Government Land Tenure Clusters

The summation of the outputs which evolve from the three levels of the land use process at the contextualizing level, the prescriptive level and the institutional capacity level can give indications of optimal levels of land use patterning within the two towns of Ngong and Athi River towns.

$$B_1\text{LARARM}+b_2\text{CEREPAP}+b_3\text{SUSIDECO}A=\text{LUP.}$$

$$B_1(0.253)\text{LARARM}+B_2(0.24)\text{CEREPAT}+B_3(0.24)\text{SUSIDECO}A =0.733$$

7.3.0 Land use in Freehold Land tenure clusters of Ngong-Ngong and Katani

Ngong-Ngong in Kajiado district and Katani in Machakos district are found within the former African rural areas which are under FHLTC. The land patterning process in the FHLTC, which is obtained through the independent variables of LARARM, CEREPAT and SUSIDECO A were discerned as follows:

7.3.1 Contextualizing Level of Land Use Freehold Tenure Land Clusters and Formation of LARARM.

As earlier mentioned, the formation of LARARM requires a total of seven components drawn from both RESUS and SPASUS as follows:

$DCE+D\text{-SSDR}+D\text{-NSDR}+SDCA+SP+DAOC+LEGIPOGUIDE=LARARM.$ All the components contribute an equal value of 0.046 out of the possible 0.32 which is required at this level of the land use process towards the formation of LARARM.

Field results

The study found out that Ngong-Ngong area has a spatial framework (SP) which was prepared by the Physical Planning Department (PPD) as highlighted in Chapter 6. The SP clearly specified areas, which were zoned for high-density residential, medium density residential, low density housing and areas that were specified for road widening. Although PPA specifies that LAs should approve land use development at all levels of the land use process including land subdivisions, the field survey found out that the land subdivision approving authority in the rural areas were actually the Land Control Boards

(LCBs). LCBs derived their authority from the Land Control Act (LCA) (Kenya, Cap 302). The presence of two land use controlling authorities at the same level of the land use process then went against the requirement of single development control authority (SDCA) as conceptualized in this study.

The certificates of land ownership issued to landowners in the FHLTC, do not contain any conditions for development control (-D-SSDR). However, the LCA (Kenya, Cap 302) specifies that those involved in land subdivisions in the rural areas must seek LCB consent in order to promote the agriculture sector. It was established that LAs were provided with the powers to control land use in the rural areas in terms of the PPA (Kenya, 1996, Cap 286) and similar powers were given to LCBs under the LCA (Kenya, Cap 302). The two provisions of LEGIPOGUIDE under LCA and PPA were found to be running concurrently. However, since LCBs have long since been controlling land use in the rural areas, developers at the contextualizing level of land use were accustomed to the former land use system under the LCA (Kenya, Cap 302) and not PPA (Kenya, 1996 Cap 286)

The PPA (Kenya, 1996, Cap 286) provides that land subdivision schemes shall be prepared by registered physical planners (-DCE). However, the field survey noted that instead, land surveyors were actually preparing these schemes. This confusion was created by the dual provisions within the Survey Act (Kenya, Cap 299) and the Land Control Act (Kenya, Cap 302) and the PPA (Kenya, 1996, Cap 286). It was established, for example, that LCA (Kenya, Cap 302) and the Survey Act (Kenya, Cap 299) have given powers to land surveyors to prepare land mutations in order to facilitate land registration in the rural areas.

The PPA (Kenya, 1996, Cap 286) also provides that physical planners shall prepare land use plans and land subdivision schemes in all areas including the rural areas. There is no clarification in the PPA, RLA and the Survey Act on how the division of responsibilities between land planners and land surveyors are to be shared. This confusion created discretion among developers who then tended to bypass land use procedures which they

considered costly and deterrent to the profit maximizing intentions and this is how they viewed the PPA.

Besides the existing conflicts between the powers of LCBs and LAs, the Director of Agriculture (DA) was also involved in the regulation of rural land use under the Agricultural Act (Kenya, Cap 318). In keeping with the objectives of Agricultural productivity in the rural areas, LCBs and the DA seemed to share responsibilities as specified by the Agriculture Act (Kenya, Cap 318) and the LCA (Kenya, Cap 302). However, the activities of the LCBs and the DA were considered to be complementary because both of them were aimed at promoting agricultural productivity in the rural areas.

It is conceptualized in this study that Land which is to be adjudicated in order to produce the output of LARARM should be on a plain field and such land should not be under the ownership of any individual or authority (chapter 3). The rural areas of Katani and Ngong-Ngong were already settled and land had already been allocated to individuals using the regime of the Registered Land Act (Kenya, Cap 300). This means that LARARM as a variable had already been obtained earlier using a different land delivery model which, however, did not address all space use requirements. Developers had also gone ahead to put up physical artifacts, which were not controlled (CEREPAT) as conceptualized in this study. It means that the land use process in the two areas of Katani and Ngong-Ngong had already reached the second stage of the land use process without the benefit of regulatory planning.

It was concluded, therefore, that the land use process in FHLTC cannot evolve the output of LARARM at this level as conceptualized in this study since land was not available for alienation. Those who were involved in land use planning in the rural areas for example found conflict between promoting the objectives of agricultural production and those of land use planning (Chapter 6). Yet, there was no policy guide to clarify which between the two objectives of promoting agriculture and the objectives of promoting elements of public interest through land use planning was subservient to the other. The type of land survey, which was undertaken in the rural areas, was the general boundaries approach or

the approximate type. Since this approach encouraged landowners to demarcate their land using live fences such as hedges, this gave rise to boundary disputes when such fence is removed or tampered with. Because LEGIPOGUIDE gave two conflicting policy objectives to be achieved in freehold land clusters and never clarified on how to reconcile the two, the contribution of LEGIPOGUIDE was considered to be half towards the formation of LARARM. This also meant that land use objectives in the rural areas had a dual objective while the institutional framework had a single alignment towards the promotion of agriculture.

The process of land adjudication in FHLTC was undertaken by local committee members who were appointed by the Land Adjudication Officer as specified by the Land Adjudication Act (Kenya, Cap 288). This study considered that the variable of D-NSDR was therefore converted towards the formation of LARARM. Although seven variables were required to form the output of LARARM, it was only the component of D-NSDR which was fully converted and the contribution of LEGIPOGUIDE was also available but sub-optimal because it contributed only half of the policy guidance. The rest of the components of SPASUS land use system contributed negative inputs since their inputs were not fully converted towards the output of LARARM. The formation of LARARM in FHLTC can be summarized as follows:

$$B_1(-0.046)DCE+B_2(-.0.046)SDCA+B_3(-0.046)SP+B_5(-0.046)D-SSDR+B_6(+0.046)D-NSDR+B_7(+0.023)LEGIPOGUIDE$$

$=0.069/0.32=+21.562\%$. Whereas the maximum optimal levels required at this level of the land use process were 0.32; only 0.069 were obtained as positive inputs, constituting 21.56%. This means that the largest percentage of components in FHLTC (79.43%) did not convert their inputs towards the formation of LARARM

7.3.2 Land Use in Freehold Land Tenure Cluster during Prescriptive Stage and Formation of CEREPAT.

In this subsection, the study aimed to establish how the activities of the rest of developers who were categorized as HOBUSE, HOBURE, and HOBUEHOM were regulated in the FHLTC. The control of the activities of the above categories of developers is an indicator

of how the output of CEREPAT was evolved. The components, which are needed to create the output of CEREPAT at this level of the land use process, are as follows.

DCE+SP+DAOC+SDCA,+D-SSDR+D-NSDR+LEGIPOGUIDE+
+LARARM=CEREPAT.

Each of the eight components was expected to contribute an input of 0.04 towards the formation of the output of CEREPAT.

Field findings

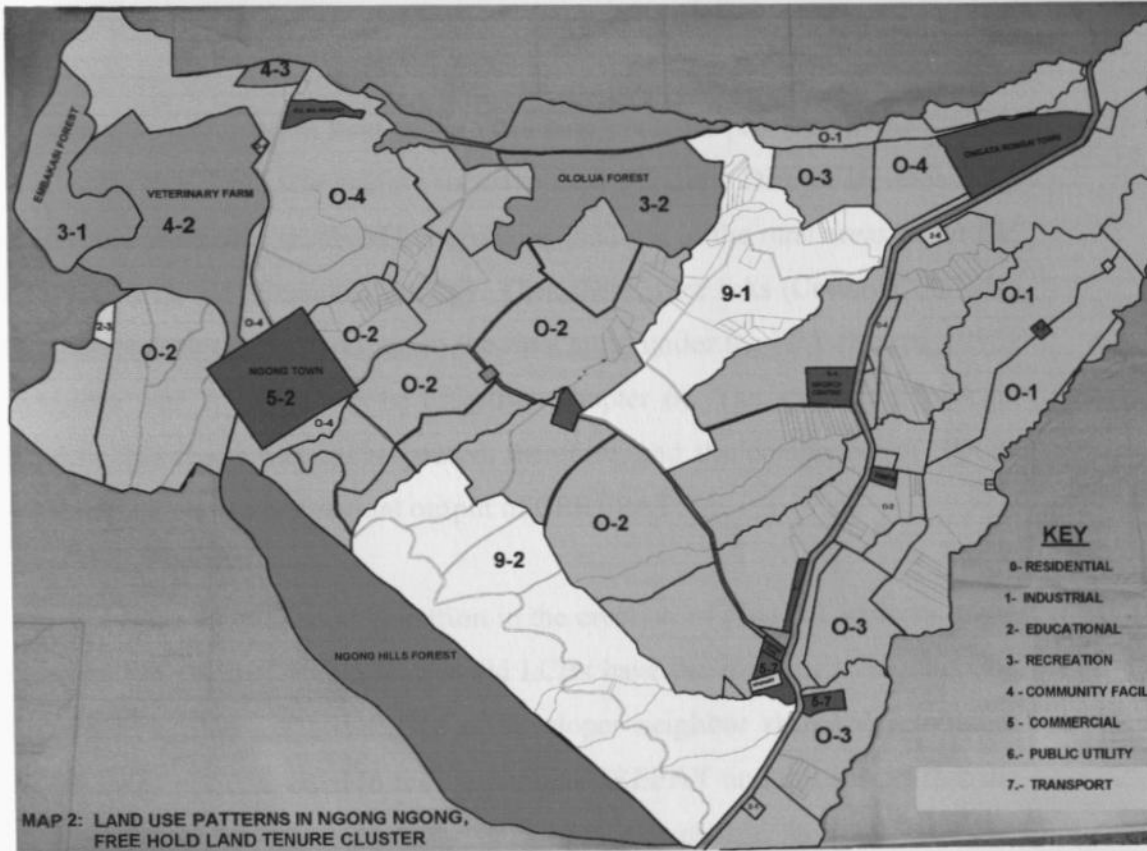
Developers who were categorized as the HOBUSE, HOBURE and, HOBUHOM within the rural areas were issued with freehold certificates of land ownership that did not include development conditions (-D-SSDR). Although there were no conditions in the land ownership certificates which required such developers to seek development permits, the field survey established that most of such developers tended to consult the services of an architect or draughtsman (DCE).

After receiving building plans from architects, these developers did not however seek for development permission from the LAs as required by PPA (Kenya, 1996, Cap, 286) and LGA (Kenya, CAP 265). Field survey further established that the type of building plans which such developers used in the construction of their houses were actually those borrowed from their friends and neighbors who had carried out similar development projects. The two local authorities of Mavoko Municipal Council and Olkejuado county council confirmed that developers in FHLTC never sought for development permission unless the approval of the plans were required by banking institutions as a condition for purposes of lending loans.

However, since FHLTC were not zoned or the zoning was not followed, the home seeker developer could not anticipate nor control the activities of the subsequent developers (DAOC). For example, after a home developer had constructed a dream house, other developers who constructed informal houses later joined the HOBUHOM category of developer. Those who constructed houses for renting also joined the HOBUHOM developer. This tended to create incongruous residential neighborhoods (See map 3).

Although the residential housing zones are not shown, most of the developments shown on Map 3 are residential while some of the residential developments were of high density, medium density, low density and others were made of informal materials. However, the community facilities were missing as everybody who bought land tended to construct a residential house.

Map 3: Land Use Patterns In Ngong Ngong, Free Hold Land Tenure Cluster



Land use control authorities in the FHLTC are LCBs who had no mandate to regulate some categories of land use development such as the erection of physical artifacts (CEREPAT).

The provisions of the conceptual land use model in Chapter 3 requires that there should be only one single development control authority (SDCA) in the land use process at all levels. However, there were many development control authorities in the rural areas. These included the LCBs who regulated agricultural land under the LCA (Kenya, Cap 302) and the MA who delegated his powers to the DA and whose role was to promote good crop and animal husbandry (Kenya, Cap 318).

Local chiefs were also involved in land use control using powers provided in the Chief's Authority Act while their role was mainly to solve land disputes. District Development Committees (DDCs) were also involved in regulating land use in the rural areas under the District Focus for Rural Development strategy. Then there were LAs (County Councils) who are also mandated to control land use in the rural areas under the PPA (Kenya, 1996) although their role was found not to be effective (chapter 6). The spirit of SDCA as conceptualized in this study was not respected, therefore, and the component of SDCA did not convert its input towards the final output of CEREPAT.

There was no provision for public participation in the erection of physical artifacts in the rural areas under LCA (Kenya, Cap 302) nor did LCBs have the mandate to regulate the erection of physical artifacts. The variable of developer neighbor shared development rights (D-NSDR) was not converted to the output of CEREPAT and this means that the economic and social factor were the only land use determinants in rural land use development to the exclusion of public interest. Although there was a plan (SP) to contextualize development control within FHLTC in Ngong-Ngong zoning plan, developers did not follow the plan and the variable of SP did not therefore contribute positively to the formation of CEREPAT. The final formation of the output of CEREPAT was therefore as follows:

$B_1(-0.04)SP+B_2(0.02)DCE+B_3(0)SDCA+B_4(-0.04)D-SSDR+B_5(0.04)D-NSDR+B_6(-0.04)DAOC+B_7(-0.04)LARARM+B_8(+0.02)LEGIPOGUIDE$
 $=0.08/0.32=$. This again shows that the largest percentage of the land patterning process at this level was negative and this explains space use conflicts and in-optimality of land use in FHTC. It also means that the erection of physical artifacts, which actually contribute to desirable land use patterns, was not controlled in FHLTC.

7.3.3 Land Use Process in Freehold Land Tenure Cluster During Institutional Capacity and Formation of SUSIDECO

In order to obtain SUSIDECO, the following formula was used as shown earlier.
 $DCE+SP+D-SSDR+D-NSDR+DAOC+SDCA+LARARM+COREPAT+LEGIPOGUIDE+SU$
 $DC+RE+PD+TPC+PO1+PO2+PO3$.

Field Survey Findings

In the freehold land cluster, one component of D-NSDR (0.032) contributed its full input to the output of SUSIDECO and the component of DCE contributed half (0.016). All the other 5 components from the spatial system did not contribute anything to the variable of SUSIDECO. The two local authorities of Mavoko and Olkejuado County Council did not have PDs and they did not have RE sections. DC sections were either missing or were being manned by incompetent departments of survey as was in the case of Kajiado or by a works officer as was the case of Mavoko Municipal Council. Secondly, the development control sections did not have the required manpower and did not have vehicles to help the workers to monitor development in the field. The variable of sufficiency (SU), which was considered to be part of the inbuilt capacity within the institution of Local Authorities designed to effectively control land use in their areas of jurisdiction was lacking. Therefore, SDCA was not responsible for the land use system in the FHLTC as conceptualized in this study.

Apart from the PPA, which specifies that LAs should control land use in rural areas, the allied statutes such as the LGA (Kenya, Cap 265), LCA (Kenya, Cap 302) and the

Agriculture Act (Kenya, Cap.318) did not recognize LAs as part of the rural area land use control process. Moreover, the rest of the legislations in the rural areas did not require developers at the level of erecting physical artifacts to seek for development permits and the land certificates, which were held by developers in the freehold land tenure clusters, did not require them to obtain development permissions either. This means that as an integrator, LAs did not have powers to undertake the task of land use control in the rural areas and they did not have powers to control the RESUS and SPASUS within the rural area land use process.

The LEGIPOGUIDE also provided planning to be carried out in the FHLTC in terms of the PPA (Kenya, 1996, Cap 286). The provision of LEGIPOGUIDE did not however clarify how to promote the dual policies of agricultural production and that of promoting elements of public interest concurrently without compromising one of them. LEGIPOGUIDE did not also clarify the roles of the institutional frameworks between the LCBs, LAs, DDCs and MA. LEGIPOGUIDE contributed only half of its inputs towards the formation of SUSIDECO because it created ambiguity in the rural freehold tenure cluster land use process.

$B_1(-0.032)SP+B_2(-0.032)SDCA+B_3(-0.032)D-SSDR+B_4(-0.016)DCE+B_5(-0.032)D-NSDR+B_6(-0.032)DAOC+B_7(-0.032)LARARM+B_8(-0.032)CEREPAT+B_9(+0.016)LEGIPOGUIDE+B_{10}(-0.032)SU=0.064/0.32=+20\%$. This means that the remaining components were not converted towards the formation of SUSIDECO and this formed the largest part of the land patterning process (80%).

7.3.4 Levels of Optimality in Land Use Patterns within Freehold Land Tenure

Clusters.

The positive land patterning levels in the freehold land tenure clusters of Katani and Ngong-Ngong were.

$$B_1(0.069)LARARM+B_2(0.064)CERAPAT+B_3(0.064)SUSIDECO=0.197/0.95=$$

This implies that in-optimality and space use conflicts constituted the highest percentage (81.79%) of the land patterning process in the freehold land tenure clusters of Katani and Ngong-Ngong.

7.4.0 Land Use Process in Trust Land Tenure Clusters and Levels of Land Use Patterns; the Case of Ongata Rongai and Mlolongongo

Synopsis

Both Mulongo in Machakos district and Ongata Rongai towns in Kajiado district were sharing the model of Land Rights Adjudication and Registration (LARARM) which was considered in this study to be informal. The two towns were therefore classified in the same land tenure cluster, which is called trust land tenure cluster (TLTC). The process of Land adjudication in TLTC within the two towns was carried out using the departments of survey within their establishments.

7.4.1 Land Use Process in Trustland During Contextualizing Level and Formation of LARARM.

In order to evolve the output of LARARM, the following formula was used as already stated elsewhere in this study.

$$\text{LARARM} = \text{DCE} + \text{SDCA} + \text{SP} + \text{D-SSDR} + \text{D-NSDR} + \text{DAOC} + \text{LEGIPOGUIDE}.$$

Each component shown above was expected to contribute 0.046 towards the formation of LARARM as an output. If each component were to contribute its inputs fully towards the formation of LARARM, then optimal levels of 0.32 within LARARM would be obtained at this level of the land use process.

All the Kajiado district towns of Ongata Rongai, Kiserian, Kitengela and Isinya were formerly under trust-land category of tenure (TLTC) - a form of communal land tenure system. Overtime, the land which was under trust land tenure within the urban areas of Kajiado district was subdivided by the County council of Olkejuado and allocated to developers.

Field findings

During field survey, it was established that all the land in Ongata Rongai and Mulolongo was subdivided by a cartographer or plan compositor both of whom were not trained in the field of land surveying (DCE) or land use planning. The plans were not prepared by the Director of Physical Planning, as was the case in the towns with GLTC. This means that the component of DCE was not converted towards the formation of the output of LARARM as required in this study. It was observed that the certificate of land ownership which was given to plot owners in the TLTC and signed by the clerk to council was containing some development control related conditions (D-SSDR). Some of the conditions specified that prior to development the plot owner should be required to submit building plans for approval by the responsible local authorities. The land certificates also specified that if the plots remained undeveloped within two consecutive years, the council would repossess the said plots. This study did not find the specified conditions effective in regulating land use as there was no SP to guide development.

The formation of LARARM requires policy guidance, which comes from the regulative subsystem (RESUS). Land use objectives within the category of such towns are contained in Section 166 of the LGA (Kenya, Cap, 265), which empowers LAs to control development in their areas of jurisdiction. The objectives of the PPA (Kenya, Cap 286) in the land use process within such towns are to promote public health, safety, convenience, efficiency and economy and this is what was to be achieved in towns as specified earlier in the TPA (Kenya, 1931 Cap 134). The PPA also provided that LAs were responsible for the control of land use within their areas of jurisdiction. This provision also related to the category of towns under TLTC such as Mulolongo and Ongata Rongai towns.

In order to strengthen the capacity of LAs to control land use within such towns, there is provision in the LGA (Kenya, Cap 265) to enable LAs to make bylaws if they found the legislative authority inadequate. The variable of SP was not however incorporated in the land use process in TLTC and therefore SP as a component did not contribute positive inputs towards the formation of LARARM as an output. The land surveyor was engaged in the process of land subdivision but the skills of the land use planner were ignored

(DCE). The variable of public participation (D-NSDR) was not utilized in the process of LARARM formation in TLTC since the county councils allocated plots without involving members of the public.

The variable of DAOC did not contribute inputs towards the output of LARARM also because there was no existing SP to contextualize the activities of all the developers (DAOC) conceptualized in this study. The whole process of land use regulation during the contextualizing stage was however handled by county councils without any interference from any other authority and this could be seen as being in line with the spirit of SDCA as conceptualized in this study. The input of SDCA was therefore fully converted to the output of LARARM during the contextualizing stage of land use.

From the seven components whose inputs were required of the formation of LARARM in the trust land tenure clusters (TLTC), only two variables were able to make their contributions. These components were the SDCA (+0.046) and LEGIPOGUIDE (+0.046). The variable of DCE was considered to have contributed half of its value (0.023) out of the total 0.046 because of the role of the land surveyor. However, the component of DCE did not contribute part of the remaining input of 0.023 because of the absence of the land use planner. The formation of LARARM at this stage of land use process was computed as follows.

$B_1(0.046)SDCA + B_2(0.046)LEGIPOGUIDE + B_3(-0.046)D-SSDR + B_4(+0.023)DCE + B_5(-0.046)D-NSDR + B_6(-0.046)SP + B_7(-.046)DAOC = 0.115$. This means that although the optimization of LARARM was to be 0.32 at this level of the land use process, it was only 0.115 which was obtained and this forms only 35.94% of the positive land patterning process. The remaining part of the land patterning process constituting the largest percentage (64.06%) of the components was not converted to the outputs of LARARM and this explains the in-optimality of land patterns and space use conflicts in TLTC.

7.4.2 Land Use Process in Trustland during Prescriptive Stage and Formation of CEREPAT.

The components, which are needed during the formation of CEREPAT, are eight and each component is expected to contribute 0.04 towards the formation of CEREPAT as shown below:

$$\text{LEGIPOGUIDE} + \text{LARARM} + \text{DCE} + \text{SP} + \text{D-SSDR} + \text{D-NSSDR} + \text{SDCA} + \text{DAOC} = \text{CEREPAT}.$$

If the eight components contribute 0.04 each, then the output of CEREPAT would achieve optimality of 0.32.

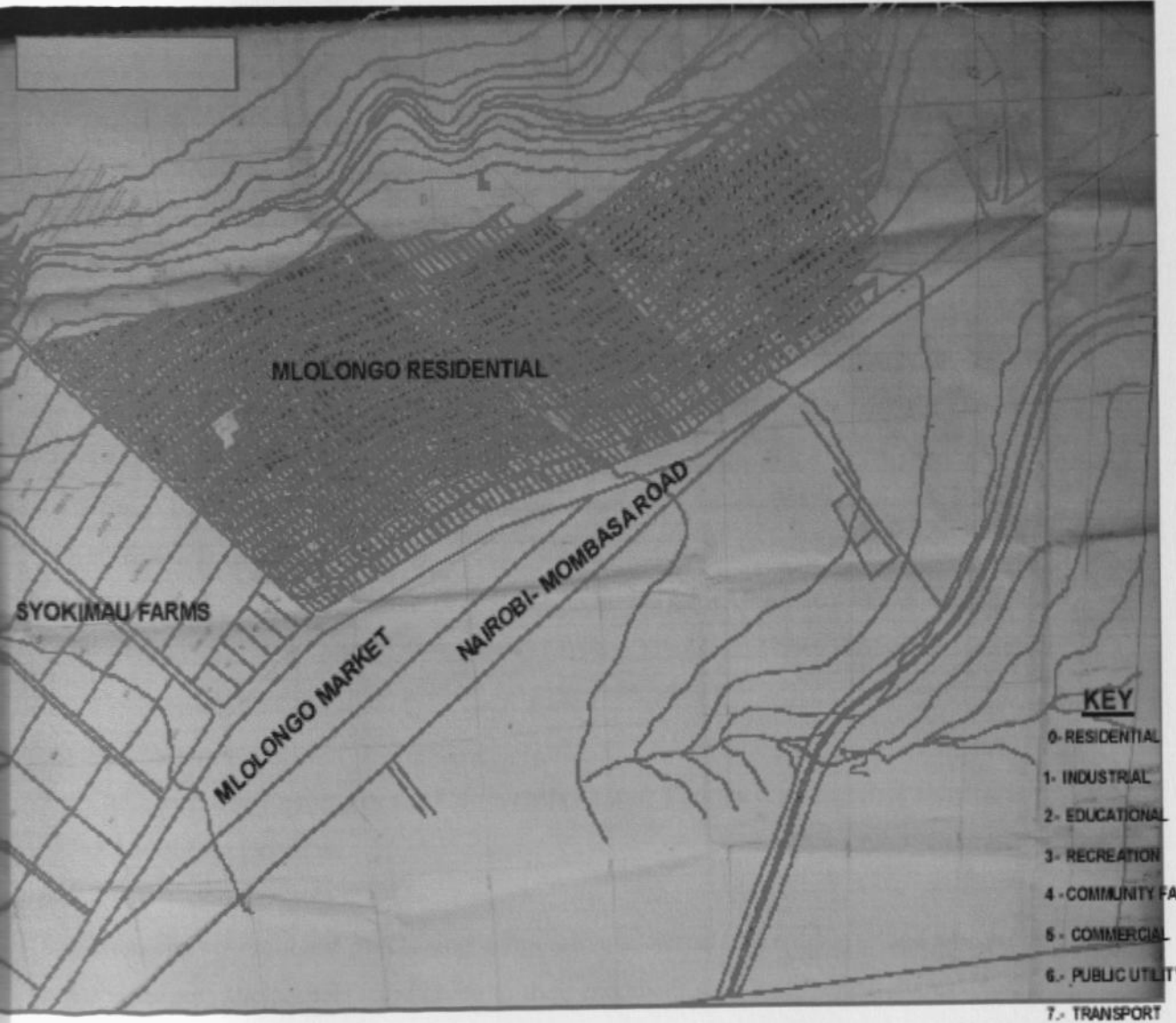
Field findings regarding formation of CEREPAT

HOBURE, HOBUSE, HOBUHOM categories of developers were found to be the most dominant in the areas of Mulolongo and Ongata Rongai towns. During field survey, it was established that most of the plots which were allocated to developers in the two towns of Mulolongo and Ongata Rongai were actually used for commercial development, high density residential (flats) and informal shanty housing. It can be understood why developers in the two towns chose these types of investment. The housing options, which were preferred by developers in the two locations, enabled them to maximize on profits and economize on the use of space. Developers in these towns could be able to enjoy this freedom because there was no SP to specify the type of development in every zone as was the case in the GLTC of Athi River and Ngong towns. Although developers in these towns were required by the relevant authorities to submit building plans for approval, such requirement was only symbolic since there was no spatial frame work (SP) to guide land use development within the TLTC urban areas.

Out of the eight components whose inputs were required towards the formation of CEREPAT, the only components that made positive contributions towards the formation of CEREPAT were LEGIPOGUIDE (0.04), DCE which contributed half of its input (0.02) and SDCA (0.04). The total contribution of the inputs from the components towards the formation of CEREPAT in the trust land clusters was 0.1. Although the highest output formation, which was expected at this level of the LAUP, was 0.32, only

0.1(31.25%) was positively converted towards the land patterning levels. The largest part of the components remained unconverted (69.75%) and this means that the largest part of the land patterning process was either characterized by space use conflicts or in-optimal land patterns.

Map 4: Land Use Patterns in Mlolongo Trust Land Tenure Clusters.



Source: Machakos District Physical Planning Office

It can be observed that all plots are put into residential use in one zone of Mulolongo (map 4) without integrating the residential component with other complementary land uses. Out of ten components, which were expected to contribute inputs towards the formation of SUSIDECO, the only components, which were able to contribute their inputs positively, were two and half. These were LEGIPOGUIDE, SDCA, and half of the variable of DCE. The rest of the components starting from the variable of LARARM, CEREPAT, SP, DAOC, D-NSDR and SU, had nothing positive to contribute to the land use process at this level. The variable of SUSIDECO was formed as follows.

$$B_1(0.032)LEGIPOGUIDE+B_2(0.032)SDCA+B_3(-0.032)D-SSDR+B_4(0.016)DCE+B_5(-0.032)DAOC+B_6(0.032)LARARM+B_7(-0.032)D-NSDR+B_8(-0.032)SP+B_9(-0.032)CEREPAT+B_{10}(-0.032)SU=0.08/0.32=25\%$$

The contribution of inputs from outputs was only 0.08 out of the expected optimum of 0.32 and this forms a percentage of 25%. The largest part of the components did not convert their inputs into the required outputs (75%) and therefore in-optimality of land use formed the largest part of the land patterning process at this level within the TLTC.

7.4.3 Final Land Use Patterns in Trustland Tenure Clusters of Mlolongo and Ongata Rongai Towns.

Land use pattern is a function of the variable of LARARM (0.115) + CEREPAT (0.1)+SUSIDECO (0.08)=0.295/0.95=+31.05%. The rest (-69.95%) were negative contributions towards the LUP

7.5 The Land Use Process in the Cooperative Land Tenure Clusters and Formation of Land Use Patterns

Synopsis

In Kitengela, several land purchasing cooperative societies had acquired land which they subdivided and the parcels were given to their members who had bought shares. Notable among such cooperative societies where this survey was carried out was Chuna in Kitengela area of Kajiado district, which belongs to the members of the University of Nairobi. In order to obtain the optimum formation of LARARM, the following formula is utilized.

$DCE+D-SSDR+D-NSDR+DAOC+SDCA+SP+LEGIPOGUIDE=LARARM$.

Each component or variable was expected to contribute a total value of 0.046 to achieve optimality in the output of LARARM within the CLTC at (0.32) out of the possible 0.95 in the whole land use process.

Field findings regarding Formation of LARARM

In Kitengela area for example, the cooperative society of the University of Nairobi (Chuna) had settled more than three thousand (3000) members on plots ranging from 0.045 hectare to 0.2 hectares. Although the subdivision schemes were prepared by a land use planner, the land subdivision process was carried out on a micro area without linking it to the rest of land use system within the neighboring areas. The land use planner was able to provide areas for community facilities, shopping centers and recreational areas within the Chuna settlement.

The land use plan (SP) was implemented by a registered land surveyor (DCE) who used the fixed survey model and therefore disputes between the space users were minimized. However, because land tenure here was basically freehold tenure, the policy guide in the land use process is to promote agricultural production. The land ownership documents were on freehold title, which implies that such land certificates did not contain development control related conditions (D-SSDR) to promote land use planning.

Out of the seven critical variables, which were needed to form the output of LARARM, half of the component of LEGIPOGUIDE from RESUS subsystem was available for conversion and there was a spatial framework (SP) prepared by the land use planner to contextualize the land use development. The role of the two development control experts; the land surveyor and the land use planner were also incorporated (DCE) during the first level of land use as conceptualized in Chapter 3. The development activities of the members of the cooperative society in the area were brought under control through the rules and regulations designed by committee members (DAOC). When development rules were being drafted, members of the cooperative society were also consulted and therefore it was concluded that the component of developer neighbor shared development

rights (D-NSDR) was also incorporated. The largest percentage of components in CLTC (79.43%) did not convert their inputs towards the formation of LARARM. This then gave a contribution of 0.115 to the variable of LARARM as shown below.

B1 (0.046) SP+B2 (0.046) D-SSDR+B3 (0.023) LEGIPOGUIDE. The rest of the variables, which include the SDCA and the D-SSDR, were not incorporated towards the positive land patterning process. This is because of the involvement of the committee members in the land use control who therefore acted as an alternative development controlling authority. This then went against the spirit of SDCA as conceptualized in this study since local authorities were required by law (Kenya, PPA, 1996, Cap 286) to issue development permits

7.5.1 Land Use Process in Cooperative Land Tenure Cluster and the case of

Syokimau

In Syokimau, cooperative societies were engaged in buying and selling plots to the members of the public and therefore they were not settling cooperative members, as was the case with Chuna in Kitengela. The process of LARARM formation in Syokimau was therefore, different from that of Chuna in Kitengela. However, the process of subdividing land was often carried out by land surveyors who were not obliged to follow the provisions of a spatial plan (SP) and therefore the development activities of the citizens (DAOC) could not be regulated.

Letters of land ownership issued to developers within the CLTC, did not contain any development control related conditions (-D-SSDR). The land use process at the contextualizing stage (level 1) did not involve public participation (D-NSDR) and the variable of single development control authority (SDCA) was violated in Syokimau because of the presence of the Commissioner of Lands in the initial stages of LARARM formation. Other authorities, which were involved in land use control in the areas of Syokimau at this level were the LCBs and Neighborhood Associations (NAs). This further went against the concept and spirit of SDCA as is conceptualized in this study. Out of the seven variables whose inputs were needed in the formation of the variable of LARARM, only half (0.023) from DCE were contributed out of the expected outputs of

0.32. This means that whereas 0.023/0.32 or 7.18% was the only positive input from the components during the formation of LARARM, the largest percentage (92.82%) was not converted and therefore the largest percentage of the land patterning process was negative hence in-optimality.

7.5.2 Land Use Process in Cooperative Land Tenure Cluster at Level 2 and Formation of CEREPAT.

In the cooperative areas of Chuna in Kitengela and Syokimau, eight variables were required to enable the formation of CEREPAT as an output as shown below. The variables, which contribute inputs to the formation of CEREPAT, come from both the RESUS and SPASUS as follows.

$$DCE+D-SSDR+D-NSDR+SDCA+SP+DAOC+LEGIPOGUIDE+LARARM=CEREPAT$$

Field findings

The cooperative management committee, which was elected by members in Chuna, drafted rules to guide land use development in their neighborhoods. The rules specified the type of houses to be constructed (bungalows and maissonetes) and the type of building materials to be used were also specified. This approach made the quality of physical artifacts in cooperative land tenure areas fairly impressive. In Syokimau, land use control was being carried out by the neighborhood associations (NA) who equally had the support of the neighbors within the settlement.

The HOBUHOM category was the most dominant developer in the two areas of Syokimau and Kitengela although some developers (HOBUSE) had built houses for sale. However, since the conditions, which were drafted by cooperative committees and NAs and passed, as rules to regulate development cooperative were not inserted in the land ownership documents, the activities of subsequent developers could not be anticipated nor could they be controlled. Although there were policy requirements to control land use development at the level of erection of physical artifacts in the rural areas under PPA (Kenya, 1996, Cap 286), this provision was, however, difficult to implement due to the

absence of development control conditions in the land certificates and a clear lead agency in charge of such type of land use control.

The variable of CEREPAT did not get any positive input from all the variables of SPASUS. Kitengela cooperative land cluster had a physical development plan prepared by a registered planner and, therefore, one may argue that this should have been considered as SP. This was not an approved physical development plan and it was only localized and not synchronized with the rest of the land use system within the neighborhood. Further, the areas that were set aside for public purposes were still in danger of being grabbed because they remained under private ownership. However, there were policy provisions, which required two objectives to be promoted in the rural areas. Therefore part of LEGIPOGUIDE was converted to positive outputs (0.016) while the remaining was negative. The total positive conversions by the components in the cooperative areas were as follows.

$$DCE(-0.032)+SDCA(-0.032)+DCE(-0.032)+D-SSDR(-0.032)+D-NSDR(-0.032)+LARARM(-0.032)+LEGIPOGUIDE(0.016)=0.016=+5\%=-95\%$$

This means that whereas CEREPAT at the prescriptive level of land use was expected to obtain 0.32 outputs, it was only able to achieve 0.016 which formed only 5% of the total positive land patterning process. The largest percentage (95%) of the components was not converted to positive outputs of CEREPAT and this means that the largest percentage at this level contributed to in-optimal land patterns. The rest remained as negative and this implies that the largest part of the cooperative areas land patterning was in optimal and characterized with space use conflicts.

7.5.3 Land Use Process in Cooperative Land Tenure Cluster at Level 3 and Formation of SUSIDECO A.

All the ten variables needed to contribute to the creation of SUSIDECO A were missing in the two areas of Chuna and Syokimau as earlier discussed under the rural area freehold tenure clusters. SUSIDECO A as a variable therefore had no positive inputs from the components during the institutional stage of land use process. This means that 100% of the components did not contribute their inputs towards the formation of SUSIDECO A

and therefore this percentage contributed to 100% negative land patterning process and therefore in-optimality.

7.5.4 The Final Land Use Patterns in Cooperative Land Tenure Clusters.

In Kitengela, the state of the land patterning was as follows:

$$\text{LARARM (0.115)+CEREPAT (0.016)+SUSIDECOIA (0)=LUP (0.131)=+13.79}$$

This means that whereas 0.95 of the total positive land patterning was expected from the variables of LARARM, CEREPAT and SUSIDECOIA towards the dependent variable of LUP, it was only 13.79%, which was achieved. The largest number of the components both from RESUS and SPASUS did not convert their inputs towards the formation of the land patterning process in the CLTC and therefore this was the cause for in-optimality and space use conflicts. In Syokimau, Machakos district, the land patterning process was as follows:

$$\text{LARARM (0.023) +CEREPAT (0) +SUSIDECOIA (0) =. 023=2.42\%}$$

Synthesis

The land use patterns in peri-urban Nairobi are summarized in the table below (Table 7.1). The negative land values indicate levels of in-optimality while the positive values indicate levels of optimality in land use patterns. Field evidence indicates that apart from GLTC, all other land tenure clusters had higher negative land use patterns than the positive ones. This shows that in the three land tenure clusters, the land use processes were characterized with conflicts of space use and in-optimal land use patterns.

Table 7.1; Levels of Land patterning in selected land tenure clusters in periurban Nairobi

Land tenure cluster	LARARM	CEREPAT	SUSIDECO A	POSITIVE LUP	NEGATIVE LUP
FHLTC	0.069	0.064	0.064	0.197	0.753
TLTC	0.115	0.1	0.08	0.295	0.655
CLTC	0.115	0.016	0	0.131	0.819
CLTC	0.023	0	0	0.023	0.927
GLTC	0.253	0.24	0.24	0.733	0.217
Average LUP	0.115	0.0792	0.0736	0.2678	0.7002

Source: Field survey, 2006

7.6 Relationships in Land Use Policies and In-Optimality in land use patterns

In this section, the question being answered is whether policy is a factor in causing in-optimality in land use patterns as hypothesized in this study.

7.6.1 Variations in Policy and Legislative Guides in Various Land Tenure Clusters and Variations in Levels Of LARARM Output.

(i) *GLTC* -The provisions of GLA (Kenya, Cap 280) require that land must be planned and surveyed before being allocated. This means then that the output of LARARM can be obtained on a plain land surface and on land, which has not been committed for allocation before as was conceptualized in this study. This then enables the land use planner to articulate a land use framework, which takes care of all land use activities (Equity considerations). Further, it is possible at this stage to provide a spatial framework, which promotes all elements of public interest from the land use planning point of view. The need for planning within GLTC was made possible because of the provisions within GLA (Kenya, Cap 280), TPA (Kenya, 1931 Cap 134) and LGA (Kenya, Cap 265). All these legal provisions came from the regulative land use system as conceptualized in this study and the aim was to guide the components of SPASUS within the COLAUSS. It can be argued that the formation of LARARM in GLTC was facilitated by LEGIPOGUIDE

from RESUS and it can be realized that LARARM in GLTC was able to achieve an optimal level of 79.06%?

(ii) FHLTC - The policy in rural areas was to promote agriculture. Other elements of public interest, which are achieved through land use planning, were being articulated within the urban areas using the Growth Center Strategy and service center strategies (chapter 6). The land use determinants in FHLTC were mainly social and economic since land use planning was lacking. When PPA (Kenya, 1996, Cap 286) introduced land use planning in the rural areas, land was privately owned, hence not available for allocation to land uses which were considered necessary for public interest. Secondly, in-optimality can only be rectified through land readjustment and there was no legal provision for this process.

(iii) TLTC - The colonial government applied planning within the major urban centers occupied by the white settlers, and therefore planning in the African centers was neglected. Within the African urban centers, it was the public health officers who guided land use and their interest was to promote basic public health standards and not land use planning as such. The County Councils empowered to manage land use within the former African towns did not have physical planning departments and instead they used land surveyors to allocate plots without a proper planning framework. Conflicts in space use in the former African markets can therefore be attributed to lack of planning provision in such towns from the colonial period, which was continued to post-colonial period.

(iv) CLTC - Although land purchasing and selling as an activity which is undertaken by companies and cooperative societies have been the largest users of land since independence, there has been no policy to date to regulate their activities. Cooperative societies have continued to subdivide land without regard to planning and such land subdivisions are still considered to be promoting agriculture even when the subdivisions are not viable in advancing the productivity objective in the agriculture sector. Again this is because the minimum land sizes for agricultural promotion were not specified in the Agricultural Act (Kenya, Cap 318) and the LCA (Kenya, Cap 302)

7.6.2 Different Development Control Models and Variations In Levels of CEREPAT Output

Whereas there were policy and legislative requirements within GLTC areas for all developers to seek development permits, this was not the case in the rural areas and cooperative land areas. The need for development permission in GLTC areas was boosted by the LARARM model that had provisions in the certificates of land ownership which contained development conditions. Land certificates in the rural areas and cooperative areas did not contain any development conditions and therefore developers could construct physical artifacts that were not regulated. Again, it is the policy, which failed to address the variations in land administration approaches between the rural, and the urban areas which created variations in land use patterns. Within the former African markets TLTC, there was requirement to have all developers seek development permits before erecting physical artifacts and for the purposes of development control. However, the component of SP to guide such land use was absent. Again, this is because policy did not provide for land use planning within such towns.

7.6.3 Uncoordinated Institutional Frameworks and Lack of Capacity and Variations in Land Use Patterns

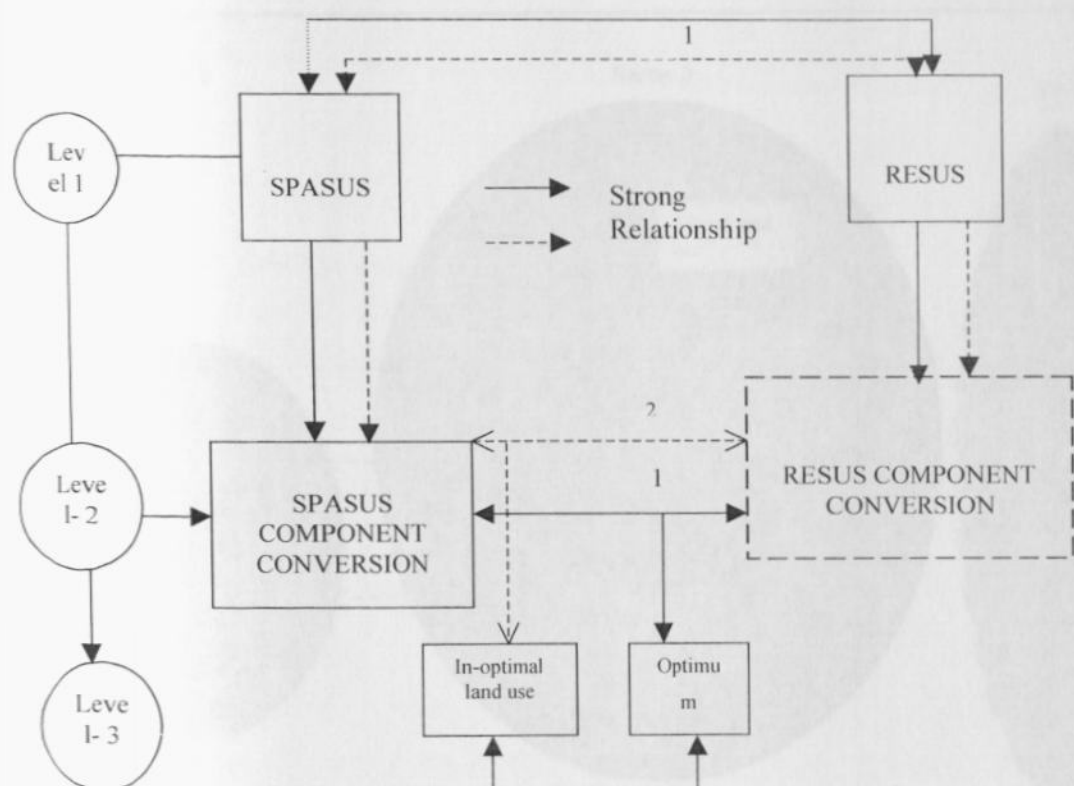
Within the GL clusters, the presence of two development control authorities; the COL and LAs created in-optimal land patterns. The LAs had no capacity to monitor development because plans were prepared in the Ministry of Lands by the PPD and the level where LARARM was produced as an output was being handled by the COL. This means that LAs were implementing plans which they did not prepare and they did not have manpower to monitor such development. This ambiguity was created by the RESUS land use subsystem, which created the GLA (Kenya cap 280) and LGA (Kenya, cap 265) and appointed different authorities to administer land use at different stages. Again, RESUS placed the two authorities within different ministries without putting in place a mechanism of coordination between the two.

Within the former African markets, county councils were given the mandate to run the towns but they did not have planning departments within their establishments except a small department of survey, which was meant to keep records of council land. The PPD was located in the Ministry of Lands and therefore county councils were just preoccupied with the allocation of plots. The overwhelmed department of physical planning was unable to extend the services of planning to the small centers and where they were able to do so, local authorities did not have manpower to oversee the implementation of such plans. Within the rural areas, all authorities were geared towards the promotion of agriculture and not planning from the land use context.

When PPA introduced planning in rural areas, the LEGIPOGUIDE did not separate powers of LCBs and LAs while there was no specific authority to undertake land use planning in the rural areas. The same law did not distinguish the plan preparation authority between the office of the Director of Survey and the Director of Physical Planning which made the implementation of PPA difficult. The LEGIPOGUIDE also created two land use systems of urban and rural without linking the two. Further, two policy objectives were specified in the rural areas and these were the promotion of agriculture and the promotion of public interest through land use planning. However, policy approaches introduced dual land use objectives in the rural land use system without clarifying how the two objectives were to be harmonized. The institutional framework set up to promote agriculture was left intact without realigning it to include the objective of land use planning.

Summary-It is noted that space use conflicts and in-optimal land patterns are brought about by weak relationships between RESUS and SPASUS subsystems within the composite land use systems of the RUI. Because of the weak relationship between RESUS and SPASUS, the integration of the components between the two subsystems became weak or absent and it became difficult therefore to evolve the essential outputs of LARARM, CEREPAT and SUSIDECO which were needed as independent variables towards the formation of optimum land patterns.

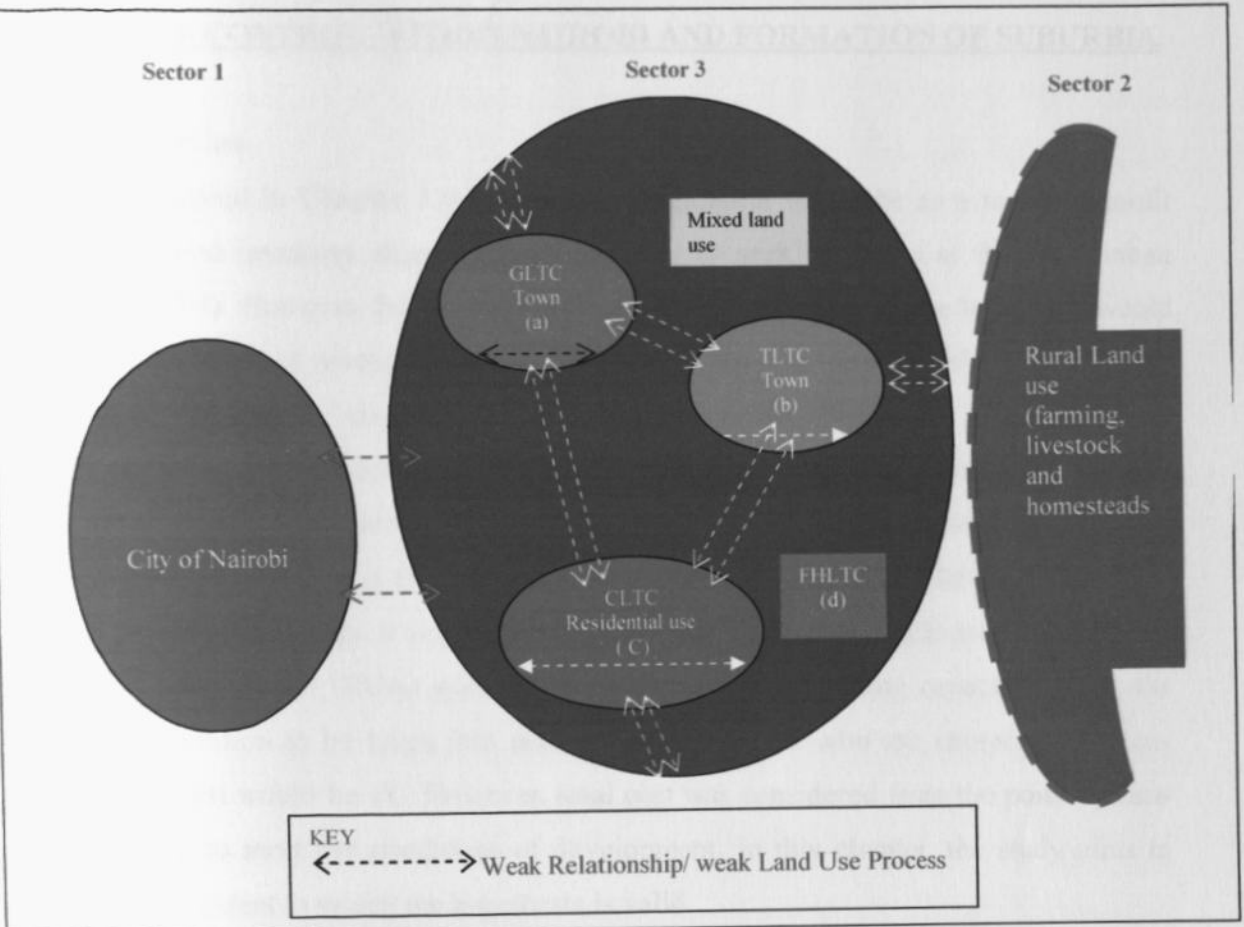
Figure 7.2; Relationships within the Periurban Composite Land Use System



Source: Authors' Construct

The study established that the land use in peri-urban land tenure clusters covered by the survey tends to follow track 2 of the land use process (Fig. 7.2). However track 2 of the composite land use process is characterized by weak relationship between the spatial subsystem (SPASUS) and the regulative sub system (RESUS). As a result of the weak relationship between the two subsystems of the composite land use system component conversions were also sub-optimal. This resulted into in-optimal land use patterns which is the end result of track 2 of the land use process as opposed to the end result of track 1 of the land use process.

Figure 7.3; Islands of dysfunctional and discrete peri-urban land use clusters



Source: Author's Construct.

The result was the evolution of islands of both dysfunctional and discrete land use clusters, which not only had weak relationships within themselves, but also manifested weak interrelationships as well. The dysfunctional land tenure had no linkage with the inner city land use system as shown in Figure 7.3

CHAPTER 8

LAND USE CONTROL WITHIN NAIROBI AND FORMATION OF SUBURBIA

8.1 An Overview

It was postulated in Chapter 3 that peri-urban formation would be as a result of profit motivated land investors shunning the inner city to seek locations at the rural urban interface (RUI). However, before such investors opt for locations in the RUI, they would consider the factor of revenue generating capacity in the two locations of urban and RUI. The profit-motivated investor would further consider the cost of undertaking development in the two locations. Profit levels, which investors seek to maximize, would then result from the difference between total revenue (TR) and total cost (TC). If TR is held constant and TC was the only variable factor, then the lower the TC, the higher would be the profit levels. It was further hypothesized in this study (chapter 1) that sector 1 (urban) and sector 3 (PUA) would have the same TR generating capacity, hence, the only consideration to be taken into account by developers who are choosing locations where to invest would be TC. However, total cost was considered from the point of view of preparing to meet the conditions of development. In this chapter, the study aims to establish the extent to which the hypothesis is valid.

Four categories of developers were investigated in peri-urban Nairobi to test the hypothesis that their preference for areas in the rural urban interface is a result of high costs of development in Nairobi and the need to maximize profits in the low development cost in the RUI. The first category of developers included the sample of those who went to the RUI to build houses in order to let them for purposes of earning rent (HOBURE). The second categories of developers are those who went to the RUI to speculate on land in order to resale such land for profit (LASPE). The third category of developer is the one who goes to the RUI to build a house(s), which he/she puts on sale again in order to make profit (HOBUSE). Lastly, the fourth category of developer is the one who goes to the RUI to buy land and build a house for his/her family (HOBUHOM).

Three sources of income were used as variables in this study to analyze the profit making land use activities of the four categories of developers. The three income variables include the price of a plot in the market (0.045 HA) or land value (LAVA), the value of rent accruing from a two bed house (REVA) unit and lastly, the value of a house (HOVA) which is the size of two bedrooms. The identified income variables were also corresponding to the investment returns, which the four categories of developers were likely to seek or consider before choosing locations where to invest. The various income values; LAVA, HOVA and REVA were tabulated into averages in all the clusters that were selected in the city and those of the RUI. The average income values for Nairobi were compared with those of Kajiado separately using ANOVA test and again it was compared separately with the average income values of Machakos clusters.

The analysis of income variables between Nairobi and the RUI up to this stage was aimed at verifying the validity of the hypothesis that TR between the two locations would be the same or that the variation between the TR within the two locations was not likely to vary significantly. The second stage of analysis was to establish the levels of development costs within the clusters of Nairobi and those of the RUI clusters. The average development costs between the Nairobi clusters and those of the RUI clusters were subjected to analysis of variance using a t-test. The aim was to find out whether there were any significant variations in DECOST between the Nairobi clusters and those of the RUI. The approach taken during field investigation was first to interview the respondents in order to find out the factors that motivated them to seek peri-urban locations. The second approach was to compare the responses from field interviews with the results of the t-test tabulations based on the variables of LAVA, HOVA and REVA as discussed below.

8.2.0 Variations in Development Costs in Sector 1 and sector 3 and Peri-urban Formations

In this section, the study analyzed the land use activities of the groups of developers identified above in order to find out whether their options to relocate to RUI were related

to high costs in the inner city. The investment activity of each category of developers was analyzed as follows.

8.2.1 Variations in Development Cost between Sector 1 and Sector 3 and Options of The Land Speculator

The land speculator developer (LASPE) was seen to be interested in buying land for resale in order to make profit. It was postulated in this study that the land values between the inner city and the RUI would not vary significantly, meaning that the TR generating capacity between sector 1 (the urban) and sector 3 (the peri-urban) would be the same or would not vary significantly. If this postulation is valid, then the LASPE category of developer would be indifferent between the inner city and the areas at the RUI. As a result, he/she can carry out LASPE activities in Nairobi or at the RUI. The land use activities of the LASPE developer were analyzed to establish the validity of this hypothesis as follows.

8.2.2 Factors that Motivate Land Speculator to Rural Urban Interface; Evidence from Field Survey

To validate this hypothesis, a group of seven land speculators were interviewed in the Ngong-Ngong region and three in Ongata Rongai. It was difficult to find the LASPE category of developers in a particular location and, therefore, the selection was purposeful because the process of identifying them was dictated by access to interviewees. The ten land speculators who were interviewed were all found in the freehold land tenure cluster. In order to gain in-depth knowledge regarding the profit making land use activities of the LASPE developers, this study further carried out interviews with committee members of some land purchasing and selling societies that were carrying out land speculative activities in Syokimau and Katani. The aim of the interview was to find out what influenced the LASPE category of developer to buy plots at the RUI locations and, further, why they engaged in speculative land activities at the RUI rather than carry out such activities in the areas within the city.

The evaluation of data collected from interviews with LASPE developers revealed that those who engaged in speculative land activities at the RUI were motivated by availability of cheap developable land (45%), proximity to the inner city (20%), availability of services (15%), availability of transport (10%) and finally, clean environment (10%). It means that LASPE category of developers considered the above factors before selecting locations. The LASPE activities are actually dictated by the requirements of the clients who buy the land. The other three factors, which were all given by respondents such as availability of services, transport and clean environment, were all-available within the city and could not motivate a developer to shun the city and opt for peri-urban locations.

These categories of developers were also asked to state what motivated them to engage in the business of selling land and not any other business for example. Most of the respondents cited the need for money as the main factor which made them to engage in speculative land activities (58.3%) and others said that they wanted to invest their money in alternative business ventures (33%) which means that land speculation was seen by those with excess liquidity as one such alternative. The last response implies that perhaps some of those who had excess liquidity opted to engage in the business of land speculation instead of keeping the money idle in the bank.

The question one may ask then is: why developers who had excess liquidity could not invest their money within the areas of the city? The other factor of proximity to the city can be challenged also because "why proximity to the city and not within the city"? Among all the factors which were mentioned by respondents, availability of cheap land at the RUI remained the only factor to be further validated. However, the first reason, which motivated such developers to engage in LASPE activities, was the need to make money and this falls within the profit motive as hypothesized in this study.

8.2.3 Insignificant Variations in Threshold Levels between City and area of Rural

Urban Interface and the Indifferent Land Speculator

It emerged from field survey that the main motivation for the LASPE category of developers to acquire land at RUI and engage in speculative land activities was a result of availability of cheap land (45%). Although evidence emerging from field responses agree with findings of other recent studies (Mwangi, 1994; Simiyu, 2002), cheap land as a factor, however, contradicts the hypothesis in this study. The hypothesis postulated in this study is that land values in the two locations would not vary significantly. It was decided, therefore, to make further analysis in order to validate the extent to which cheap land could be taken as a factor that influences the LASPE category of developer to carry out land speculation business at the RUI. This analysis was carried out by comparing the average land values between the city and those of the selected clusters at the RUI (Table 8.1) using the t-test and the findings were as follows.

The calculated t value for land values (LAVA) of Nairobi and Kajiado is 0.167. At the degree of freedom of 6 and alpha value at 0.05, the t table value is 2.571. Clearly the calculated t value is less than the t- table value ($0.167 < 2.571$) which implies that there is no significant difference of land values between the two zones. The calculated t value for land cost values of Nairobi and Machakos is 1.847. At the degree of freedom of 6 and alpha value at 0.05, the t table value is 2.571. Therefore the calculated t value is less than the t table value ($1.847 < 2.571$) which implies that there is no significant difference of land values between the two zones.

The findings of the t-test then enabled this inquiry to conclude that land values between the selected clusters of Nairobi and those at the RUI were not different as was cited by respondents who were interviewed by for this study. It was also concluded that cheap land *per se* was not a factor, therefore, that influenced the land speculator developer to avoid the inner city locations in favor of the areas at the RUI. This again made the study to make one more conclusion, which arose from the findings of the t-test as follows. If the variable of land value (LAVA) was the only factor which the land speculator considered when selecting locations, then this developer would be indifferent between the inner city and the peri-urban since LAVA were the same.

However, it is argued in this inquiry also that if income-earning capacity between the city and the RUI are the same, the LASPE category of developer rather than being indifferent would most likely be impelled to opt for the areas within the inner city. Although TR would be the same between the two locations, sector 1(urban) is however better serviced hence more suitable to those who buy land and would therefore possess more economies of scale than locations at the RUI. Since variations in land values could not be the factor to explain peri-urban formations from the point of view of the LASPE developer, what then was the factor? The t-test findings consonant with the study hypothesis and, therefore, the hypothesis is partly validated at this level.

8.2.4 Variations in Land Delivery Costs between City and Rural Urban Interface and Options of Land Speculator

Since TR between sector 1 and sector 3 did not vary significantly, it was further postulated that variations in development cost (DECOST) would be the factor which would persuade the LASPE developers to shun the inner city where DECOST would be high and invest at the RUI where such cost would be low. It was, therefore, decided in this inquiry to consider whether the variable of development cost as earlier hypothesized was the factor which made the LASPE category of developer to shun the inner city in favor of the RUI.

The development cost, which would be incurred by the LASPE developer, can be seen in the context of the cost of land delivery and registration (COLARD). The levels of land delivery (COLARD) both in the areas within the city clusters and those at the RUI were analyzed and tabulated into averages. As argued earlier, profit levels would be the difference between total revenue and total cost (TR-TC). Since total revenue (TR) was assumed to be the same in areas of the city and those of RUI, and indeed this has been confirmed to be true by way of t-test, then the only variable, which would affect the profit levels of LASPE, was COLARD. In analyzing the impact of COLARD on the profit levels, two assumptions were made.

Assumptions-The TR that the LASPE developer is likely to accumulate from a land speculation transaction would be determined by land selling price (LSP) and land sales would be affected by the land purchase price (LPP). The TC, which this category of developer would incur, can be seen in terms of the land purchase price (LPP) and land delivery price (COLARD). TC in the context of LASPE activities, therefore, has two aspects, market land purchase price (MLPP) and the cost of land delivery and registration (COLARD). The assumption made in this study is that both the land selling price (LSP) (TR) and the land purchase prices (LPP) would be dictated by the market forces. The land speculator, therefore, was not in a position to influence profit levels from the point of view of varying either the MLPP or land selling price (MLSP or TR). However, profit will be the difference between MLSP and MLPP (MLSP or TR-LPP). In order for this category of developer to maximize profits, the only option left to him/her was to minimize on the cost related to land delivery and registration (COLARD). Therefore, this developer would choose locations where the cost of land delivery (COLARD) was lowest in order to maximize on profits since land values were the same (TR) between the two locations (urban and RUI). Since the variable of COLARD which is part of TC is a variable factor, the final TC would also vary when there are variations in COLARD.

The levels of profit would then be a factor of COLARD since COLARD would be the only variable factor. Therefore COLARD and profit levels would have an inverse relationship which means the higher the COLARD is the lower the profit levels and vice versa. The land delivery costs both in the inner city and peri-urban areas were tabulated into averages (Table 8.1) and subjected to analysis of variance. In order to establish the cost of land delivery for development purposes (COLARD), the following variables were used. It was assumed that COLARD would be determined by the Cost of Planning Services (COPS), the Cost of Survey Services (COSS), Cost of Legal Services (COLES), Cost of Deed Plan Approval (CODPA), Cost of land Registration (COLRS) and Cost of Land Control Board approval (LABOC).

$$\text{COLARD} = \text{COPS} + \text{COSS} + \text{COLES} + \text{CODPA} + \text{LABOC} + \text{COLRS}$$

8.2.5 Cost of Land Delivery in the Selected Clusters of Nairobi City

The total COLARD in the inner city was as follows: COPS (40,000) + COSS (60,000) + COLES (60,000) + CODPA (30,000) + LABOC (0) + COR (30,000).TC= 40,000 + 60,000 + 60,000 + 30,000 + 30,000 = 220,000. The costs of land delivery in other peri-urban clusters were as follows (Table 8.1).

Table 8.1; Summary of land values and cost of land delivery in Nairobi and periurban clusters.

Zone	Sub-zone	Gross value of 0.045(ha)	CO1 COLARD(Ksh)
Nairobi	Kayole	335,000	220,000
	Zimmerman	900,000	220,000
	Satellite	700,000	220,000
	Embakasi	1,500,000	220,000
Average		858,750	220,000
Kajiado	Ngong town	1,000,000	55,805
	Ngong-Ngong	500,000	8,975
	Ongata-Rongai	650,000	4,000
	Kitengela	664,000	3,975
Average		703,500	18,188.75
Machakos	Mulolongo	600,000	5,000
	Athi River	525,000	55,805
	Syokimau	350,000	3,975
	Katani	100,000	3,975
Average		393,750	17,188.75

Source: City Valuation Department, District Valuation offices, Real Estate Consultants and Media property surveys(2006).

The average development transaction cost in Nairobi clusters and those of the RUI clusters were subjected to analysis of variance and the results were computed as shown below.

The calculated t value for land delivery cost (COLARD) between Nairobi and Kajiado is 16.025. At the degree of freedom of 6 and alpha value at 0.05, the t table value is 2.571. Evidently the calculated t value is far greater than the t table value (16.025 < 2.571), which implies that there is a high significant difference of land delivery costs between the two zones of Nairobi and Kajiado clusters. The calculated t value for COLARD between

Nairobi and Machakos is 15.753. At the degree of freedom of 6 and alpha value at 0.05, the t table value is 2.571. Evidently the calculated t value is far greater than the t table value ($15.753 > 2.571$) which implies that there is a highly significant difference of development costs between the two zones

From the earlier assumptions, COLARD and profit values would have an inverse relationship, which implies that the higher the COLARD, the lower the profit levels, and vice versa. Because the inner city had high COLARD costs, the LASPE category of developer would tend to shun the inner city where profit levels would be lower and opt for locations at the RUI.

Following the results of the average land delivery costs variations between the city and locations at RUI which showed that COLARD values in Nairobi were higher than those of the peri-urban locations, it was concluded that the reason why the land speculator category of developer tended to shun the inner city to invest at the RUI was because of variations in the land delivery costs.

In order to validate this conclusion further, the study carried out an interview with one individual in Ngong who was involved in the business of land speculation and a group of cooperative society officials in Syokimau and Katani who were involved in the land buying and selling. The professional LASPE developers could then be seen as key informant people who enabled this study to not only gain an in-depth understanding of the activities of the LASPE developer but also be able to corroborate the evidence from the few developers who were interviewed. The two case studies are discussed below.

Box 1; Case study 1: Variations in development cost between sector 1 and sector 3 and options of land speculator at the rural urban interface.

During the field survey, this study managed to hold an interview with Njuguna who is involved in the business of land speculation in the Ngong-Ngong freehold land cluster. Njuguna begins his LASPE business by identifying the land seller who could avail to him at least one acre of land. Those who had such big sizes of land were the original livestock and crop farmers who resided in Ngong-Ngong and Mavoko areas before peri-urban formation. By the time of the interview, Njuguna had already spent one million two hundred (1,200,000) thousands to purchase the one acre of land for speculative business. Field survey indicated that the value of an acre of land in Ngong-Ngong was higher than the one million, two hundred thousands of money which was paid to the land owner. However, the one million, two hundred amount of money was so enormous that it was tempting for the farmer to resist the offer. Njuguna then proceeded to contract the land surveyor who he instructed to produce eight subplots (8) from the one acre land. Njuguna spent a total of Ksh 8,975 per subplot including ksh 3000 as survey fees, Ksh 5000 LCB expenses and Ksh 975 for registration and acquisition of titles ($8 \times 8,975 = \text{Ksh } 71,000$). Njuguna then advertised the plots in the print media and was able to sell all of them within one month at a price of Ksh 500,000 per subplot. The total revenue which was collected from the sale of the eight subplots at the price of Ksh 500,000 would be four million Kenya shillings (Ksh 4,000,000). If Njuguna subtracts the total land purchase price (LPP) and cost of land delivery and registration (COLARD) ($1,200,000 + 71,000 = 1,271,000$) from the total revenue (4,000,000), then the amount of money left to him would be two million seven hundred and twenty eight and two hundred thousands (2,728,200) as profit.

Lessons learnt from Njuguna's case study

The amount of money, which was earned by Njuguna during this transaction, was considerably high by all standards. Njuguna could not be able to carry out such business in the inner city because he was unlikely to get such big junk of land in the city. Again, the cost of land delivery in the inner city was enormous (220,000) which then means that if everything was held constant, the cost of land delivery and registration (COLARD) for the eight subplots within the inner areas of the city would have been two million eight hundred thousand (Ksh 2,800,000), being the cost of land delivery and land purchase in Nairobi (COLARD). This then would mean that whereas in the peri-urban he was able to earn a profit of Ksh 2, 728, 200, in the city he was going to obtain a lower profit of Ksh 1, 200, 000. However, there are chances that even such profit could not be made in the inner city because authorities in the city would have required that the subplots be serviced to adoptive standards before selling them to buyers.

This requirement would have made the cost of land (COLARD) to escalate so much that the land speculator would have been unable to make profit in the areas within the city. This developer had also avoided the Government Land cluster in Ngong town because within the town center, developers were not allowed to subdivide land below the specified standards which are shown on the zoning plan. Secondly, land delivery costs (COLARD) in Ngong town are high because landowners are under leasehold tenure administered under GLA (Kenya, Cap 280). COLARD in Ngong town was for example Kenya shillings 55,805 per subplot while that of Ngong-Ngong was Kenya shillings 8975 only per subplot.

Box 2; Case study 2: Cooperative land buying societies land speculative activities and Peri-urban options.

This inquiry interviewed one company which was involved in land speculation business. The company which was in the form of cooperative society was found in Syokimau and Katani areas which formerly belonged to the scheduled areas (white settlement areas). Because land in the white settlement zones was in leasehold titles, it was administered by the Commissioner of Lands (COL) in terms of the RTA (Cap, 281) and the LTA (Cap, 282). The land registration model within GL was the Deed plan system and this was applicable in Syokimau areas. This model was different from the freehold land registration system, which was carried out under RLA (Cap, 300) within rural areas. It was established that cooperative societies which were involved in LASPE activities usually bought the land in five acre blocks. After purchasing the 5- acre blocks, the LASPE developers converted the land from the requirement of RTA (Kenya, Cap 281) and LTA (Kenya, Cap 282) to the requirements of RLA (Kenya, Cap 300) before subdividing the land into subplots for sale. After converting the land from the requirements of RTA and LTA to RLA under the guise of using it to promote agriculture in line with the government's policy in the rural areas, LASPE then asked the land surveyor to subdivide the 5-acre land to 48 subplots. The forty eight pieces of subplots were then advertised and sold to developers at a price of Ksh 350,000 Kenya shillings per subplot. It was established during field survey that the amount of money which was spent to purchase the five acre block of land before subdivision was ksh 10, 000, 000. However, the total sales realized from the 48 subplots at a price of Ksh 350,000 were Ksh 16,800,000. The cost of land delivery in freehold areas of Katani and Syokimau was only 3,975 (Table 8.1) which then made the LASPE developer to incur a total cost of ksh 190,800 for all the 48 subplots at a cost of 3,975 per sub plot. If the cost of land purchase was added to the cost of land delivery, then the total cost that was incurred by the LASPE category of developer in Syokimau and Katani was ksh 10,190,800. If the total cost (TC) is subtracted from the total sales (TR) then the LASPE cooperative societies in Katani and Syokimau were able to make a profit of Ksh 6,610,000. If such developer had carried out business in Nairobi, then the TC would be, $TC=220,000 \times 48=10,560,000$ (COLARD) +LPP (10,000,000) =20,560,000. Clearly, it shows that such developer would have incurred a loss in Nairobi and would not be motivated to do business in LASPE.

Lessons learnt from activities of LASPE in Syokimau and Katani

It can be concluded that COLARD was an important consideration by the LASPE category of developers in selecting business locations. This is because in Syokimau and Katani, this category of developer first opted to convert the land from the requirements of LTA (Kenya, cap 282) and RTA (Kenya, Cap 281) to that of RLA (Kenya cap 300) before the land subdivision was undertaken. The aim of converting land from the requirement of RTA and LTA to RLA can only be seen in the context of trying to avoid the expensive land delivery model under the Government Lands Act (cap 280) (GOVULARARM) and the expensive survey system under the Deed Plan System. The land survey model under RLA emphasized on the use of natural boundaries and hedges and although beacons were placed to show the plot boundaries, the land registration in the rural areas only required proof of plan mutations in order to issue title deeds for land registration and not deed plans (Chapter 6). This again confirms that the high cost within the inner city caused by high COLARD was a factor that forced the LASPE category of developer to avoid the inner city. The COLARD was high in the city because of the urban development control model and zoning approaches.

The second factor which made this category of developers to seek locations in suburbia is that land which could be bought in big blocks, as was the case in Syokimau and Katani, was rarely available in the city. Thirdly, Syokimau and Katani clusters were next to the city of Nairobi and, therefore, the LASPE sellers could target buyers from the nearby city.

Conclusion-It can be conceded that although availability of land in the RUI was a factor, the considerations of development costs by the LASPE developers were more critical in the agenda because land conversion from the requirement of LTA (Kenya, cap 282) and RTA (Kenya, cap 281) to RLA was the first thing the LASPE developer undertook to do as soon as they bought the land in the peri-urban. In any case, big plots of land were still available in the Ruai areas of the city and even in Karen, although these categories of developers still avoided such locations.

8.3.0 House Builder for Rent, Variations in Development Cost and Options at

Rural Urban Interface.

In this subsection, the study analyzed the house builder to rent (HOBURE) category of developer in relation to the hypothesis in this study that high development cost in the inner city is what made them to opt for the area at the Rural-Urban Interface (RUI). It was postulated in this study that TR which developers earn from rent within the city and the RUI would not vary significantly. Therefore, the HOBURE developer would be indifferent between the two locations of urban and RUI in deciding the location of investment. If the assumptions made in this study are valid, the profit levels which this developer was seeking would be a function of development cost (DECOST) only since TR was considered to be similar in the two locations of urban and RUI.

8.3.1 Factors Which Influence the House Builder to Rent to the Rural Urban

Interface; Evidence from Field Survey

As stated earlier, the approach taken in this study was first to establish the factors which attract such developers to the areas of the RUI from the point of view of the developers themselves through interviews. These categories of developers were, therefore, first asked why they chose the RUI and not the areas within the city. The following were the responses from those who were interviewed given in terms of importance. The HOBURE category of developer tended to prefer the RUI because there were ready markets (people to rent) for the houses (23%). Others said that they preferred the RUI because it was easy to build the type of houses which they desired (22.54%) while others said that land in the RUI was cheaper than Nairobi (17%). Yet, others responded that they preferred the RUI areas because development requirements in these areas are few (15.5%). Finally, others preferred to build at the RUI because there were no zoning requirements (9.9%).

The factors, which were advanced by the HOBURE category of developer, were summarized in three clusters. In the first cluster, the study combined those factors, which could be seen in the context of inner city zoning and development control. These factors were as follows. There are those who preferred to locate business at the RUI because there was no requirement to follow any zoning (9.9%) and others gave other reasons such

as few development requirements in the areas of RUI (15.5%). There were others also who opted to invest in the RUI areas because they could build the type of houses which they desired (22.54%). The three factors in this cluster were combined to constitute one main factor, which could be categorized as related to inner city land use control and zoning and this factor formed a grand total of 47.58%.

Some of the factors cited by the respondents such as availability of people to rent the houses (23%) and high rent values at the RUI (5.16%) were combined into one main factor which was categorized as the threshold level factor (28.16%) as highlighted in Chapter 3 of this study. This then means that if a developer aims to invest in the business of rental houses within the area of the RUI, the business would be viable because there was sufficient demand for such houses created by the available threshold factor. The third cluster comprised those who cited cheap land (17%) as a factor, which motivated them to invest in the RUI. By inference, therefore, the main reasons which motivated the HOBURE categories of developers to invest at the RUI were: the inner city control and zoning (47.58%), availability of threshold demand levels (28.16%) and cheap land (17%).

Discussion-The HOBUSE respondents who cited inner city land use zoning and controls (47.58%) as the main factor, which made them to avoid the inner city locations and opt for locations at RUI concurred with the study hypothesis. However, those who cited the two other factors of high threshold levels and cheap land at RUI vis-a-vis the city contradicted the expectations of the study hypothesis. The apparent contradiction between the study hypothesis and the responses from the field interviews suggest that there was need for further analysis to fully validate the hypothesis. However, cheap land as a factor was already discarded earlier in this study when the t-test analysis showed that between sector 1(urban) and sector 3 (RUI), there were no significant variations in land values. Cheap land as a factor could not be the reason that made the HOBURE category of developer to choose the areas of RUI. High threshold levels, as a determining factor then remains the only factor that goes against the expectations of the study hypothesis. The question, which the inquiry must endeavor to establish, is: Are threshold levels (TR)

in the areas of the RUI higher than those of the inner city? This question is answered in the following subsection.

8.3.2 Insignificant Variations in Threshold Levels between City and Rural Urban Interface and the Indifferent House Builder to Rent

This study had hypothesized that the threshold levels between the city and RUI would be the same and, therefore, developers would be indifferent in their choice of the two locations. However, the field survey contradicts this position. To what extent were threshold levels (TR) within the areas of the RUI different from those of the areas within the city as was reported by a significant number of respondents (28.16%)? Threshold levels (TR) in the context of the HOBURE were being measured using the variable of rent values (REVA) between the inner city and the RUI. The implications of the responses from the field survey, however, were that REVA would be higher in the areas of the RUI than those within the city. The average rent levels in the inner city clusters and those of the peri-urban areas of Kajiado and Machakos are shown in Table 8.2. The averages REVAs were subjected to analysis of variance using a t-test to find whether there were any variations in REVAs between the city and peri-urban locations.

Table 8.2; Average rent levels, Cost of Land Delivery (DECOST) in Nairobi and Periurban

		2 Bedroom-Rent level(REVA)	COLARD Cost 1	CEREPAP Cost 2	CODEP Cost 3	TC Σ C1 C2 C3 DECOST	Average cost
Nairobi	Kayole	7,500	220,000	210,000	3,000	433,000	433,000
	Zimmerman	6,000	220,000	210,000	3,000	433,000	
	Satellite	7,250	220,000	210,000	3,000	433,000	
	Embakasi	10,000	220,000	210,000	3,000	433,000	
Nairobi	Average	7,687.50	220,000	210,000	3000	433,000	
Kajiado	Ngong town	9000	55,805	50,000	6000	111,805	71,188.75
	Ongata Rongai	7000	4000	50,000	6000	60,000	
	Kitengela	8000	3,975	50,000	-	53,975	
	Ngong -Ngong	8,500	8,975	50,000	-	58,975	
Kajiado	Average	8,125	18,188.75	50,000	3000	71,188.75	
Machakos	Mulolongo	6,500	5000	50,000	18,000	73,000	76,188.75
	Athi-River	8000	55,805	50,000	18,000	123,805	
	Syokimau	6000	3975	50,000	-	53,975	
	Katani	6000	3975	50,000	-	53,975	
Machakos	average	6625	17,188.75	50,000	9000	76,188.75	

Source: Field Survey, 2006

From the figures shown in Table 8.2, the average rent levels in the Kajiado side were higher (8,125) than those of the inner city clusters (7,687.5). Rent levels in Ngong town (9,000) was higher than that of Zimmerman (6,000), higher than that of Kayole (7,500) and higher than that of Satellite (7,250). However, rent in Ngong town was slightly less than that of Embakasi (10,000). The rents in Ngong-Ngong (8,500) and Ongata Rongai (7,000) were either higher or comparable to those of the clusters within the city such as Kayole (7,500), Zimmerman (6,000) and Satellite (8,000). Preliminary conclusions in this study then were that rent values (REVA) in some clusters of the RUI were actually higher than those of the city of Nairobi. However, in certain clusters of the inner city, REVAs were higher than those of some of the clusters of the RUI. These findings then fail to conclusively establish whether the rent values were the same or different and, therefore, it was difficult to validate the hypothesis on the basis of this observation.

However, to validate the hypothesis further, the average rent levels within the Nairobi clusters, Kajiado clusters and Machakos clusters (Table 8.2) were tabulated and subjected to analysis of variance using the t-test static and the findings were as follows:-

The calculated t value for rent levels between Nairobi and Kajiado was -.465. At the degree of freedom of 6 and alpha value at 0.05, the t table value is 2.571. Evidently the calculated t value is far less than the t table value ($-.465 < 2.571$), which implies that there is no significant difference in rent levels between the two zones. The calculated t value for rent levels between Nairobi and Machakos is 1.104. At the degree of freedom of 6 and alpha value at 0.05, the t table value is 2.571. Evidently the calculated t value is less than the t table value ($1.104 < 2.571$), which implies that there is no significant difference of rent levels between the two zones. The calculated t value for rent values between Kajiado and Machakos is 2.353. At the degree of freedom of 6 and alpha value at 0.05, the t table value is 2.571. Evidently the calculated t value is less than the t table value ($2.353 < 2.571$), which implies that there is no significant difference of rent levels between the two zones.

Findings and discussions-From the results of the t-test, the study established that there were no significant variations in rent levels between the inner city clusters and those of the RUI areas of either Kajiado or Machakos. The t-test further showed that such variations in rent levels were not significant between Kajiado clusters and those of Machakos. The HOBURE category of developer could therefore opt to invest within the

Machakos areas of RUI clusters, Nairobi or those of Kajiado side and in all the three clusters such an investor would still enjoy the same income/sales generating capacity in terms of REVA or TR, unless other factors were taken into considerations.

In other words, if the HOBURE category of developer was faced with a choice of selecting either the urban or the RUI for business investment, he was likely to be indifferent between the clusters of Nairobi city and those of either Kajiado or Machakos. Most likely, however, a shrewd developer would prefer to invest in the inner city clusters of Nairobi because land was serviced and because clients to patronize the rental houses were more likely to be reliable within the city. Reliability in the number of clients to patronize the houses was likely to be as a result of the differences in distance between the inner city and RUI locations. Why then did such investor shun the inner city to invest at the RUI areas since rent levels were the same, meaning that there was no advantage at the RUI?

Since TR measured in house rent value (REVA) were not found to vary significantly between the two locations of urban and RUI, it was concluded that the variable of REVA could not make this category of developer to avoid the inner city in favor of the RUI. The findings of the t-test, therefore agree, with the hypothesis of this study and the remaining part of the hypothesis which is yet to be validated is that DECOST between the two locations of urban and RUI would be the factor which would motivate developers to opt for low DECOST locations.

8.3.3 Variations in Development Cost between the City and the Rural Urban

Interface and Options of House Builder to Rent

This study set out to analyze the variable of development cost (DECOST) and how it influenced the HOBURE category of developer in deciding where between the areas within the city and those of PUAs he/she was going to invest. It was assumed in this study that variations in DECOST were likely to be as a result of variations in land delivery models and variations in the development control models between the city and RUI.

In order to adequately tabulate the variable of cost, it was considered that the HOBURE category of developer was likely to incur development costs at three levels. The first level of land use where this category of developer was likely to incur costs is in land delivery and registration (COLARD). Secondly, when erecting a physical artifact (EREPAT) in the form of a house to rent, the HOBURE developer would incur another type of cost related to the need to contract the services of consultants (DCE). Some of the development control experts whom the HOBURE developer was likely to consult were the architect, quantity surveyor and engineer. The expenses this developer would incur at this point were considered as cost 2 (C2). Finally, the HOBURE developer would be required to obtain development permission from the LAs and the requirement to obtain permission had cost implications which can be considered as cost of development permission (CODEP). This category of developer would, therefore, incur all the three types of development transaction costs, which occur at the three levels of the land use process C1+C2+C3 (Table 8.2).

The costs related to development control, which the HOBURE category of developer was likely to incur both in the inner city and within the areas of RUI clusters were calculated in terms of averages. The DECOST averages were subjected to analysis of variance using the t-test and the results were as follows. Whereas the average costs for Nairobi were Ksh 433, 000, that of Kajiado was Ksh 71,188.75 and that of Machakos was Ksh 76,188.75 (Table 8.2), and this obviously shows glaring variations. However, these costs were subjected to analysis of variance using the t-test and the results were as follows.

The calculated t value for C1C2C3 values of Nairobi and Kajiado is 26.599. At the degree of freedom of 6 and alpha value at 0.05, the t table value is 2.571. Evidently the calculated t value is far greater than the t table value ($26.599 > 2.571$), which implies that there is a high significant variation of C1C2C3 values between the two zones of Nairobi and Kajiado. The calculated t value for C1C2C3 values of Nairobi and Machakos was 21.634. At the degree of freedom of 6 and alpha value at 0.05, the t table value is 2.571. Evidently the calculated t value is far greater than the t table value ($21.634 > 2.571$) which implies that there was a high significant variation of C1C2C3 values between the two zones of Nairobi and Machakos.

From the results of the t-test, it was concluded in this study that variations in the levels of development costs that the HOBURE category of developers were likely to incur between the areas of Nairobi and the clusters of either Kajiado or Machakos were statistically significant.

Discussion-It was earlier argued that if TR and TC as dictated by market forces and prevailing factor prices are held constant, then the DECOST which will be incurred by the HOBURE developer at the three levels of the land use process would add to TC. Since TR and TC were assumed to be the same, then variations in DECOST would be the factor that would determine profit levels. Since the rent values (REVA) taken as a reflection of total revenue (TR) were not found to vary significantly between the inner city and the RUI, why then did this developer prefer the areas of the RUI? In the absence of any other plausible factor, the development transaction cost (DECOSTs) was considered to be the reason that persuaded this category of developer to avoid the inner city and invest in the rural urban interface (RUI).

The factor of zoning in the inner city was added to the final TC because at the RUI, the developer had the freedom to build the profit-advancing category of houses while in the city the freedom was curtailed because of zoning. The house builders to rent who were observed in the field could be categorized into sub-groups as discussed below. The first category was the HOBURE posh house developers who build very expensive houses in PUAAs to rent and such developers were targeting the rich people. The second categories of HOBURE were classified as informal because they build houses to rent targeting the poor in the RUI. The two sub-categories of the HOBURE developer are discussed below.

(a) The 'posh' category of House builder to rent developer and minimax at rural urban interface.

The study noted that there was a group of HOBURE developers at the RUI who constructed expensive houses to rent targeting the rich. These developers mainly chose areas in Ngong town (GLTC); Ngong-Ngong (FHLTC) and Ongata Rongai (TLTC) and the FHLTC respectively. The high-income house renters preferred the areas of Ngong-

Ngong and Ongata Rongai because of the presence of attractive neighborhoods. Some of the attractive sceneries within Ngong-Ngong and Ongata Rongai were the nearby spectacular Ngong hills, the beautiful high income neighborhoods of Karen, Ololua forest and Empakasi forests. Other sceneries located near Ongata Rongai include Nairobi National park, the attractive Nairobi River and Kadisi River. The posh houses, which were targeting the rich at the RUI, were found to be similar to those which are found in the high-income areas of Nairobi city such as Karen, Kileleshwa and Kitsuru.

For the HOBURE developers who were constructing the posh category of houses to rent, locating such business at the RUI could be seen in the context of two factors. First, these developers tended to target the construction of profit maximizing investments such as flats within the RUI because such houses gave them more income per square metre. Areas in the city where flats could be constructed were few because of zoning specifications and areas in the city where such development could be permitted were very expensive. Secondly, development costs within the city were very high (Ksh 433,000) compared to the average DECOST at the RUI, which was Ksh 71,188.75 in Kajiado side and Ksh 76,188.75 in the Machakos side (See Table 8.2). Because there is an inverse relationship between profit levels and DECOST, peri-urban areas became high profit zones.

(b) Informal house builder to rent category of developers and minimax at rural urban interface

This category of HOBURE developers were constructing houses at the RUI, which could be categorized as informal. These developers use building materials which are not allowed in the city such as wattle, timber, iron sheets and mud for the walls of such houses. On a small plot of 0.045 hectares for example, the HOBURE informal house developer was able to obtain ten rooms (10 rooms) in one row and another ten rooms (10 rooms) in another row. The HOBURE informal housing category of developer was able to earn one thousand shillings from one room which then could be converted to a total of twenty thousands Kenya shillings in one month (1000×20) = (Ksh 20,000) from the twenty rooms.

The field survey found out that these types of houses lacked basic necessary facilities such as portable water, electricity and sanitation. Those who rented such houses, therefore, had to buy water and paraffin for lighting. The informal houses were in high demand from people who worked in the informal sectors especially casual workers in the building industry. Some of those who worked in the ISE and who patronized these houses for rent included watchmen, Manson builders, stone dressers, commercial sex workers, waiters in bars and restaurants and charcoal vendors.

The result of the foregoing scenario was the evolution of large squatter colonies or informal settlements at the RUI. In the Ngong area, for example, there was the 'Gichagi' informal settlement located on government land. The sprawling Mathare informal settlement in Ngong, Kerarapon and Bulbul were yet other cases of slum development that emerged due to poor development control at the RUI. In Ongata Rongai town, there were the 'kware' slums while in Kitengela there was the "Kwa ngombe slums" and Portland slums respectively. In Athi-River, there were the "slaughter" informal settlements and in Mlolongo, almost the larger part of the town was made of informal settlement. The HOBURE informal house category of developer was predominant in Kitengela and Mulolongo towns because authorities in the two towns had an informal approach to development control and the land delivery model was also informal and cheap.

It is argued in this study that the HOBURE informal category of developer could not operate from the inner city. This is because authorities in the city specify the type of houses to be constructed and the informal category of houses therefore were not part of the specified houses. The byelaws in the city also specify the type of building materials to be used in the construction of houses and such materials did not include the informal type used at the RUI. Further, byelaws in the city also required that the developer must service the land before he/she embarks on development. The above development standards and requirements made areas within the city inaccessible to the HOBURE informal house category of developer and, therefore, the peri-urban became the only alternative destination for him/her.

8.4 Variations in Development Cost, Options of House Builder to Sell at Rural

Urban Interface and Peri-urban Formation

This category of developer was considered to be profit motivated. Owing to considerations of profit motivation, such a developer was likely to find out whether the level of threshold (demand) (TR) was sufficient in the location where he/she intended to invest before he/she decides whether such an investment would be viable. The intentions of the HOBUSE developers were to construct houses, which they later would sell for profit. Such developer could only be able to establish the threshold levels in a particular location by comparing the house values (HOVA) or TR within the areas of the city and those at the RUI (TR).

In order to make an informed decision, such developer was also likely to verify the levels of development costs between the two locations which would then enable him/her to estimate the profit levels per location. However, the HOBUSE investor was not likely to be in a position to change the market value of the house he would construct because this factor would be dictated by the forces of demand and supply. Such developer was not likely to change the cost of house construction also because such cost would be dictated by the going market prices of building materials. Therefore, TC and TR, seen from this point of view were considered in this study to be constant. Within the context of the above assumptions, the land use activities of HOBUSE were therefore analyzed as follows.

8.4.1 Similar Threshold Levels in Urban and Rural Urban Interface and the Indifferent House Builder

Earlier, it was postulated in this study that the TR both in the areas of the city and those within the areas of RUI clusters would not vary. Based on the above assumptions, therefore, this developer would be indifferent between the areas of the inner city and those of the RUI when choosing locations where to invest. However, the cost of development transaction, which this category of developer would incur during COLARD, CEREPAT, and CODEP would definitely add into the cost of construction and, therefore, make the TC to vary in relation to TR. The HOBUSE developer would, therefore,

itinerate between the two locations of urban and the RUI to find out which of the two locations had the lowest DECOST. The level of DECOST in a particular location was considered to have an inverse relationship with the level of profit. In this section, the study tries to test the validity of the postulate made in this study using the variables of HOVA and DECOST and evidence collected from the respondents during field survey interviews. The following were the results of the survey which was aimed to establish the variables of DECOST and HOVA.

Table 8.3; Levels of: house values (HOVA) and development cost (DECOST) in Nairobi and areas of rural urban interface (RUI) clusters

Zone	Subzones	Value of 2 bedroom house in KSH	Total cost- C1+C2+C3(DECOST in Ksh)	Average costs (DECOST in Ksh)
Nairobi	Kayole	3,000,000	433,000	433,000
	Embakasi	3,250,000	433,000	
	Zimmerman	2,500,000	433,000	
	Satellite	2,500,000	433,000	
Nairobi	Average	2,812,500	433,000	433,000
Kajiado	Ngong town	2,500,000	111,805	71,188.75
	Ngong-Ngong	2,750,000	58,975	
	Ongata Rongai	3,000,000	60,000	
	Kitengela	1,500,000	53,975	
	Σ/4	2,437,500	71,188.75	71,188.75
Machakos	Mulolongo	2,000,000	73,000	76,188.75
	Athi-River	1,750,000	123,805	
	Syokimau	1,500,000	53,975	
	Katani	1,000,000	53,975	
	Σ/4	1,562,500	76,188.75	76,188.75

Source: Field survey, 2006

Table 8.3 shows the value of a two-bedroom house within the selected clusters of Nairobi and those of the RUI. The levels of development cost both in the city and the RUI were also tabulated into averages which were taken in this study as the Nairobi cluster average DECOST, the Kajiado cluster average DECOST and lastly, the Machakos cluster average DECOST. This study used the two-bedroom unit as a measure of the threshold (TR) levels between the city and the peri-urban.

The average HOVA (Figure 8.3) were subjected to analysis of variance using a t-test static and the results were as follows (details in appendix iv).

The calculated t value for 2-bedroom values (HOVA) of Nairobi and Kajiado is 0.991. At the degree of freedom of 6 and alpha value at 0.05 the t table value is 2.571. Evidently the calculated t value is less than the t- table value ($0.991 < 2.571$), which implies that there is no statistically significant difference of bedroom values between the two zones of Nairobi and Kajiado. The calculated t value for 2-bedroom house values of Nairobi and Machakos is 4.399. At the degree of freedom of 6 and alpha value at 0.05, the t table value is 2.571. Evidently the calculated t value is greater than table t value ($4.399 > 2.571$), which implies that there is a significant difference of 2- bedroom house values between the two zones.

Findings and discussions-From the results of the t-test, it was then concluded that since there were no significant variations in HOVA (TR) between the two locations of Nairobi and the RUI of Kajiado side, then the investor was likely to be indifferent between Nairobi and Kajiado. However, as argued earlier, Nairobi would be the most likely destination for a developer who was faced with such a dilemma because land in Nairobi was likely to be serviced and there was likely to be a wider clientele. It can be observed, however, that the HOBUSE developer nevertheless chose areas of RUI, which, then could mean that there could be another factor which motivated him/her to seek such locations.

However, the t-test showed that there were significant variations in the house values (HOVA) between Nairobi and Machakos clusters. This could then imply that the HOBUSE category of developer would prefer to invest in the inner city rather than in the areas of RUI clusters of Machakos. However, the reason why there were significant variations in 2-bedroom house values (HOVA) between the Nairobi side and Machakos side was because of the presence of Katani and Syokimau clusters in the mean sample. The two clusters of Syokimau and katani were new settlement where land was not serviced hence houses which were constructed there did not attract quick demand. It, therefore, means also that the supply of such houses in the two areas of Syokimau and Katani could be higher than the demand. Land values within Katani and Syokimau clusters were also lower than those of other locations within the same clusters such as Athi River and Mulolongo.

The land delivery costs in the two clusters of Syokimau and Katani were also very low because the two clusters were operating under the former African rural area land delivery model of (FARALARARM), under RLA (Kenya, Cap, 300). It is possible then that the HOBUSE category of developer in Katani and Syokimau who wanted to sell his/her house quickly may have considered the factor of low DECOST to lower the prices in order to capture quick market demand. It was not possible for those in Athi River and Mulolongo within the Machakos clusters to follow a similar strategy because land values in the two clusters were high and DECOST in Athi River was high (Ksh 123,805) compared to that of Katani (Ksh 53,975) and Syokimau (Ksh 53,975)

Despite what was considered in this study as less attractive factors for developers to locate in the areas of Katani and Syokimau, the two areas nevertheless were found to be the destination for most HOBUSE categories of investors. It was concluded in this study, therefore, that there could be another factor, which motivated the HOBUSE developers to these locations other than the house values (HOVA). This inquiry considered the variable of development cost as earlier hypothesized to find out the extent to which it influenced the HOBUSE developer to opt for areas at the RUI. The analysis of the cost variations factor was carried out as follows.

8.4.2 Variations in Development Costs, Options of House Builder to Sell Developer and Peri-urban Formations.

The house builder to sell (HOBUSE) developer was likely to incur development cost (DECOSTs) related to land delivery (COLARD), cost of erecting physical artifact (CEREPAT) and the cost of obtaining development permission (CODEP). Hence this developer would pay all the three costs of $C1+C2+C3$. The average costs, which, this category of developer would incur in the Nairobi clusters and within the clusters of the RUI are recorded in table 8.3. The analysis of variance in the average development costs (DECOST) within Nairobi, Kajiado and Machakos in the various clusters were carried out in this study using the t-test. The results of the t-test showed that there were very significant variations between the inner city DECOSTs and those of peri-urban areas. This shows that if the HOBUSE category of developer was faced with the decision of

where to invest, he would choose the areas of the RUI clusters within the clusters of Kajiado and Machakos where DECOST were relatively low.

In order to gain in-depth understanding of the activities of this category of developer, one developer who falls in the HOBUSE category of developers was selected for interview.

Box 3; Case study 3: Njuguna the House builder to sell developer

Njuguna had several flats to rent in Juanco area of Ngong. At the time of this interview, he was in the process of negotiating for a one acre piece of land with the aim of constructing eight bungalow types of housing units for sale. It was established from Njuguna that he planned to spend a total of six hundred thousands Kenya shillings to construct one two-bedroom house unit. Njuguna was also targeting to earn about 1.2 million Kenya shillings from the sale of each unit of house once completed. After completion, the two-bedroom units would give the HOBUSE developer a profit margin of another six hundred thousands (Ksh 600,000) each. "Where would you expect to find buyers for all the house units which you intend to construct for sale"? Njuguna replied that in Ngong area, the market for these types of houses was insatiable and the demand was created by people escaping the inner city congestion. Congestion as a push factor from the inner city was again mentioned by those categories of developers that relocated to the RUI to construct homes or to purchase homes (HOBUHOM).

Lessons learnt from Njuguna; the house builder to rent category of developer.

In order to meet the requirements of his clients, Njuguna chose locations where such services including electricity, transport facilities and community facilities exist. Other facilities, which were required by Njuguna's clients, include the proximity to public schools, health centers, police stations, shopping centers, water, recreational areas and churches. Most of the facilities also exist within the satellite centers of the RUI such as Ngong town, Athi river town, Ongata Rongai and Mulolongo and this explains why most developers tended to coalesce around such centers.

Although Ngong area had both leasehold and freehold land tenure clusters, Njuguna opted to seek locations within freehold land tenure clusters (FHLTC). Within the two locations of freehold and leasehold, returns from the two-bedroom houses were almost the same; Ngong-Ngong (2,750,000) and Ngong town (2,500,000) and, therefore, income variations (TR) could not be the factor, which made Njuguna to opt for freehold tenure

locations. In any case, most services including better roads were located within Ngong town and one would expect, therefore, that such developer would locate business within the town and not within FHLTC, which were slightly far from such services.

The fact that Njuguna opted for freehold tenure clusters can only be seen within the context of variations in DECOST. DECOST negatively impacted on profit levels and yet profit maximization was the main motivation for Njuguna to undertake the HOBUSE category of development project. Whereas DECOST in the leasehold cluster of Ngong town was Kenya shillings 111, 805, that of Ngong-Ngong was Kenya shillings 58,975 (Table 8.3). At the level of erecting a physical artifact, there was no requirement within the FHLTC that Njuguna seeks for development permission and the development control authority at the level of prescriptive land use was not specified (Chapter 6). Because there was no specification on the type of houses required in the freehold tenure clusters, the study found out that Njuguna sometimes opted to build even flats, which enabled him to save on space, but to maximize on profits. However, the type of investment, which Njuguna was undertaking during the time of this interview, was the construction of 8 bungalow type house units on one acre of land (0.05 per unit).

Within Ngong town, the minimum plot sizes for residential houses were 0.1 hectares, which means that Njuguna could only construct four units instead of eight. Secondly, the houses within Ngong town were planned on single plot basis, which means that Njuguna was going to service the houses separately and this had high cost implications on his side. However, Njuguna said that in the Freehold land tenure clusters, he would consolidate the housing units together as this would be cheaper to service them. Secondly, the house units, which Njuguna considered to construct in freehold land tenure cluster, would occupy less land with more housing units per plot than those within Ngong town. This model of development allowed Njuguna to generate more profits from the extra houses at lower cost within a small size of land than within Ngong town.

Njuguna engaged the services of an architect and a mason and at a later stage; he also engaged the services of an electrical technician. This again means that he often avoided

other development control experts. The savings realized from the use of the cheaper land delivery model and the use of cheap expertise means that Njuguna had converted all of them into profits.

8.5.0 High Development Costs in the City than Rural- Urban Interface, and Options of House Builder for Home.

8.5.1 An Overview and Assumptions

In this subsection, land use activity processes within the context of the house builder for home (HOBUEHOM) categories of developers were also analyzed in order to establish the factors which motivated them to invest at the RUI. In order to have a home for his/her family, the HOBUEHOM category of developer had two options. The first option was for the HOBUEHOM developer to buy a plot and construct a house of their choice. The second option for such developer was to look for houses, which were already constructed by other developers such as the HOBUESE category and buy a ready-made home.

In order to make informed decisions on the appropriate location to invest (between the inner city and peri-urban), the HOBUEHOM category of developer had to make two considerations. In case he/she opted to buy a plot and built a house for home, the first consideration would be for him/her to consider the value of land (LAVA) both in the city and in the peri-urban. Such developer would further consider the cost of land delivery between the two locations. The other option was for such developer to buy a house; hence, he/she must consider the value of houses (HOVA) in the two locations of urban and RUI. The activities of the HOBUEHOM category of developer were, therefore, analyzed using one of the two variables of either land values (LAVAs) or the value of the two-bedroom house (HOVAs) both in the city and in the peri-urban as discussed below.

8.5.2 Similar Threshold Levels Between Urban and Rural Urban Interface and the Indifferent House Builder for Home.

In the event that the HOBUEHOM developer decided to take either of the two options of buying a house or a plot, they would most likely consider where between the city and the RUI they would be able to obtain a cheaper house or plot and opt for locations where

they could find such conditions. However, it was hypothesized in this study that the LAVA and HOVA between the areas of the city clusters and those of the RUI would not vary significantly. In the circumstances, the HOBUEHOM category of developer was likely to be indifferent to the two locations.

The analysis carried out earlier in this chapter using the t-test shows that there were no significant variations in HOVA values between the city and Kajiado side because HOVA were lower in the Machakos side of the RUI. If the option of the developer was to buy a house, this developer would, therefore, be indifferent between the city and peri-urban areas of Kajiado. But such developer would most likely prefer Machakos side if he/she was choosing between the city and Machakos because HOVA values were lower in the Machakos peri-urban clusters. If this category of developer were to consider the value of land (LAVA) between the two locations of urban and rural, again he would be indifferent between the two areas of the city and peri-urban areas of Kajiado and Machakos side because there were no significant variations in LAVA variables. It was concluded, therefore, that the two variables of LAVA and HOVA could not be considered as factors which motivated the HOBUEHOM developer to avoid the inner city and invest at the RUI.

8.5.3 Factors, which Motivate House Builder for Home to Rural Urban Interface; Evidence from Field Survey.

It was necessary to establish the factors that motivated this developer to locate in the RUI from the point of view of the respondents who were sampled and interviewed for the study.

8.5.3.1 Original Homes of Peri-urban Residents

The first thing was, therefore, to establish where this category of developer came from and the factors that pushed him from his place of origin.

Table 8.4; Previous home of the periurban residents by zone and location

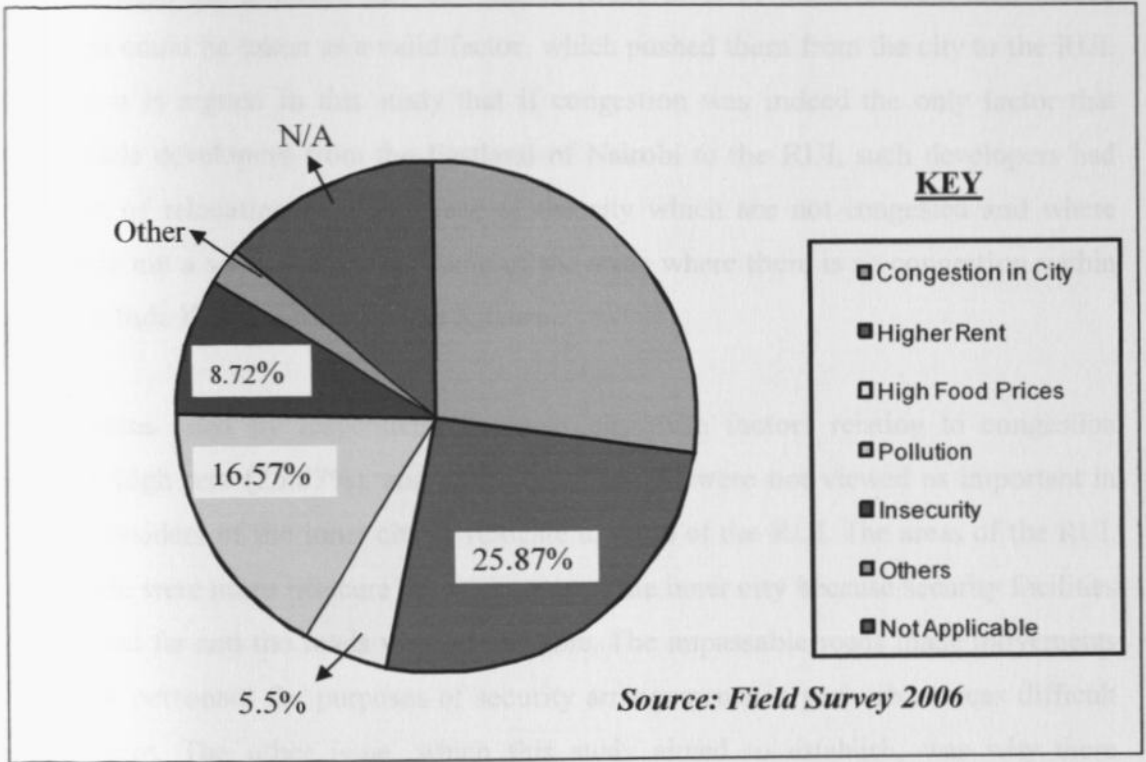
		Ngong /Ngong	Ngong town	Kitengela	Ongata Rongai	Athi-River	Mlolongo	Syokimau	Katani	Total	%
Nairobi	01	16	11	30	23	23	15	27	27	172	71.67
Urban do	02	2			2					4	.83
Urban akos	03							2	1	3	2.1
Kajiado/ akos	04	12	19		5	7	15	1	2	61	25.42
Sample size		30	30	30	30	30	30	30	30	240	100

Source: Field survey: September 2006

A sample of thirty respondents from every cluster both in Kajiado and Machakos side were randomly selected for the interview. From the findings of the interview (Table 8. 4), the majority of homeseekers in the RUI came from Nairobi (71.67%) and the rest (25.42%) came from the rural areas of Kajiado and Machakos. An insignificant number (2.93%) of the homeseekers was originally residing in the peri-urban of either Machakos or Kajiado before they were joined by others from the city and elsewhere. It was further established that majority of the migrants who had settled in Ngong-Ngong and Ngong town and who had not originated from the inner city of Nairobi had come from Kiambu district.

The field survey established that those who came from Kiambu to settle in Ngong had come in the 1960s and were attracted by farming and the availability of land in Ngong. Later, some of the migrants from Kiambu were given land during land adjudication and those who did not benefit from land adjudication were able to buy land from the original Maasai owners.

Figure 8.5; Inner city rural interface Push-Factors



The respondents were further asked to state why they left the areas within the city to settle in the RUI. The factors which pushed those who migrated from the city to the RUI in terms of importance included congestion in the city (27.33%), high rent (25.87%), pollution in the inner city (16.57%), insecurity (8.72%) and lastly, high food prices (5.5%) (Figure 8.1).

Discussion- However, the t-test analysis carried out elsewhere in this study indicates that there were no significant variations in rent levels between the city and those of the RUI and therefore this could not be considered as a push factor. From the results of the field survey, the most prominent push factors for the inner city out migration related to congestion (27.33%), pollution in the inner city (16.57%) and insecurity (8.72%).

All respondents in the clusters samples of the RUI areas were mainly Africans and most Africans within the city of Nairobi were residing in the Eastland zones, which were indeed congested (Chapter 2). Assuming then that the Africans who relocated to the RUI had come from the Eastland part of Nairobi where most of them resided, then indeed congestion could be taken as a valid factor, which pushed them from the city to the RUI. However, it is argued in this study that if congestion was indeed the only factor that pushed these developers from the Eastland of Nairobi to the RUI, such developers had the option of relocating to other areas of the city which are not congested and where pollution is not a serious concern. Some of the areas where there is no congestion within the city include Karen, Muthaiga and Kitsuru.

The concerns cited by respondents as inner city push factors relating to congestion (27.33%), high rent (25.87%), and pollution (16.57%) were not viewed as important in making a resident of the inner city to relocate to areas of the RUI. The areas of the RUI, for example were more insecure than the areas of the inner city because security facilities were located far and the roads were impassable. The impassable roads made movements by security personnel for purposes of security arrangements in peri-urban areas difficult to implement. The other issue, which this study aimed to establish, was why these developers opted to coalesce just around the satellite centers and along the highways and the responses were as follows.

8.5.3.2 Factors for Motivating Concentrated Settlements Patterns and Ribbon Development at RUI

When the peri-urbanites reached the rural urban interface, the reasons which influenced them to choose particular locations in terms of importance were the availability of land (35.21%), the affordability of land (23.25%), the availability of services (20.93%), the availability of infrastructure (16.94%) and accessibility to Nairobi city (3.65%).

Discussion-From the data collected, there was a high number of respondents who chose certain zones due to the availability of land (35.21%) and the affordability of land (23.25%) respectively both of which made an aggregate total of 58.46%. This was as a

result of three factors. First, migrants to Katani, Syokimau and Kitengela had bought land through shares and shareholders were later given land using the criteria of individual share contributions. Other HOBUHOM developers had bought land individually from the land buying and selling cooperative societies, which were found in Syokimau and Katani. It can be argued that the location of land where these categories of developers found themselves was already predetermined earlier by either the cooperative society representatives (Chuna case) or the land buying and selling companies (Syokimau and Katani cases). Those who bought land in such areas were not involved in the conscious process of choosing the locations.

HOBUHOM developers who were within the urban areas of Ngong town, Athi-River, mlolongo and Ongata Rongai bought plots which were advertised by LAs or the COL or from individual plot sellers who were allocated by the COL or LAs. In both of the above cases, the location and availability of land was already fixed and predetermined by others and not the current occupants. The decision by developers to buy land in the areas of Ngong town, Athi River, Mulolongo and Ongata Rongai towns was, therefore, dependent on the affordability and availability of the land as cited by the respondents. The homeseekers who came from the inner city and who consciously looked for locations at the RUI to build their houses considered a lot of factors before purchasing land. The availability of electricity, water, areas of shopping, and schools was considered more critical (20.93%), followed by the proximity to areas of communication or transport (16.94%).

The above-mentioned facilities were found within the already developed nodal points (satellite centers) or along the tarmac roads. This explains why settlement patterns at the RUI were either nucleated around the nodal points or scattered along the main roads forming patterns of ribbon development. In the absence of any convincing reason that motivates this developer to RUI, the factor of development cost was considered as earlier hypothesized in this study and this is discussed below.

8.5.3.3 Variations in Development Costs between Sector 1 and 2 and Options of House Builder for Home.

In order to establish the reasons which actually motivated the HOBUEHOM developer to opt for areas at the RUI, the variable of DECOST was analyzed to find out whether it was the reason which made this developer to avoid the city. The findings of the t-test carried out earlier show that there were significant variations in DECOST between Nairobi clusters and the peri-urban clusters of Kajiado and Machakos. If DECOST was the only consideration for the HOBUEHOM developer, as hypothesized in this study, then such developer would opt to invest at the RUI of Kajiado or Machakos side. However, the t-test results also indicate that there were significant variations in house values between Nairobi and Machakos which means that between Nairobi and Machakos, the HOBUEHOM developer could opt to buy a house in Machakos side.

The HOBUEHOM category of developer though not considered to be profit motivated, it was assumed in this study that he/she was also operating within a budget constraint and, therefore, the factors of cost and utility in space use were critical considerations. It was concluded, therefore, that the factor of DECOST motivated this developer to opt for locations at the RUI. Within the group of HOBUEHOM developers, the study noted other resident sub-groups as explained below.

(a) Low income rent squeezed house builder for home developer, variations in Development costs and options at rural urban interface.

It was established through field survey that there were some categories of formal workers in the inner city who earned low incomes but decided to form cooperative societies that enabled them to contribute money per month. The money contributions were later used to buy land at the RUI through installment, and this land was later subdivided and allocated to individual share holders. Other individuals who were not in organized groups also opted to buy land at the RUI through installment and this land was bought either from farmers or from land speculators.

The two categories of homeseekers did not have enough money in the first case and, therefore, after paying for a plot, they often constructed informal houses at least to enable them run away from the snare of the inner city rents. Over time, some of these developers were able to construct houses of their own choice. The houses are, however, constructed in phases where one may start with the bedroom and kitchen which he/her occupies with their families. Later, these categories of developers construct the rest of the rooms slowly until the house is complete and this may take between 5-10 years.

Discussion-It is argued in this study that such developers did not mind residing in the city, but could not find land within the city which they could pay through installment. Secondly, regulative planning in the inner city did not condone informal houses such as which this category of developer was intending to construct and to start with until he/she graduates to a better one. These categories of developers were found in Katani in Machakos and the outskirts of Kitengela in Kajiado. These were the areas where most of the land was being bought by cooperative societies or by land speculators. Because this categories of HOBUHOM developers could not afford to be in the city due to land use controls and, high building standards, it can be argued that their only option was at the RUI and therefore, they suffered from 'peri-urban destined syndrome'.

(b) Posh house builders for home

These categories of developers were found to buy land in Ngong and Ongata Rongai where they built houses similar to those in the upmarket areas of Nairobi. Some of these developers first bought the required land on which they built an informal house and later build standard houses (a dream house). This approach was not applicable in Nairobi because of development controls which specified building materials and made construction in Nairobi inflexible.

8.6 Determinants of peri-urban formation at the rural-urban interface of Nairobi; a

Summary

Most of the developers targeted by this study migrated from the inner city for reasons which could be seen in the context of DECOST as summarized below. Factors which

create variations in DECOST between the city and the RUI include variations in COLARD models as explained.

8.6.1 Variations in Cost of Land Delivery in Sector 1 and 3 and Peri-urban Formations.

The study found out that the two land delivery models of GOVULARARM which covers the city and the two towns of Ngong and Athi River and FARALARARM which covers the rural areas where Africans reside had variations in COLARD. The variations in COLARD between GOVULARARM and FARALARARM tended to affect profit levels between the city and the RUI. The other land delivery model, which was covered by this inquiry, is that of former African markets which were informal and controlled by the county councils (FAMILARARM). Because of the informal process of land delivery, the cost was low and this was converted by developers to profits.

The last model was that of cooperative or company land rights adjudication and registration model (COLARARM). The COLARARM followed the rural area registration system under RLA and LCA (Kenya, Cap 300; Kenya, Cap 302) respectively. However, COLARARM had the characteristic of allowing developers to pay for land through installment, which made land acquisition flexible than that of the city. The cost of acquiring land within the cooperative or company areas was spread over along time, sometimes over a period of ten years. First, members contribute money to buy land. Secondly, they contribute to pay for survey services and land control board expenses. Thirdly, the members contribute to obtain title deeds. Lastly, the share holders are allocated individual portions of land. This process proves to be manageable and flexible because the costs are spread over along time and such arrangements were rare in the city.

8.6.2 Variations in Cost of Development Control Models between City and Rural Urban Interface, Formations of Physical Artifacts and Peri-urbanization

The second aspect that made the areas of rural urban interface (RUI) cheaper was the variations in development control models which were applied during the erection of physical artifacts. The urban areas where the GOVULARARM model of land registration

was applied were controlled using a spatial framework and developers were required to obtain development permission. The development control model within GLTC can be regarded as Government Land Development Control Model (GOVULADECOM). Other development control models are those which cover the former African rural areas, FARADECOM, former African markets informal land development control model (FAMILADECOM) and lastly cooperative/company land development control models (COLADECOM).

Discussion-

Zoning in GLTC reduced the options of land investors because developers could not choose profit promoting investment options such as the construction of flats and Landis. Other land tenure clusters were not regulated to the requirements of the spatial framework (SP) and those who were erecting physical artifacts were not required to obtain development permissions. Within the former African markets, there were requirements for development permission but there was no SP to guide development. This can explain why land use patterns in such areas were undesirable. The rest of the developers within other land tenure clusters such as CLTC and FHLTC were not required by law to obtain development permission when erecting physical artifacts. Therefore, this enabled developers to erect cheap houses (informal) and they had the option of building any house of their choice.

However, areas with cooperative type of land tenure clusters had neighborhood associations in place as in the case of Chuna in Kajiado or in other cases committee members who often set rules that specified the required housing types. This requirement made construction of houses in some of the cooperative tenure settlements areas expensive. However, all the development control models within the RUI were cheaper than that of the city and this was why locations at the RUI became attractive to all categories of developers.

8.6.3 Variations in the Institutional Capacity between City and Rural Urban

Interface and Peri-urban Options

The concept of Single Development Control Authority and how it contributed to peri-urban formation was also critical. The areas, which were under county councils such as market centers tended to suffer from in-optimality of land use patterns because county councils operated without control from any other authority. Secondly, the county councils allocated land without preplanning. Developers took advantage of the confusion within the RUI to put up physical artifacts because they knew that they could not be prosecuted and this then created in-optimal land patterns. The two LAs of Olkejuado and Mavoko had no capacity in terms of manpower; budget and vehicles to monitor development in the field. Developers could, therefore, build a house to the level of completion without being noticed by council authorities.

8.7.0 Peri-urban Threshold Level Analysis.

8.7.1 An Overview

In order to be attracted to the RUI, one of the factors which developers are likely to consider would be whether there is effective demand to make investment viable. Effective demand was considered within the context of threshold levels as conceptualized in the central place theory (chapter 3). It has been established in this study that there are no significant variations between the threshold levels within the city and those of the RUI. Because of the foregoing, developers were able to avoid the high development cost in the inner city to invest in the low development cost at the RUI where profit could be maximized. The question to be answered is: what actually created the resilience at the RUI, which then made TR within the city and that of the RUI almost the same? This question is answered in the sections that follow. It was earlier hypothesized that such threshold at the RUI would be the same with that of the city because overtime, the RUI become part of the city. This section tries to establish the validity of this hypothesis.

8.8.0 City-RUI- Linkage and Threshold Levels in the RUI

8.8.1 An Overview

It was hypothesized earlier that RUI areas were part of the city and this is why there was resilience that made investment viable. This section endeavors to establish the extent to which the hypothesis holds true. The level of interaction between the city and the RUI was seen as one indication, which could show the extent to which the two systems of urban and RUI could be seen as one system.

8.8.2 Source of Employment of Residents at RUI.

The source of income for most people (69.58%) that were covered by this survey was from the formal salaried employment. A good number of those who reside at the RUI (24.58%) were working in self-employed jobs and the remaining (5.83%) were working in casual employment. It was then concluded that the presence of a big pool of workers (69.58%) at the RUI areas who were engaged in the formal salaried employment was able to create the strong resilience among the population of the RUI areas. It was further established that out of the 167 workers in peri-urban who worked in salaried employment in peri-urban, 157 (94.4 %) of them were working in the city. The large percentage of salaried workers at the RUI who worked in the city not only shows the level of dependence of the RUI on the city (linkage) for employment but also shows the level of dependence of the city on the RUI residents for labor.

Respondents who were in formal salaried employment were asked to state the amount of salary they earned per month and it was established that most of them were earning more than fifteen thousands Kenya shillings. This amount of income per month was considered in this study to be substantial enough to create the desired threshold at the RUI, which then made investments in this zone a viable undertaking.

8.8.3 House Construction Activities and Construction Related Employment at RUI

Within the RUI, the study found out that there were several activities which created informal employment. One of such activities which created informal employment were companies in the quarrying industry which were trying to meet the high demand for

building materials both in the inner city and within the RUI. It was established during field survey that the quarrying activities have created informal employment which inter-alia included the blasting of stones, stone cutting, loading of stones into waiting vehicles and the loading of quarry chips into Lorries. It was found out that these activities created informal employment for residents at the RUI, and this then explains why those who resided at RUI had high purchasing power just as those who resided within the city. Some of the informal employment sources within the ISE included masonry work, digging of pit latrines and septic tanks, those who hawked food to construction workers, those who hawked water in carts (Mkokodeni), and those who sold water in Lorries. Most of the ISE can be summarized as follows.

Table 8.6; Sources of Informal Employment Opportunities at the Rural Urban Interface.

Activity	No of workers engaged per/time/moment	Unit produced per/day/month	Amount of money per unit/person	No of units produced per 20 days in month	Amount of income per 20 days work period
Dressing	1	300 feet/day	Ksh 6/foot	6000	Ksh 36,000
Stone builder	1	1	Ksh 400	8000	Ksh 8,000
Latrine /Septic diggers	2	3 feet/day	Ksh.1000/feet	60 feet	Ksh.60,000/30,000 each
Home Food seller	Tea Porridge Chapati	• 50 • 50 • 50	Ksh 5 Ksh 5 Ksh 10	1000 1000 1000	5000 5000 5000
Water Hawking	2	50 drums/day	Ksh50/drum	1000 drums	Ksh 50,000
Hawking water	1	5 trips	Ksh 3000/per trip	100 trips	Ksh,300,000
	1	5 bottles	Ksh 50	100 bottles	Ksh 5,000
Trade	1	1	Ksh 500	20	Kh 10,000

Source: Field survey, 2006

Discussion-From the above table one can observe that the income earned in peri-urban areas is very high and sometimes it was higher than that earned by those who worked in the formal employment in the city. The money, which was earned from the ISE in at the RUI areas, was again available for expenditure in the superstores and beer places in the evening. Other business opportunities, which are available in periurban, areas include market for Dairy products (meat and milk), because of the proximity to urban and RUI

market. In the areas of Ngong, Kiserian, Ongata Rongai and Kitengela, there was a thriving livestock market, which created jobs for the unemployed people. Meat products are in high demand in the nearby Nairobi city and at the RUI. There were some investors who had constructed slaughterhouses to take advantage of this business opportunity. Those who owned slaughter houses usually employed young men to slaughter the animals and the slaughter service providers were paid money and they were allowed to retain some parts of the animal such as the head, the intestines and legs. The slaughter service men again sold these parts of the animal to acquire more money. The money, which was earned through various informal business opportunities, was available for expenditure in clubs in the evening and even in the supermarkets.

8.8.4 Linkage of Inner City and Rural Urban

The linkage of the city and RUI was estimated using the following variables.

8.8.4.1 Accessibility to Community Facilities

The inquiry aimed to find out where people who resided at the RUI obtained their community facilities services and facilities. Majority of the people obtained their security services at the areas of the RUI (99.34%). Most people at the RUI areas acquired their postal services in the inner city (54.2%) while a substantial number (45.73%) obtained their postal services within the areas of the RUI. An overwhelming majority of the residents of the RUI (91.5%) carried out their banking services in the city. The large number of peri-urban residents who carried out their banking services in the city could be as a result of the absence of such banking services at the RUI satellite centers, which means that the city was the alternative banking destination for them. However, residents at the RUI did not bank their money in the nearby district headquarters of Kajiado and Machakos, although, such district headquarters were equally accessible. This finding was able to show that the conceptualized third sector (RUI) was more linked to the inner city than it was to the rural land use system (Sector 2) (Chapter 3).

During the time of writing this thesis, banks within the city were reporting heavy profit gains. The resilience in the city based banking industries could, therefore, be partly

attributed to the presence of customers from the areas of the RUI. It also means that money borrowed from the inner city banks was used to develop homesteads and other business ventures at the areas of the RUI. This strong social and economic linkage between the urban proper and the RUI could not be ignored for it was not known to what extent the linkage was holding the urban economy (fabric) together. Such linkage or its absence could perhaps lead to the collapse of the city as a viable central place. The residents of RUI also relied on the inner city so much to the extent that the RUI could not be seen in isolation of the inner city.

The study established that 44 % of the respondents at the RUI clusters carried out their shopping within Nairobi while yet a bigger number (55.94%) carried out their daily shopping activities within the areas of RUI satellite centers. Although residents of the RUI worked and earned their salaries from the inner city, quite a substantial amount of that income (55.94%) was actually spent at the RUI area and a good amount of money (44%) was also spent in the inner city itself. During field survey, a lot of business activities were flourishing within the areas of suburbia and these included groceries, petrol stations, hardware business, beer dens, supermarkets and veterinary drug shops among others. The businesses, which were located in PUAs, had similar resilience as those of the inner city. This shows that there was a lot of money that was spent within the areas of RUI and this could be the salaries which were earned in the city and the incomes which were earned from the various informal sectors economic activities located within the RUI.

8.8.4.2 City- RUI Satellite Centers Hierarchical Relationship

In the Christalian model, towns exist as central places to distribute goods and services to the population in the city and within the range (chapter 3). According to the Christallian model, however, central places exist in the form of hierarchy where those in the lower order distribute lower order goods to a lower order threshold population and those in high hierarchy distribute higher order goods to a high threshold population (chapter 3). In this section, the study aimed to establish the relationship of Nairobi city and the satellite centers, which are located at the areas of RUI using the Christallian model.

The field survey showed that a high percentage (61.8%) of the residents at the areas of RUI bought lower order goods and middle order goods from the city of Nairobi. In the Christallian model, the population, which purchases goods and services of a lower order from a particular central place, are assumed to be part of the threshold population of that particular central place. In order for RUI satellite centers and the city to qualify as centers which are related in a hierarchical order, the population at RUI should patronize the satellite centers within the RUI itself by buying lower order goods from them. Secondly, residents of the RUI should only purchase higher order goods from the city of Nairobi as postulated in the Christallian model in order to show that the two are related in hierarchical form.

Discussion-From the findings of the field survey, it was concluded that the relationship between the city and areas of RUI satellite centers was not that of a high order center related to a lower order center in the Christallian sense. The relationship between satellite centers at RUI and the areas within the city could be seen as that of a leg or ear, or head, which then forms part of the body system. In this case, the part cannot do without the body. The two land use systems of urban and RUI therefore formed one land use system, which could be seen in the context of the systems theory. Those at the RUI areas who bought lower order goods and middle order goods from the city formed a critical threshold for the viability of the city as a central place. These findings agree with the study hypothesis and also agrees with evidence of earlier peri-urban formations in the USA (1910) and the UK (1915 (chapter 4)). In earlier peri-urban formations in the USA and the UK, it was established that those who lived in suburbia had strong socio-economic linkages with the city and therefore were considered to be part of the city (chapter 4).

8.9.0 Characteristics of Nairobi's Peri-Urban Model.

In this section, a brief description of the characteristics of peri-urban formation in Nairobi is given. The aim is to establish whether peri-urban formation in Nairobi's case could be seen in the context of other countries (chapter 4).

8.9.1 Characteristics of the Population in Peri-urban Nairobi

Majority of the residents of the peri-urban area were predominantly Christian (97.4%) followed by Muslims (3.03%). A good number of those in peri-urban areas who were Christians (52.26%) were found to patronize churches in the areas within the RUI while a significant number of them (39.86%) went to seek for divine interventions within the city. A greater numbers (67.12%) of the peri-urbanites practiced some sort of urban agriculture.

The field survey established that there were a lot of people in peri-urban areas of Nairobi who were of low income and who worked in the informal sector. These workers lived in the informal houses, which were constructed by the HOBURE informal investor. The compositions of the people in peri-urban areas also show that they came from almost all the ethnic groups in the country. The Kikuyu ethnic group formed the largest number of those who resided in peri-urban (38.75%), followed by Kisiis (25.42%) and Kambas (15%). The fourth position of peri-urban ethnic composition was shared by Luhyas (8.3%) and Kalenjins (8.3%) respectively. Evidence from field findings indicates that those who formed a bigger number of the residents of suburbia were from communities that were suffering from rural overpopulation and land pressure (Kisiis and Kikuyus). However, developers in the category of HOBUHOM who were interviewed and asked why they left the city in favor of the peri-urban had cited factors such as inner city congestion and high rent. If congestion is the factor which pushes people from the inner cities to peri-urban, why would it affect particular ethnic groups only and not others? This question could form the basis for a separate study, since it was not part of the scope of the current investigation.

From the previous subsections, it was established that the rich, the poor and the middle class were all available in peri-urban areas of Nairobi. Besides developers who belonged to the HOBUHOM category, there was a second group of peri-urbanites who were advancing the profit-maximizing motive. The profit seeking developers at the peri-urban were the LASPE, HOBUSE and HOBURE. This shows that although peri-urban formation in the USA, Britain, the city of Riyadh in Saudi Arabia and South East Asia

were associated with the rich (chapter 4) and the middle income, Nairobi's peri-urban formation were characterized by mixed income groups. The Nairobi model of peri-urban formation is not like that of Latin America, which is dominated by the poor class. The case of Nairobi's suburbia comes close to that of the city of Daresaalam (chapter 4).

About 62.08% of the people who resided in peri-urban areas used public transport system and their destination was the inner city. A good number (37.92%) used their own cars to travel to the inner city and most of those who used personal cars were in Syokimau, Kitengela, Katani and Ngong-Ngong where public transport was deficient. In public transport deficient locations, residents in the areas, therefore, became private car captive, which was the opposite of what Obiero (1992) saw as a public transport captive syndrome among the low and middle-income residential areas of the inner city.

Majority of the peri-urbanites (62.92%) had access to water and most of those with water were in Ngong-Ngong, Ngong town, Kitengela, Ongata Rongai and Athi-River. A significant number (35%) did not have water connection and most of those without water connections were found in Syokimau, Katani and Mlolongo. Most of those in Ngong town, Ngong-Ngong and Ongata Rongai who had access to water got it from the boreholes (38.33%). The rest of peri-urban residents in all the towns except Kitengela and Athi-River bought water, which was sold in Lorries and which was collected from rivers and boreholes. In Kitengela (chuna), water was being piped from the communal borehole which was constructed using money that was contributed by shareholders. The borehole was therefore private property and water could only be accessed by the members of the cooperative society.

Almost half of the people who were covered by the survey were using pit latrines as a method of waste disposal (49.67%) and a good number (45%) were using septic tanks as a method of waste disposal. The survey established that it was only 3.9% of the households who were connected to sewer and this was found in Athi River. Sanitation methods in the areas which were covered by this survey, therefore, were inappropriate and unviable. This is because peri-urban areas had become densely populated and

therefore pit latrines and septic tanks were no longer useful. Most people had electricity connections (60.75%) while a good number used paraffin/lamp (20.42%) and others used solar energy (15%). Seen in the context of the peri-urban formation models in chapter 4 of this study, the Nairobi model can be summarized as explained in the sections that follow.

8.9.2 The Case of Nairobi's Sporadic Appended Urban Model of Periurban Formation.

8.9.2.1 An Overview

The study established that there exists a strong linkage between peri-urban Nairobi and the inner city. One could argue, therefore, that the peri-urban areas of Nairobi as seen today, together with the satellite centers of Ngong, Kiserian, Athi-River, Ongata Rongai, and Mlolongo cannot be on their own without the support of the city. However, if peri-urban Nairobi is seen as part of the city, can the formation of peri-urban areas be considered as urban sprawl in the context of the USA and Latin America models of peri-urban formation? Urban sprawl occurs through invasion and succession at the RUI when there is no dichotomy between the two spatial systems

The RUI in Nairobi's case was not homogeneous as in the USA and Latin America models where the city extends boundaries through the city-rural continuum model (CIRUCOPOM) (Chapter 4). The urban rural relationship in the Nairobi model was dichotomized by the presence of strong obstacles in the form of land ownership variations and territorial variations. Peri-urban formation in Nairobi could not, therefore, be seen in the context of urban sprawl because urban sprawl occurs along urban-rural continuum model where there is no dichotomy between the rural and urban. Developers who 'jumped' the fence between the urban and rural boundaries to take advantage of low development costs at the RUI are the ones who brought about peri-urban formation in suburban Nairobi. The two land use systems of urban and rural have variations in use (urban and agricultural), variations in tenure systems (freehold and leasehold) and territorial and jurisdictional variations (city-rural authorities) which made them different territories and different land use systems.

Although land use activities in PUAs formation were mixed, development trends showed that the final model of land use would be dominated by urban activities. Yet, peri-urban formation was taking place in the rural space where land use regulation did not capture mixed development or urban type of development in peri-urban. Nairobi's peri-urban formation could then be seen in the context of being an urban area suspended in the rural spread, yet removed from the urban proper through jurisdictional dichotomy. The outer-ring of peri-urban Nairobi, however, remained porous. This then means that the outward expansion of the peri-urban area appeared unstoppable towards the rural land use system. As a result, some big wall similar to the one which divided East and West German, could only stop the outward incursion of the peri-urban towards the rural land use system. Nairobi's peri-urban model and the way it was expanding towards the rural space (Sector 2) could then be described as peri-urban sprawl for it was the peri-urban that was eating towards the rural.

However, it has been observed that land use characteristics in PUA would eventually be urban in nature. Since the evolving urban was removed from the urban spatial system proper through the policy dichotomy, the peri-urban, which was emerging in suburban Nairobi was given the name in this study as an appended urban area (AP-urban). If peri-urban formation in Nairobi is seen in the context of being Apurban, then the nature of sprawl in peri-urban Nairobi may not even be considered as peri-urban sprawl but could be seen as Ap-urban sprawl. However, Apurban sprawl was not currently known and therefore its formation could be seen as sporadic Apurban formation (SPOAPURBAN) and therefore SPOAPURBAN sprawl

8.9.2.2 Nairobi's SPOAPURBAN Peri-urban Formation not Transitional.

Evidence from other countries showed that those who resided in Peri-urban areas were on transit while waiting to move to the urban area proper. This stand remains challenged in view of the emerging evidence in this study because SPOAPURBAN dwellers were mostly from the city (71.67%) and a few from rural areas. This shows a reversionary trend in migration from city to rural urban interface, which was not anticipated by earlier theories of migration. Theories of migration mainly considered rural urban migrations.

Asked whether they were prepared to relocate to other areas from peri-urban, those who were interviewed (87.92%) responded that they would stay in the peri-urban permanently and were not contemplating to relocate to other areas of the country or the inner city (Table 8.7).

Table 8.7; Asked whether they regretted ever moving to the Periurban

	Ngong-Ngong	Ngong town	Kitengela	Syokimau	Athi-River	Mlolongo	Katani	Ongata Rongai	Total	%
Yes	12	4	2	2	7	0	3		30	12.5
No	16	26	28	28	20	30	27	30	205	85.41
N/A	2				3				5	2.08
	30	30	30	30	30	30	30	30	240	100

Source: Field survey 2006

Evidence from the Nairobi model of SPOAPURBAN formation puts into question two conclusions in the area of migration theory; that peri-urban formation is transitional where residents would move to the city later and that migrations are characterized by rural to urban. It is established in this study that in the Nairobi case, migrants relocate to the peri-urban from the city.

However, SPOAurban peri-urban formation model in suburban Nairobi had only attracted the black Kenyans. This is where the Nairobi model of peri-urban formation could be seen as being similar to the trend observed in the model of earlier peri-urban formations in North American where majority of peri-urban migrants were whites only (Indigenous) (Chapter 4). In peri-urban Nairobi, there was no strong link between levels of education and peri-urban formation. However, recent migrations to Syokimau, Kitengela and Ngong comprised of people who had attained University level of education and were in their middle age (36-60 years).

Majority of the respondents (85.41%) felt that they did not make a mistake to move to the peri-urban; neither did they regret the decision. A few of the peri-urban migrants (12.5%) regretted their decisions to move to the peri-urban areas. Those who felt that they made a mistake to settle in the peri-urban complained of problems such as lack of water, lack of services such as sewerage, insecurity and the long distances to and from the city. This again shows that peri-urban residents had a strong linkage with the city.

8.9.2.3 The Dominant Land Use in Nairobi's 'SPOAurban'

In the SPOAurban, there were all sorts of land use activities. In the Kajiado side of the SPOAurban for example, one could find quarrying activities in Ongata Rongai, Ngong and Kitengela. These activities could also be seen in Mlolongo side of Machakos district. In Kajiado, one could find wildlife crossing from Nairobi national park along the wildlife dispersal corridor.

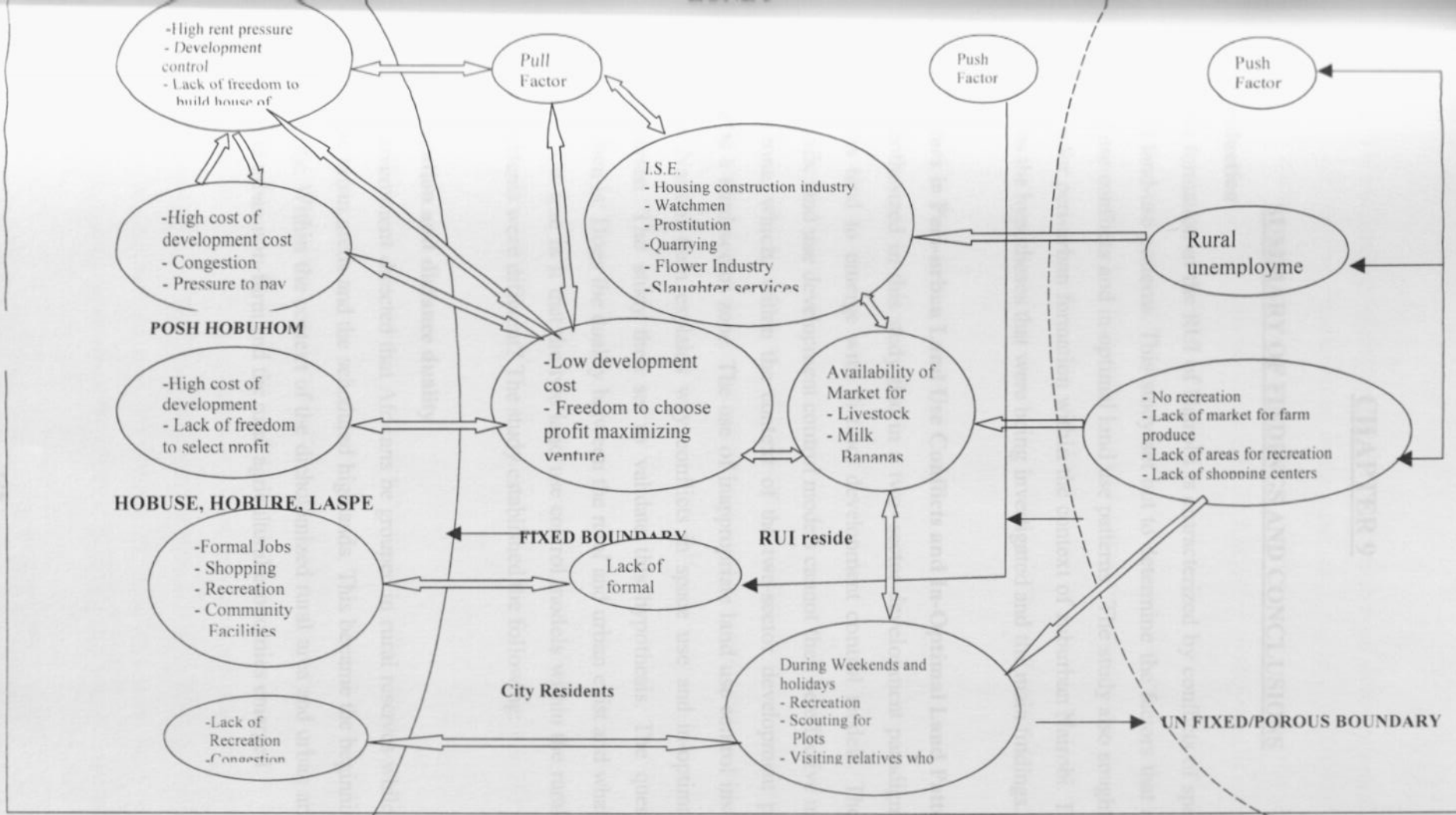
Kitengela and Athi-River had attracted steel smelting factories, lime, chalk and cement and the export-processing zone was also located in Athi-River. Commercial activities were mainly concentrated in the nodal points or satellite centers of Ngong town, Athi River, Kitengela, and Ongata Rongai. The dominant land use activity in the peri-urban areas of Nairobi, however, was residential activities. Again, this seemed to be like the earlier characteristics of North American suburban formation and UK peri-urban formations where the dominant land use was residential followed by offices.

Conclusion- This chapter set out to validate the hypothesis that peri-urban formation is a result of the two-sector dichotomy development paradigm. In this development policy paradigm, the urban and the rural areas are treated separately although part of the rural space located at the rural urban interface has actually been integrated with the urban areas both in the economic and the social aspects. The study has established that the area of RUI is actually part of the urban land use system because people who reside in the peri-urban areas of Nairobi comprise part of the labor force of the city and they also spend their money in the city. This makes their part of the threshold to be critical for the survival of the city as a central place.

The formation of the peri-urban areas in Nairobi's suburbia can then be seen in the context of the two sector dichotomy development paradigm. This, has over the years, separated the urban and rural at the RUI and in between formed a mixed land use referred to in this study as peri-urban formation(Sector 3),(See figure 8.2).



Source: Author's Construct



Source: Authors Construct

CHAPTER 9

SUMMARY OF FINDINGS AND CONCLUSIONS

9.1 Introduction

Peri-urban formation at the RUI of Nairobi is characterized by conflicts of space use and in-optimal land-use patterns. This study set out to determine the factors that account for such land use conflicts and in-optimal land use patterns. The study also sought to explain the factors for peri-urban formation within the context of suburban Nairobi. This chapter summarizes the hypotheses that were being investigated and the main findings.

9.2.1 Factors in Peri-urban Land Use Conflicts and In-Optimal Land Patterns.

It was hypothesized in this study that in a two- sector development paradigm, two land use systems tend to emerge with distinct development control models. The rural and urban specific land use development control models cannot then be effective in the mixed land use zone, which, within the context of the two-sector development paradigm is evolving as a third sector zone. The use of inappropriate land use control instruments in peri-urban Nairobi then explains why conflicts in space use and in-optimal land use patterns persist. The study then set to validate this hypothesis. The question to be answered then is: Does the duality between the rural and urban exist and what caused it? Secondly, how true is it that the two land use control models within the rural and urban land use systems were different? The study established the following:

9.2.1.1 Location and distance duality

Colonial government directed that Africans be grouped in rural reserves while the whites lived in the urban areas and the scheduled highlands. This became the beginning of rural-urban duality. Within the context of the dichotomized rural area and urban area land use systems, the urban non-farm and the rural agricultural economies emerged.

9.2.1.2 Duality in land use objectives and variations in land delivery models

The study established in Chapter 6 that in the rural areas, the land use objectives were to promote agriculture and all the institutions in the rural areas were set to achieve this particular objective. For example, a simple land delivery model was introduced in the rural areas to make it easier for farmers to acquire titles. These titles were to be used as mortgages to acquire loans from banks for purposes of developing the agriculture sector. A simple survey system which makes use of mutation plans and hedges was also introduced in the rural areas. The land titles in the rural areas were freehold without development control conditions except those aimed at promoting agriculture.

9.2.1.3 Variations in land use management

During colonial rule, land use planning was carried out in urban areas and the white highlands but not in the African rural areas. Leases given to white settlers required them to maintain 10% of the land under forests and 10% under crops. The leases required the white settlers also to build houses of permanent character. In the urban areas, the social and economic motives in a land use development process were pursued and zoning was used by the public sector as a strategy to indirectly contextualize the activities of the private sector. Zoning was also used as a strategy to promote public interest in the urban areas and this is prove of an existing duality in land use management approaches between the urban and rural areas. This approach created African land use systems and white settlers land use systems which were separated in distance and in quality of spatial patterns

9.2.1.4 Variations in the institutional frameworks and jurisdictional mandates

The Land Control Boards and the Minister for Agriculture were given the mandate to promote agriculture in the rural areas but not to regulate land use through zoning as it is in the urban areas. In the Boma types of urban areas, land use control was managed by Local authorities and the Commissioner of Lands. Land in small markets and towns were managed by county councils. This then created a jurisdictional duality in the institutional frameworks between the two land use systems of urban and rural. This jurisdictional duality continued until 1996 when the physical planning Act was introduced in Kenya,

hopefully to harmonize the two land use systems of urban and rural. However, the objectives of land use in the rural areas remained dualistic. The previous objective of promoting agriculture remained intact and the agricultural promotion objective and those of promoting public interest through land use planning were being promoted concurrently. Nevertheless, the institutions which were meant to promote agriculture were not realigned to capture the second objective of promoting public interest through land use planning.

Policy and legislative guidance did not envisage nor did it anticipate the evolution of areas of mixed land uses at the RUI. The mixed land use zone at the rural urban interface was assumed to be part of the rural land use system. However, the rural land use regulation models could not effectively manage land use activities which were of mixed nature because the institutions had no mandate over them.

9.2.2 Policy and Legislative factors in land use conflicts

The second level of the hypothesis was to establish the extent to which conflicts in land use and in-optimal land patterns in peri-urban areas were attributed to policy as postulated in the study. It was necessary also to establish the stages within the land use process where conflicts in space use occurred and areas where in-optimal land patterns take place. In order to effectively answer the foregoing question, it became necessary to understand the land use process and the components constituting the land use system.

The study identified a land use system as comprising of two subsystems; the spatial subsystems (SPASUS) and regulatory subsystem (RESUS) (section ii of chapter 3). The two subsystems of RESUS and SPASUS have components, which combine at three levels of the land use process to evolve a land use pattern (LUP). The spatial subsystem (SPASUS) and the regulative subsystem (RESUS), therefore, both constitute what is conceptualized in this study as the composites land use system (COLAUSS).

Activities within the composite land use system (COLAUSS) then produce three main outputs, which become independent variables that determine the land use Pattern (LUP).

These variables are the land use rights adjudication and registration model (LARARM), the controlled erection of a physical artifact (CEREPAT) and the single and sufficient development control authority (SUSIDECO). The question then asked at this juncture is: if land use occurs as a system, and the levels which produce the optimum/desirable land use patterns are achieved when the land use system optimizes at the three stages of the land use process to produce optimized three independent variables, does this happen so at the peri-urban areas of Nairobi?

The conceptualized land use development model was then used to diagnose the levels of optimality in land patterns within various land use processes within peri-urban land tenure clusters. Different land use processes occur in different land tenure clusters and therefore optimal levels in land use patterns would tend to vary. The study found out that certain land tenure clusters in peri-urban Nairobi could not evolve optimized outputs of LARARM, CEREPAT and, SUSIDECO that are considered as independent variables to the land patterning process.

Land tenure clusters where in-optimality occurred were considered to be dysfunctional land use systems. It was within the dysfunctional land tenure clusters where land use conflicts and in-optimal land patterns were rampant. The factors which created the conflicts and in-optimal land patterning levels within the peri-urban land tenure clusters can be summarized as follows. It is worth noting that the factors which contribute to space conflicts and in-optimal land patterns are a result of the two- sector dual policy approach in Kenya.

9.2.2.1 Variations in Land Delivery Models (LARARM) within the Land Tenure

Clusters and Variations in Land Use Patterns

The study established that at contextualizing land use level, four models are used to identify space use rights and to register the land rights in peri-urban Nairobi. These models are the Government Land rights adjudication and registration model (GOVULARARM), former African rural area land rights adjudication and registration model (FARALARARM), former African markets informal land rights adjudication and

registration model (FAMILARARM) and cooperative/company land rights adjudication and registration model (CALARARM) (chapter 6 and 7).

It was only within the GOVULARARM model where the land use process was able to convert almost all the components of SPASUS and RESUS into outputs at the contextualizing land use stage. The land use systems which had the highest conflicts in space use and in-optimality did not have the component of land use planning which is spearheaded by the public sector. When the planning component was introduced later through PPA (Kenya, 1996.cap 286), the plain land for alienation as conceptualized in this study was lacking because land was in the private sector realm. This then explains the in-optimality of land use patterns in the three land tenure clusters of TLTC, FHLTC, and CLTC which were rampant in peri-urban Nairobi. GLTCs where optimal levels of land use patterns were higher, however, were only found in the city of Nairobi and in the two towns of Ngong and Athi River which are located in peri-urban areas of Machakos and Kajiado.

9.2.2.2 Variations in Development Control Models within Land Tenure Clusters, and Quality of Physical Artifacts and Land Use Patterns

At the prescriptive level of land use, again four development control models evolved. These were the Government Lands Development Control Model (GOVULADECOM), former African reserves land development control model (FARADECOM), former African markets informal development control model (FAMIDECOM) and cooperative areas development control model (CADECOM). The level of prescriptive land use simply aims to restrict development to the requirement of the spatial framework (SP) as already contextualized at level 1 of the land use process. It is at this level of the land use process also where the erection of a physical artifact must be regulated also. However, land use planning was not carried out in the three land tenure clusters of FARALARARM, FAMILARARM, and COLARARM except GOVULARARM. Land tenure clusters where the spatial framework (SP) was not incorporated is where houses were constructed which promoted the economic motive at the expense of the public interest motive. Land use development cannot take place in the city without the

component of zoning (SP) which in the peri-urban was applied in the Government Land tenure cluster only. This then created conflicts in space use and in-optimal land patterns. This approach again tends to show the variations in land use development control approaches between the city and areas of the peri-urban.

9.2.2.3 Variations in Institutional Capacity to Police Development and Levels of Land Use Patterns

The development control institutions were conceptualized as constituting the third level of the land use process. Within the former African rural areas, land use control is carried out by the Land Control Boards (LCBs) and the Minister of Agriculture. Within the cooperative areas, land use control is carried by LCBs and the cooperative officials at different levels of the land use process. In the market centers, land use control is carried out by County Councils. The various institutional frameworks influence land use patterns differently. The objectives of land use control were different from cluster to cluster.

Land use control on Government land was carried out by the COL and LAs at different stages of the land use process. However, local authorities had no capacity to control land use because they lacked skilled manpower and did not have budgetary allocations for land use control purposes. Local authorities did not have legal power to police all categories of land use in all the land tenure clusters which are found in the peri-urban areas. LCBs did not have the mandate to regulate physical artifacts and did not regulate land subdivisions to SP. Cooperative officials had no legal mandate to control land use. This means that in peri-urban Nairobi, the institutions were many, they lacked capacity and they pursued various land use objectives some of which did not promote public interest. Most of the land use control institutions in peri-urban Nairobi did not have a clearing house.

9.3 Factors for the Formation of the third Sector (The Mixed Land Use Peri-urban)

This section explains peri-urban formation in Nairobi. It was postulated in this study that in the context of duality, the expensive development control model which was applied in

The urban area would impel developers to avoid the inner city and settle at the area of RUI. This then would lead to peri-urban formation at the area of rural land use system which is in contact with the urban land use system.

The study established that there were very significant variations of COLARD. However, it was postulated that apart from considering the level of total cost (TC), developers would also consider whether the levels of threshold (TR) are sufficient enough to make investments at the RUI viable. It was then argued that if investors would avoid areas of the city to invest in the peri-urban, then the areas of RUI and those of urban must be having similar TR generating capacity. This kind of scenario could only be possible if people who resided at the PUAs were part of the city subsystem or if there were sufficient sources of employment at the RUI. However, field survey shows that the second scenario was not the factor and this leaves us with only one possible scenario that the RUI could be part of the urban land use system. The study established the following.

9.3.1 Similar Threshold Levels between the Inner City and areas of Rural-

Urban Interface and the indifferent developers

The first analysis was carried out to establish whether it was true that TR was similar between the two locations of city and PUAs. The total revenue was measured using land value (LAVA), house values (HOVA) and rent levels/values (REVA). The study established that the average levels of LAVA, and REVA between Nairobi and the areas of rural urban interface of Machakos and Kajiado did not vary significantly. However, the HOVA were higher in Nairobi than the peri-urban areas of Machakos. It was concluded then that developers who wanted to invest either in Nairobi or in peri-urban areas of either Machakos or Kajiado to earn rent or carry out speculation on land would be indifferent between Nairobi and areas of RUI. But those who wanted to build houses and earn profit would prefer Nairobi zones where TR were higher, unless the cost became a deterrent factor

9.3.2 Variation in Development Cost and options of developers

The LASPE developer would be affected by cost 1 (C1) which is COLARD. The average COLARD for Nairobi and areas of RUI were tabulated and subjected to analysis of variance. The study established that there were very significant variations of COLARD values between Nairobi and areas of RUI. The rest of the developers who were categorized as HOBUSE, HOBURE and HOBUHOM would incur extra costs than the LASPE because they pass through more stages in the development process. The costs which were incurred by HOBUSE, HOBURE, and HOBUHOM include that of land delivery (COLARD) (C1), the cost of hiring development consultants (C2) and the cost of obtaining development permission (C3). The three costs were summed up for both the city and peri-urban clusters and they were tabulated in terms of averages. The average development costs in Nairobi clusters were compared with those of Kajjido using a t-test static. The average development costs in Nairobi were also compared with those of Machakos separately. The study established that there were significant variations in development costs between Nairobi and the peri-urban clusters of Machakos and Kajjido.

9.3.3 Informal Sector Enterprises, City-Rural Urban Interface Linkage and

Threshold Levels

It was established in this study that most of the people who resided in the peri-urban were working in the inner city. This then created a critical mass of the inner city workers residing in the peri-urban who were able to offer effective demand for the investments created in the peri-urban by various categories of developers. Secondly, there were several informal business (ISE) opportunities related to the housing construction industry and urban agriculture. This means that people who worked in peri-urban were gainfully engaged in either formal employment within the city or in the ISE within the RUI. It should be noted that even those who resided within the city were similarly employed either in the formal or informal sector. There was no difference between people who resided in the peri-urban and those who resided in the inner city suburbs like Umoja and Kayole in terms of sources of employment and hence threshold levels between the two locations did not vary significantly.

9.4 Conclusions

CHAPTER 10

The conclusion made in this study is that the dualistic land use approach to urban and rural areas created two land use systems that were not integrated and which were mutually exclusive (Chapter 6). However, the RUI and the city remained as one system. The two land use systems were, however, separated from each other by an imaginary line called boundary. However, residents of the two zones moved freely from one location to another. The inadvertent city-rural land use dichotomy created an inadvertent Apurban model of peri-urban formation in suburban Nairobi.

The model of peri-urban formation in Nairobi is referred in this study as sporadic appended urban (SPOAPURBAN). The SPOAPURBAN cannot be regulated by tools specifically designed to control either the urban or the rural land use systems. As a result, the land use patterns that have emerged at the RUI are both conflicting and in-optimal. Peri-urban Nairobi, however, needs urgent land use regulation approaches and this study gives the way forward. It is concluded also that the variations in land administration approaches between the city and areas of rural urban interface, variations in development control models and variations in the institutional frameworks have created cost variations which have created speculative opportunities at the area of RUI. At the current institutional frameworks and legislative provisions, land use control problems at the peri-urban areas will continue unresolved. The study recommends the way forward in the following chapter (Chapter 10).

CHAPTER 10

TOWARDS THE RESOLUTION LEVEL OF NAIROBI'S SPOAPURBAN

MODEL

10.1 Synopsis

The study findings in Chapters 7 and 8 indicate the urgent need to resolve the undesirable land use patterns in the peri-urban areas of Nairobi. The need for government to intervene in the management of peri-urban land use activities is justified on grounds of protecting the wider public interest (Chapter 3 and 8). The study established, for example, that land uses in peri-urban Nairobi are characterized by conflicts in space use and in-optimal land patterns (Chapter 7). Further, essential community facilities such as schools, police posts, health facilities, water and sewerage services were absent in the peri-urban albeit the increasing development and population densities (Chapter 8; Simiyu, 2002). Again, since it is anticipated that authorities in the city of Nairobi may need to extend the boundaries of the city towards the rural space, then there would be need for the state to put in place land redistributive measures in order to release land from freehold individual ownership to accommodate the city's expansion. In this chapter, the study makes recommendations that can give policy guidance.

The suggested models of resolving land use in suburban Nairobi are based on the problems of the SpoApurban peri-urban model which have been examined in this study. Further, the recommendations proposed in this study are based on the practical experiences of peri-urban management approaches borrowed from the case studies analyzed in Chapter 4. The evidence adduced from the case studies (Chapter 4) for example show that peri-urban management and the models that evolve at the RUI derives from government policies. The analysis highlighted in the case studies in Chapter 4 demonstrate that land use policies are dictated by the dominant human settlement clusters (DHSC) found in a particular country and the economy that dominates such clusters. As a case in point, Nairobi's SpoApurban model of peri-urban formation is a result of the dual rural-urban dichotomy policy approach (Chapter 6 and 8). The urban rural duality policy approach in Kenya and, Nairobi, in particular was necessitated by the presence of the

urban and rural human settlement clusters and dualistic economies that supports the two clusters. Future land use policy in Kenya would, therefore, again depend on the type of human settlement clustering scenario that dominates in the future and the type of economy that would form the main preoccupation of the dominant human settlement cluster. This study was premised on an impending urban population pressure in Kenya which implies that urban areas would be the preferred destination of most Kenyans as opposed to rural areas. Therefore, the recommendations made in this study would assume that the dominant human clustering in Kenya would be urban and the economy that dominates in the future would be urban nonfarm as opposed to agriculture.

10.2 Urban Dominant Human Settlement Cluster-led-Rural urban Land Use Policy

Options

In this section, the study would assume that the dominant human settlement scenario would be urban dominated in accordance with global trends. The UDHSC would then dictate the future land use policy in the country and the policy would further dictate the urban rural relationship and further, the model of peri-urban formation (Chapter 4).

10.2.1 Creation of a Unified Land Use System (UNICOLAUSS)

The first policy approach in this scenario is to create a unified land use system through integrating the urban composite land use system (URBACOLAUSS) and the rural composite land use systems (RUCOLAUSS) in the long-term. The other options then would be as discussed below.

10.2.2 Integrate Inner City and the Spoapurban Model of Peri-urban Formation

The findings of this study show that the peri-urban areas had strong socio-economic linkages with the inner city to the extent that the SpoApurban formed part of the city land use system. Because of the strong linkage between the city and the SpoApurban, it is suggested in this study that the SpoApurban model be taken or be properly integrated with the inner city land use system. Britain took a similar approach of integrating the sterilized SpoApurban peri-urban formation with the areas of the inner city in 1910 and USA also pursued a similar approach in 1915 and 1920 respectively.

Southeast Asia is also currently taking a similar approach using the concept of extended metropolitan regions (EMRs) as highlighted in Chapter 4. However, integrating the sterilized SpOApurban model of peri-urban formation with the main city is not sufficient in solving the existing peri-urban land use problems as this approach tends to create another problem of urban sprawl. The Nairobi case of peri-urban formation would change from that of SpOApurban sprawl to that of urban sprawl. One other problem is how to regulate land use conflicts and in-optimal land patterns within the SpOApurban area after integrating the SpOApurban with the existing urban areas. The two problems of sprawl and in-optimal land patterns can be solved as follows.

10.2.3 Resolve Land Use in SPOAPURBAN Area using the LA5R and IR2

Strategies.

In an ideal/desirable land use process, the variable which is produced as an output at level 1 of contextualizing land use process is LARARM and the variable of CEREPAT is produced as an output at level 2 of prescriptive land use stage. Finally, the variable of SUSIDCOA is produced at level 3 of institutional capacity stage.

The land use model which was conceptualized as ideal in this study is based on the new towns concept in Britain where land was set aside for urban development. In this case, the land use expert is able to adjudicate all space use rights and indicate them on the plan through zoning. Such rights were consequently demarcated on the ground using the model of fixed survey and the same rights were registered and protected. Before the rights are registered, conditions are inserted in the title to specify the obligations of developers and this was able to incorporate the variable of D-SSDR and D-NSDR in a land use system. At the second level of prescriptive land use, it was possible in the conceptualized land use process to control the CEREPAT because all developers seek development permission before putting up physical artifacts.

The institution to undertake planning was appointed and after finishing the land use planning process, the authority was dissolved and the responsibility to run the planned

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The institution to undertake planning was appointed and after finishing the land use planning process, the authority was dissolved and the responsibility to run the planned

town was handed over to local authorities. It can be observed then that the institution to undertake planning was appointed and was given planning and land use control without interference from other authorities (SUSIDECO). The three variables of LARARM, CEREPAT and SUSIDECO cannot be achieved in the Kenyan case because land is already with individuals and, therefore, not available for adjudication and registration.

The variable of LARARM cannot be produced in the conceptualized land use process without either resorting to compulsory land acquisition or land nationalization which then would make land available for fresh adjudication. Secondly, some of the developers in peri-urban areas of Nairobi have already constructed substandard physical artifacts since there were no controls. Therefore, the land use process in Nairobi's suburbia cannot produce the CEREPAT variable as conceptualized in this study without resorting to the demolition of the existing substandard structures. It is the erection of physical artifacts without the variable of CEREPAT which then contributed to space use conflicts and in-optimal land patterns. However, since land use optimality can only be achieved through the three variables which are considered as independent variables in the land patterning process, policy approaches must change tactics as follows.

The land use process in Kenya must first acquire all the land rights from the people (LA). This means then that the acquired land would be available for adjudication and registration in order to produce the optimum variable of land rights adjudication and registration model (LARARM). Currently, there is policy provision for land acquisition in Kenya but the process is slow and may not effectively resolve the SpoAurban land use problems immediately. This implies that there would be need for land reform (R1) to facilitate the acquisition of all land use rights by the state in the interim period. The second approach after acquiring the land use rights from the developers is to redistribute (R2) it in order to take care of community facilities and this will address the problem of equity as an element of public interest. The third policy approach would be to readjust (R3) land in order to articulate a better spatial framework (SP). The land readjustment (R3) policy should encapsulate the aspects of public interest such as efficiency and

economy in service delivery, amenity and environmental concerns and convenience to the residents of the urban area.

The fourth policy approach would be to reallocate (R4) the land use rights to the developers and this time, the land tenure would be leasehold and with development conditions (D-SSDR and D-NSSDR). Because physical artifacts were constructed which did not follow the spatial framework, developers would then be required to reconstruct (R5) the physical artifacts according to the provisions of the newly created spatial framework (SP).

This approach which is dubbed the LA5R strategy in this study would require a bold policy approach similar to the reconstruction of the cities in UK after the Second World War and the USA Marshal Plan after the great depression of 1933 and the reconstruction of New York after the great fire of 1666. Finally, new policy approaches must put in place a lead agency (L) to undertake planning in future and this would require institutional readjustment (R1) and institutional re-engineering (R2). This strategy is expensive in the short-run because high value properties would be destroyed in public interest and may disturb cultural values. However, if not undertaken, SPOURBAN sprawl would continue eating to the rural space and the current land use conflicts and in-optimal land patterns would continue at the expense of public interest. Secondly, spoAurban sprawl shall eat into agricultural land and compromise the agricultural promotion model.

The growth of Nairobi would also be hampered since the city shall be trapped by the SpoAurban model of peri-urban formation which would remain as a third sector separating Nairobi and the rural areas. Since the SpoAurban sprawl is considered in this study to be more costly in the long-run, the two strategies proposed in this study are considered less expensive in the long-run. However, controlling land use within the SpoAurban area would not stop developers from advancing their profit seeking land use activities in the area beyond the SpoAurban zone and this can be solved as follows.

10.2.4 Control Spopurban Sprawl through Urban Growth Boundary Policy

(UGBP)

It is proposed that on the outer- ring of the Spopurban formation where the rural area proper meets the Spopurban, urban expansion towards the rural is checked so that land use evolves gradually when dictated by demand and when the sprawled area is replanned. The sprawled area can be controlled and contained by using the Urban Growth Boundary Policy (UGBP) approach. This model is currently in use in the city of Riyadh, Saudi Arabia (Chapter 4) and the approach was considered in this study as influencing the checked urban sprawl (CHEURBASP) model of peri-urban formation. The approach would then lead to urban sprawl. The use of UGBP would ensure that the inside of the city is properly utilized and filled up before developers and home seekers run out of the box to seek locations in the rural urban interface. Although this approach would lead to desirable land use patterns within the sprawled areas, it will not however prevent the urban sprawl and, therefore, there would be need for another strategy as discussed below. Urban sprawl leads to long commuting distances which waste time and gasoline and the sprawled area becomes difficult to provide with essential community services due to the high costs involved.

10.2.5 Greenbelt Strategy will Limit City within UGBP Bounds and within

Optimum City Threshold.

It is assumed in this study that in future, there will be a model of an optimum city founded within the African context of management capacity, which shall be established by further research as recommended in this thesis. Based on the assumed conceptualized optimum city, therefore, it is recommended that the UGBP would be the limit within which the urban area would be allowed to develop. Further expansion of the urban areas to the rural urban interface (RUI) would be restricted by a green belt of two kilometers wide. Beyond the green belt, another satellite center perhaps realigned to another city can be allowed to evolve. The city will be contained within the threshold of the greenbelt, which also would be based on considerations of the model of the optimum city.

In order to make areas of the greenbelts safe and of economic benefit, the zone of the greenbelt can be made a tourist destination zone similar to Nairobi National Park. The areas within the greenbelts could be furnished with tourist facilities such as camping sites and tourist hotels. To make the greenbelts attractive, some landscaping such as tree planting could be proposed. The green belts can also be used as zoos where the locals and national tourists coming from other countries and other regions of the country can patronize to enable the city to generate income. However, this strategy cannot bar developers from 'jumping' the greenbelts to carry out speculative land development beyond the greenbelt threshold. The problem of speculative development beyond the greenbelt can be resolved as discussed in the subsection below.

10.2.6 Harmonize Land Delivery Models and Development Control Models between City and Rural.

It has been established in Chapter 7 and 8 that the dichotomy between the city and the rural areas tends to create cost differentials that motivate developers to 'jump' towards the area of RUI where they can maximize profits within the low cost zone. This was also found to be a similar trend in the earlier peri-urban formation in Britain and currently in the city of Dar-es-salaam, Tanzania. In order to reduce land speculation beyond the area of the greenbelt, policy approaches must seek to harmonize the urban and the rural space by removing components within the two land use systems (URBACOLAUSS and RUCOLAUSS) that accentuate the dichotomy.

The analysis carried out in Chapter 3 shows that the leasehold system tends to promote planning efficiency. The analysis carried out in Chapter 7 to find out the optimum land patterning levels within the land tenure clusters in peri-urban Nairobi shows also that areas of Athi River and Ngong Town, which had leasehold land tenure category, had the highest positive/desirable land patterning levels (optimality). This therefore tends to agree with the findings of the analysis in chapter 3 which links land tenure systems with land use patterns. The areas where the town expands to should be under leasehold title therefore in order to avoid expensive land acquisitions in the future and in order to accommodate areas for community facilities. Since piecemeal approaches would promote

speculative land development beyond the threshold of the greenbelt, it is suggested that the whole country be under a similar land tenure system and a similar development control approach.

But one may wonder how the urban land uses can be controlled the same way as that of the rural land use system. The assumptions made in this model are that the dominant economic activities in future would be urban non-farm and therefore the rural land use system would promote large scale agriculture and recreational activities. The rural areas can, therefore, promote land use planning and the objective of agricultural promotion simultaneously using the unified land use (UNICOLAUSS) approach instead of the previous dichotomy. The unified land use system approach was applied in Kenya successfully within the urban areas subsystem and scheduled Highlands where the white settlers lived. A similar approach can be applied in this model.

10.2.7 The Need for a Lead Agency and City-Peri-Urban Conglomerate Model

Once the SpoApurban is integrated to the urban, it implies that perhaps land use in the former SpoApurban would be put under the management of the city and this means that the two land use systems would be put under one lead agency to promote integration and optimum land use patterns. The city and the peri-urban would culminate in a city-peri-urban conglomerate model (Conurbation). However, putting the city and the peri-urban under one authority would create political tensions between the city government and peri-urban local authorities and districts where peri-urban development is currently taking place.

The foregoing problem can be circumvented by using city within city development policy model currently applied in South-East Asia. This strategy gives autonomy to the satellite centers while integrating them to the inner city and this approach tends to promote sustainable city peri-urban planning. The amalgamation of the two land use systems would therefore not be carried out along the lines of merging them in the true sense of the word, but by promoting the linkages between the two systems through integration (Figure 10.1). This strategy would ensure that the city and the peri-urban are seen as a unified

land use system. However, one may ask: if the city and the SpoAurban can not be merged, what kind of institutional framework then can effectively integrate the city and SpoAurban conglomerate model? This question is answered in the subsection that follows.

10.2.8 Institutional Framework to Promote the City within City Development Model

The city of Nairobi as seen currently can retain its name and even its boundary and that of the rural Apurban model. Then peri-urban satellite centers would be linked to the city through a well-articulated system of road network and a unified administration system, which makes use of the city center as the focus.

Local authorities in the peri-urban areas together with the satellite centers can maintain their status quo as seen currently. This means that most of the revenues collected in those centers can be retained and spent by the local authorities that have administrative jurisdictions over them. However, a certain percentage of the revenues collected from the satellite centers can be remitted to the central city, which again shall be the land use development-coordinating agency within the greater Nairobi.

Local authorities, which manage the RUI and the satellite centers within peri-urban areas, can then be seen in the British model of boroughs, which shall be under the larger city and yet operating independently. Local county councils and municipal councils within the peri-urban shall manage the satellite centers and the areas of RUI independently but be coordinated by the central area of the city. This will prevent possible tension between the city authorities and those of the peri-urban who may want to cling to the peri-urban satellite towns because of their revenue base and because of communal attachments to ancestral land.

The inner city can for example have an administrative clerk of a higher rank assisted by administrative clerks who shall be in charge of the local authorities based within the satellite centers in the peri-urban areas. The administrative clerks in the peri-urban areas shall, however, be answerable to the chief clerk based at the city headquarters. The city

authorities can have a mayor and local authorities in the satellite centers can have town chairmen answerable to the members of the public and coordinated by the city mayor. All chairmen and deputy clerks within the local authorities of the peri-urban shall sit in committee meetings that shall manage the larger city.

City Peri-urban Comprehensive Development Model

Although the chairmen and the deputy clerks of the peri-urban local authorities can handle certain land use issues at local level independently, matters related to strategic investment will have to be handled by authorities of the greater Nairobi in consultation with authorities in the peri-urban areas. The question then is, how will the spatial framework that guides land use in the unified composite land use system (UNICOLAUSS) be articulated in this model? This question is answered in the subsection that follows.

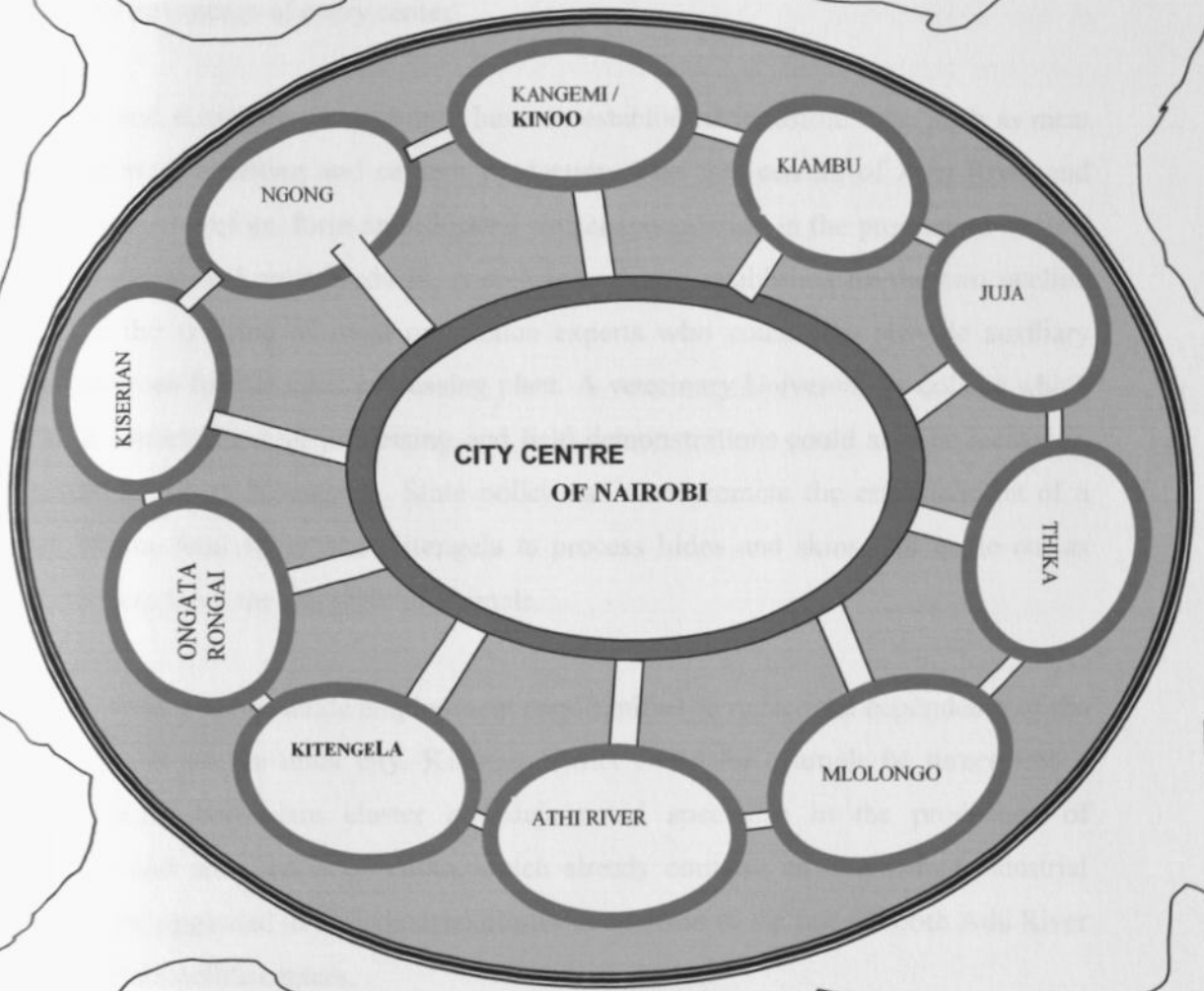
10.2.9 Adopt the City of Bogota and the City of Jarkata Land Use Planning Models.

The city and the satellite towns can be linked through a common strategic structure plan (SSP) which shows road networks and other areas of corporate and strategic investments. Some of the land use proposals that may appear in the SSP would include schools, industries, population distribution and greenbelts. At the level of satellite centers, the spatial framework would be covered by local plans articulated on the basis of the strategic structure plan. There would be no land use activity to be implemented at the level of local plan without consulting with the chief planner placed at the central city. The satellite centers within the peri-urban local authorities will have planning sections with planners, development control sections and full budget (vehicles and police) and a local court.

Between the central city and the satellite centers, there shall be a greenbelt of two kilometer wide to act as a buffer. The city and satellite centers would be interlinked through a tarmac road of class A, which shall be maintained by the central city. The other classes of roads, B, C, D, E can be maintained by the local councils (Figure 10.1). This approach will only be effective in managing the areas of the spoAurban. However, this study established that there is a strong socio-economic linkage between the city and the

peri-urban, which makes peri-urban dependent on the inner city. The approach taken in this study so far cannot stop movements between the city and the peri-urban areas since such movements would still congest the inner city. This problem can be solved as below.

Figure 10.1; City Peri-urban Conglomerate Development Model



Source: Author's construct

10.2.10 Promote Industrial Clusters in Peri-Urban to Reduce Reliance on City

This is Peri-urban satellite centers are currently at different levels of infrastructure development and, therefore, developers may tend to invest in centers that have better infrastructural provisions. To address such discrepancies, the government shall make a deliberate effort to identify the investment opportunities of each satellite center and encourage specialization in every center in terms of the production of goods and services. This strategy can be carried out in every region of the peri-urban by considering the comparative advantage of every center.

Strategy will also promote the garden city concept in the peri-urban thinking of Ebenezer Howard. Since peri-urban areas would engage in industrial activities, Athi-River and Kitengela for example have an established industrial base such as meat processing, steel smelting and cement production. The two centers of Athi River and Kitengela can, therefore, form an industrial cluster specializing in the production of steel smelting, cement and meat products. A college could be established for the two satellite centers for the training of meat production experts who could also provide auxiliary training services for the meat processing plant. A veterinary University or college which shall train experts in meat processing and field demonstrations could also be located in either Athi River or Kitengela. State policy can also promote the establishment of a tannery within Athi River and Kitengela to process hides and skins that come out as waste products from the slaughter of animals.

These activities shall generate employment opportunities to reduce the dependence of the satellite centers on the inner city. Kiambu district could for example be turned into a milk-processing peri-urban cluster and Juja could specialize in the production of horticulture and stone carving. Thika, which already contains an established industrial center, can be upgraded to an industrial cluster in addition to the one for both Athi River and Kitengela satellite centers.

10.2.11 Advantages of the City-Peri-urban Conglomerate Model

There will be no political conflict between the city and the peri-urban authorities. This is because satellite centers will remain in their respective districts and the local authorities, which are located in PUAs as seen currently, shall remain politically independent. However, there must be a deliberate policy effort to integrate and link the two land use systems of urban and rural through an elaborate land use strategy.

Need for Lead Agency and Suggested Institutional Framework

The green belts will be used as recreation areas and buffer breaks from the monotony of the city concrete (breathers) and this strategy will also promote the garden city concept in line with the thinking of Ebenezer Howard. Since peri-urban areas would engage in specialized economic activities, people who reside in peri-urban can also be employed in the peri-urban and reduce dependence on the inner city. It means then that only a few of those who reside in the peri-urban shall commute to the inner city to purchase higher order goods.

Regional Land Use Framework (RLUF)

Specialized economic activities within the satellite centers shall promote linkages between them and the inner city. These approaches will articulate a system of cities in the whole country, with no region lagging behind since growth within a particular city should not exceed the greenbelt threshold and city optimality considerations. The satellite centers would also be used to promote enterprise zones (zones of little municipal control). However, since this approach only integrates the former SpoAurban and the city, there are chances of another shadow forming beyond the former SpoAurban, which may create speculative land development activities. This problem can be solved as follows (Figure 10.2).

10.2.12 District Land Use Framework, Regional Land Use Framework and National Land Use Framework.

In every district, there should be a structure plan or land use framework (LAUF) which links all the centers. All municipal councils, town councils and urban councils within the district can have local physical development frameworks which are linked with that of the district headquarters via the district structure plans. The District plans will then be

linked to the regional planning framework (RPF) and the RPF would be linked to the National planning framework (NPF). The city SpoApurban conglomerate development model would then be linked to the DPF, the RPF and the NPF. This would then culminate into a unified composite National land use system (UNICOLAUSS) which would be articulated countrywide.

10.2.13 The Need for Lead Agency and Suggested Institutional Framework

The national land use policy can be coordinated by a national land use development authority (NLUDA) which should be placed under one ministry to be named ministry of local government, urban and regional planning. The NLUDA shall be charged with the responsibility of defining the objectives for urban development policy, the objectives for rural development and the objectives for rural urban linkage. The NLUDA shall also prepare the national land use framework (NLUF). At meso-level, there shall be a regional land use development authority (RLUDA) which shall formulate regional land use policy and a regional land use framework (RLUF).

At the lower level, there shall be municipal councils and county councils who shall prepare strategic structure plans and district level local development plans which would be based on the RLUF. At local level, the land use plans can be seen as micro-land use frameworks (MLUF) managed by micro-land use Authorities (MLUDA). This then would not only create a unified composite land use system (UNICOLAUSS), but would also put the national land use system under a lead agency (SDCA) in line with the systems approach as conceptualized in this study (chapter 3). The detailed activities of the lead agency are shown in Figure 10.2 below.

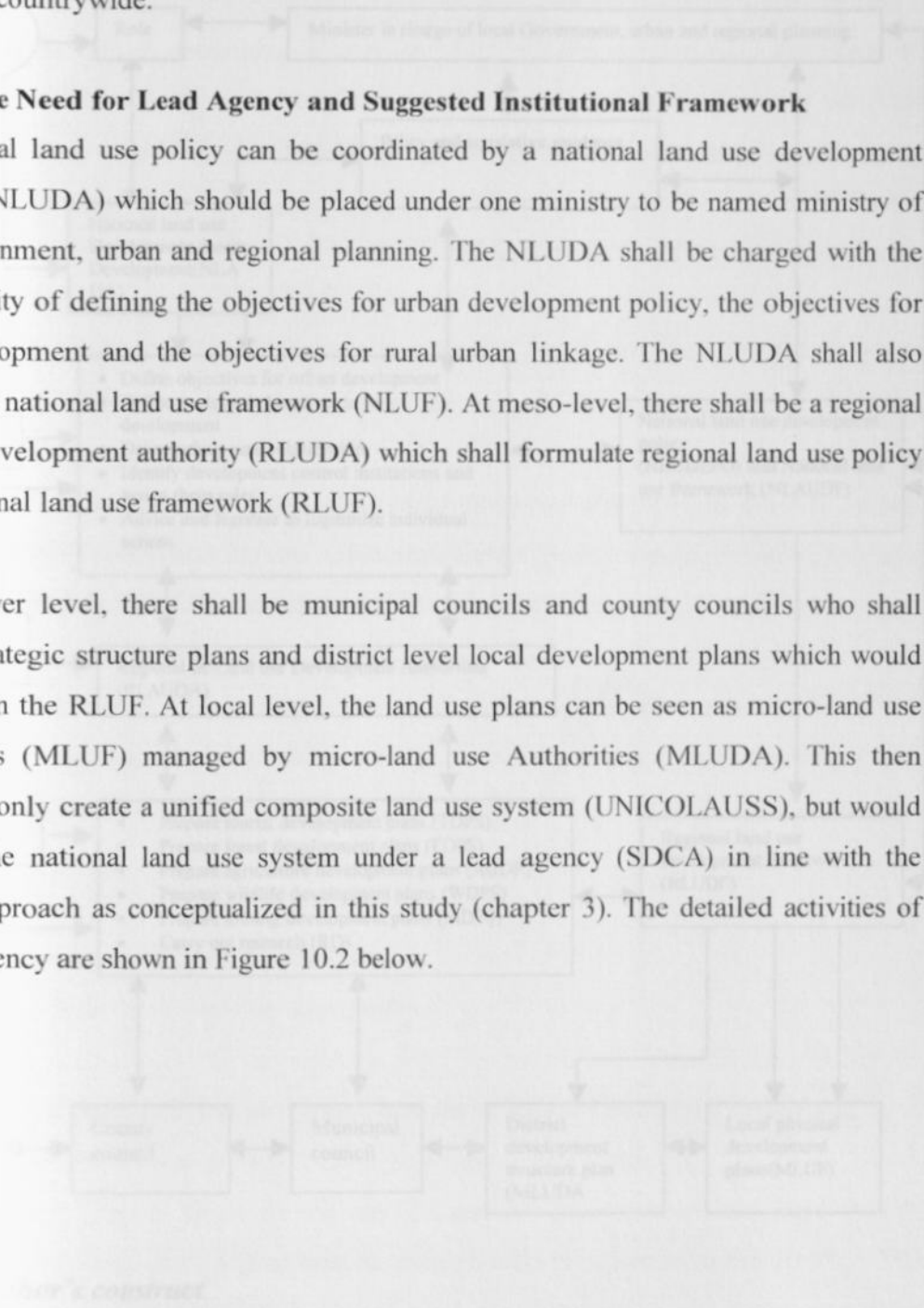
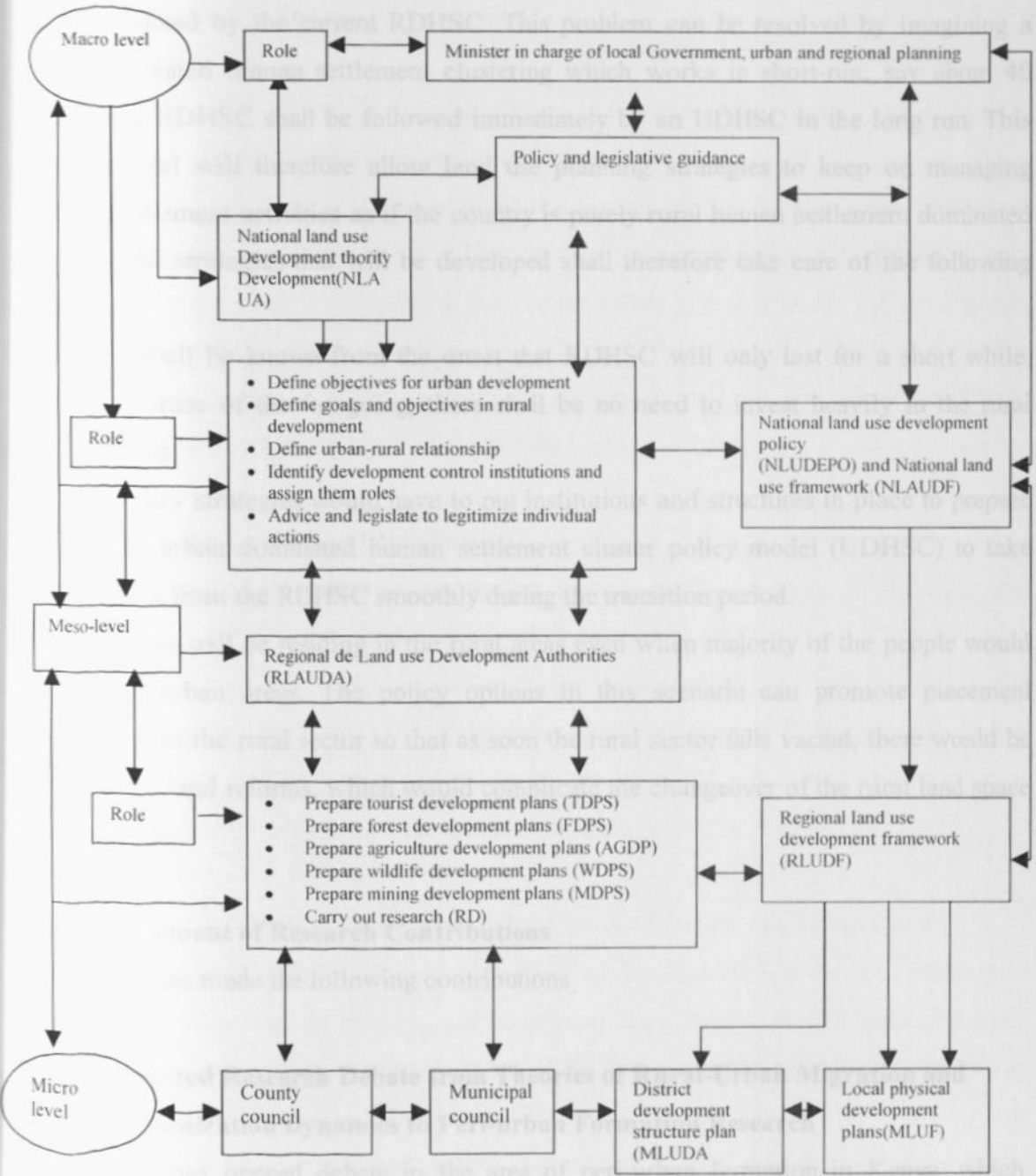


Figure. 10.2; Suggested institutional arrangement for effective planning and control of urban-peri-urban Land-use.



Source: Author's construct

10.2.14 Rural Dominated Human Settlement Clusters Policy Inertia and the Need To Stagger Implementation of Urban Dominant Human Settlement-Led Policy

It can be assumed that RDHSC can be allowed to operate in the short-run due to policy inertia dictated by the current RDHSC. This problem can be resolved by imagining a rural dominated human settlement clustering which works in short-run, say about 40 years. The RDHSC shall be followed immediately by an UDHSC in the long run. This policy model will therefore allow land use planning strategies to keep on managing human settlement activities as if the country is purely rural human settlement dominated cluster. The strategies that will be developed shall therefore take care of the following factors.

- a) It shall be known from the onset that RDHSC will only last for a short while. Because of the foregoing, there shall be no need to invest heavily in the rural areas.
- b) Policy strategies would have to put institutions and structures in place to prepare the urban dominated human settlement cluster policy model (UDHSC) to take over from the RDHSC smoothly during the transition period.

Some people will be residing in the rural areas even when majority of the people would be in the urban areas. The policy options in this scenario can promote piecemeal investment in the rural sector so that as soon the rural sector falls vacant, there would be no need for land reforms, which would complicate the changeover of the rural land space to urban use.

10.3.0 Statement of Research Contributions

This study has made the following contributions

10.3.1 Diverted Research Debate from Theories of Rural-Urban Migration and Urbanization Dynamics to Peri-urban Formation Research

This study has opened debate in the area of peri-urban formation in Kenya, which, hitherto has been neglected. Urban related research efforts in Kenya in the 1960s, 1970s and 1980s were preoccupied with issues of rural-urban migration and urban population

dynamics. Studies on the phenomenon of peri-urban formation have been intensively done in the USA, Latin America, Europe and Asia. However, studies on peri-urban development in Africa and Kenya, in particular are negligent. The study carried out in this inquiry can then be seen as having partly succeeded to fill the void in peri-urban formation research within the African context.

10.3.2 Conceptualized and Documented Various Models of Peri-urban Formations

Although current literature views peri-urban formations in the world in terms of urban sprawl model, this study has demonstrated that not all models of peri-urban formations can be categorized as urban sprawl. The study has conceptualized other forms of peri-urban formations and demonstrated that such models are driven by different policy strategies regarding rural and urban interrelations. Because of variations in policy approaches from one country to another, various models of peri-urban formations emerged, some of which cannot be seen as urban sprawl (Chapter 4).

10.3.3 Contribution to Land Use Theory

It has been demonstrated that a land use process operates as a system (COLAUSS) that constitutes the RESUS and the SPASUS subsystems. The land use system model which was conceptualized in this inquiry enabled the study to establish the levels within the land use process where the system tends to develop pathological signs. This can guide central authorities who seek to understand the stages where there is need to introduce policy guides. The conceptualized land use model was also used in this study as follows:

10.3.4 Levels in the Land Use Process where Public Interest can be obtained

Almost all elements of public interest are achieved during level I of the land use process (contextualizing). The elements of public interest are obtained at this level in a plain surface and by the use of zoning as a tool (SP). The study has established that due to policy omissions, land delivery models within some of the land tenure clusters were carried out without a spatial framework. The process of land delivery without a spatial framework ignores elements of public interest and the land patterns that emerge are characterized with space use conflicts.

10.3.5 Various Levels of the Land Use Process and Many Categories of Developers

In order to achieve an optimum land use pattern, development must be regulated within the three levels of the land use process. This was conceptualized in this study and demonstrated that some of the developers can only be controlled at particular levels of the land use process.

It was demonstrated in this inquiry that developers were of many categories and their development activities take place at different levels of the land use process. In order to control all developers effectively, the land use system must be able to regulate land use activities at all the three levels of the land use process as conceptualized in this study (chapter 3).

10.3.6 The Role of the Regulative Subsystem in a Land Use Process

The role of policy in the land development process has often been relegated by even the most recent strategic planning approaches, which emphasize the lesser role of the public sector. However, optimal land use patterns are guided through policy as shown in the conceptual model (chapter 3) and as shown in the policy driven peri-urban formation models in UK, South East Asia, Saudi Arabia and the USA (chapter 4). It has been demonstrated in this study also that in land use clusters where the regulatory system was weak, the land use patterns tended to be in-optimal.

The conceptualized land use process in this study is then capable of being evolved to what can be seen as the theory of land use and this can be seen as one of the major contributions of this study.

10.3.7 Factors for Peri-urban Formation in Suburban Nairobi

At the level of factors which prompted developers to opt for RUI and, therefore, factors which created peri-urban formations in Kenya, this inquiry was able to agree with others like Mwangi (1994) and Simiyu (2002) that investors in the peri-urban areas were motivated by low land values. This study, however, introduces another dimension as shown below.

10.3.7.1 The Role of Zoning and Development Control in the City in Creating Peri-urban Areas

This inquiry went a step further to demonstrate that land values in some areas of the inner city were not significantly different from those in the peri-urban areas. Therefore, at face value, land values *per se* could not be the main factor that prompted developers to migrate to the peri-urban areas. The factor of inner city costs and zoning were the more significance factors, which made developers to shun the high costs in the inner city and prefer the less regulated and unplanned peri-urban.

10.3.7.2 Similar Threshold Levels between the City and the Rural Urban Interface

However, developers cannot avoid the inner city because of the factors of land cost variations alone. This is because such developers too would be interested in finding out whether there are customers to purchase their products. This inquiry demonstrated that those who lived at the RUI were closely linked to the urban areas where they worked. Those who live in the peri-urban areas but worked in the city were able to provide sufficient threshold levels to make investment in the peri-urban viable.

10.3.7.3 Central Place Theory and City Peri-urban Satellites Relationship

The central place theory assumes that urban areas which are located next to each other would have a hierarchical relationship. This study established that the satellite centers in peri-urban Nairobi did not have a hierarchical relationship with Nairobi but were part of Nairobi. The central place theory assumes that all central places emerge to distribute goods and services to the resident population and the population residing within the range of the central place.

This study recognizes that the peri-urban areas did not emerge as central places on their own strength because there were no employment centers in peri-urban areas. The satellite centers in peri-urban areas, therefore, emerged on the strength of borrowed threshold which emanated from the inner city. The satellite centers in peri-urban areas were, therefore, parasites of the inner city. This finding tends to negate some of the main

assumptions of the central place theory and this study, therefore, opens further debate on some of the postulations which anchor the theory.

10.3.8 Contribution towards Methodology

The input-output strategy which was used to estimate levels of land use patterns in peri-urban Nairobi can be seen as a unique approach in methodology. This study has also proposed a research methodology process which can aid future investigations (Chapter 5, Figure 5.1)

10.4 Areas for Further Research

- Need to replicate this study inside the city of Nairobi to find out whether various land tenure categories in the city have different impacts on land use patterns.
- There is need to carry out a study to identify the best use for rural areas in future
- There is need to initiate studies to identify an "optimum city" in order to avoid urban sprawl
- Need to carry out research to identify appropriate land tenure systems
- Need for a study to establish factors that lure house renting in peri-urban areas even when evidence shows that rent levels between some parts of the city and peri-urban areas were not significantly different.
- There is need for a study to identify specialization of peri-urban clusters in order to strengthen them and avoid their reliance on the inner city.

A study should be carried out to establish rural people's responses/perceptions of the urban land use development control model proposed in this study for adoption in the whole country.

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Topic	Method	Data Presentation Technique	Data Analysis
Physical Planning Act (1979) Local Government Act Cap 202 Government Lands Act Trusts of Land Act Environment	Documentary	Documentation	
Management Act Agriculture Act 199 Forest Act Land Control Act Land Registration Act Town Planning Act Land Planning Act			Do
Developmental Land (Government Land Act Cap 250) Trust Land (Trusts of Land Act Cap 204 Co-operative/Company Land (Land control Act Cap 202) Land Registration Act Cap 309 Municipal Land (Land Control Act Cap 302) Registration of Sales & Act Company Land (Group Rating Act)	Documentary	Documentation	Do
Physical Planning Regulations Act Registration Act Urban Land (Quantity Surveying Act)	<ul style="list-style-type: none"> Interview Questionnaire 	Documentation	Thesis work

Appendix I; Sampling Approach

District	Area	Tenure system	Sampling design
Machakos	Syokimau area Katani area Mavoko town Mulolongo	Company land/Coop Freehold Leasehold/govt.land Trust land/ Informal	Systematic random Sample Stratified, random Stratified, random Systematic
Kajiado	Ngong town Ongata Rongai town Ngong/ Ngong Kitengela	Leasehold/Govt. land Trust land Freehold Company/ Cooperative land	Stratified random sample Stratified, random Systematic random sample

Field Survey 2006

Appendix ii; Data Matrix 1

Subject	Data Source	Data Collection Method	Data Presentation Technique	Data Analysis Technique
POLICY	<ul style="list-style-type: none"> • Sessional paper No 10 1965 • Human Settlement Strategy 1978 • All National Development plans • District Focus for rural Development • Policy papers, Sessional Papers No 1 1986 • Land Laws Various Laws that govern land use activities (eg) <ol style="list-style-type: none"> a) Physical Planning Act (1996) b) Local government Act Cap 263 c) Government Lands Act. d) Trusts of Land Act e) Environment 	Documentary	Documentation	Input - Output Technique
Legal Legal Institutional framework	<ul style="list-style-type: none"> ▪ Management Act ▪ Agriculture Act 396 ▪ Forest Act ▪ Land Control Act ▪ Land Registration Act ▪ Town planning Act ▪ Land Planning Act 	Documentary	Documentation	Do
Land Use Regulations	<ul style="list-style-type: none"> ▪ Management Act ▪ Agriculture Act 396 ▪ Forest Act ▪ Land Control Act ▪ Land Registration Act ▪ Town planning Act ▪ Land Planning Act 			Do
Land Tenure Systems	<ul style="list-style-type: none"> • Government Land (Government Lands Act cap 280] • Trust land (Trusts of Land Act Cap 281 • Cooperative/company Land (Land control Act Cap 302) • Land Registration Act Cap 301 • Freehold Land (Land Control Act Cap 302), Registration of Titles & Act) ▪ Company Land (Group Ranch Act) 	Documentary	Documentation	Do
and Consultants	<ul style="list-style-type: none"> ▪ Physical Planners Registration Act ▪ Engineers Registration Act. ▪ Architects and (Quantity Surveyors Act) 	<ul style="list-style-type: none"> • Interview • Questionnaire 	Documentation	Thesis text

	<ul style="list-style-type: none"> Architects Association of Kenya Kenya Institute of Planners District offices 	<ul style="list-style-type: none"> Documentary 		
Development Process	<ul style="list-style-type: none"> Nairobi city Council Olkejuado County Council Mavoko Municipality County Council of Masaku Land Control boards Commission of Lands District physical planning Office District surveyor District land Registration District works Officer District Water Engineer System Public health Office 	<ul style="list-style-type: none"> Structured Interview Structured Questionnaire Documentary Interview Questionnaire Documentary Interview Questionnaire 	<ul style="list-style-type: none"> Tables Documentation percentages Tables Documentation Documentation 	<ul style="list-style-type: none"> Compare Figures for all zones () Input-output analysis
	House H/holds in the various stratas of leasehold, Freehold, cooperative land, Communal Land, Squatters, Trust land etc. Land Speculators..... Buyers, Tenants landlords Neighborhood associations or Activities	<ul style="list-style-type: none"> Interview Questionnaire Observations structured Interview Questionnaire Observation 	<ul style="list-style-type: none"> Chats Frequency Tables Percentages Frequencies Tables Percentages 	<ul style="list-style-type: none"> Compare observation in all the B zones by input-output analysis

Annex iii: Data Matrix 2 - Establishing linkage between sector I and sector iii

OBJECT	TYPE OF DATA	SOURCE OF DATA	METHOD OF COLLECTION	METHOD OF ANALYSIS
Relationship between the sectors d.III	<ul style="list-style-type: none"> Place of shopping Place of work Place of recreation Where family goes to church What goods they produce Where they sell goods Institutions catchments areas in terms of raw materials & intake 	Households Institutions under survey	<ul style="list-style-type: none"> Interview Questionnaire Observation <p>Scheduled Interview</p>	Descriptive
Income levels in the three zones		<ul style="list-style-type: none"> Households in the zones Valuation department Documentary note taking 	<ul style="list-style-type: none"> Reconnaissance and observation Interview Questionnaire Not taking 	<ul style="list-style-type: none"> Computation of averages Analysis of variance
Sale of two Bedroom House		<ul style="list-style-type: none"> Land register in Machakos & Kajiado valuation Department city tenant 	<ul style="list-style-type: none"> Scheduled Interview Structure Questionnaire Note taking 	<ul style="list-style-type: none"> Compute Averages Analysis of variance
Sale of 50 x 100 piece of land		<ul style="list-style-type: none"> Valuation on department city council Real estate managers Land registrar in Machakos and 	<ul style="list-style-type: none"> Interview Questionnaire 	<ul style="list-style-type: none"> Analysis of variance

	<ul style="list-style-type: none"> Architects Association of Kenya Kenya Institute of Planners District offices 	<ul style="list-style-type: none"> Documentary 		
Development Control Process	<ul style="list-style-type: none"> Nairobi city Council Olkejuado County Council Mavoko Municipality County Council of Masaku Land Control boards Commission of Lands District physical planning Office District surveyor District land Registration District works Officer District Water Engineer System Public health Office 	<ul style="list-style-type: none"> Interview and questionnaire Structured Interview Structured Questionnaire Documentary Interview Questionnaire Documentary Interview Questionnaire 	<ul style="list-style-type: none"> Tables Documentation percentages Tables Documentation Documentation 	<ul style="list-style-type: none"> Compare Figures for all zones () Input-output analysis
	<ul style="list-style-type: none"> House H/holds in the various stratas of leasehold, Freehold, cooperative land, Communal Land, Squatters, Trust land etc. Land Speculators..... Buyers, Tenants landlords Neighborhood associations or Activities 	<ul style="list-style-type: none"> Interview Questionnaire Observations Interview Questionnaire Observation 	<ul style="list-style-type: none"> Chats Frequency Tables Percentages Frequencies Tables Percentages 	<ul style="list-style-type: none"> Compare observation in all the B zones by input-output analysis

Appendix iii: Data Matrix 2 - Establishing linkage between sector I and sector iii

SUBJECT	TYPE OF DATA	SOURCE OF DATA	METHOD OF COLLECTION	METHOD OF ANALYSIS
Functional relationship between the three sectors I, II, and III	<ul style="list-style-type: none"> Place of shopping Place of work Place of recreation Where family goes to church What goods they produce Where they sell goods Institutions catchments areas in terms of raw materials & intake 	<ul style="list-style-type: none"> Households Institutions under survey 	<ul style="list-style-type: none"> Interview Questionnaire Observation <p>Scheduled Interview</p>	<ul style="list-style-type: none"> Descriptive
Income variations between the zones	<ul style="list-style-type: none"> Income levels in the three zones 	<ul style="list-style-type: none"> Households in the zones Valuation department Documentary note taking 	<ul style="list-style-type: none"> Reconnaissance and observation Interview Questionnaire Not taking 	<ul style="list-style-type: none"> Computation of averages Analysis of variance
Sale of two Bedroom House		<ul style="list-style-type: none"> Land register in Machakos & Kajiado valuation Department city tenant 	<ul style="list-style-type: none"> Scheduled Interview Structure Questionnaire Note taking 	<ul style="list-style-type: none"> Compute Averages Analysis of variance
Sale of 50 x 100 piece of land		<ul style="list-style-type: none"> Valuation on department city council Real estate managers Land registrar in Machakos and 	<ul style="list-style-type: none"> Interview Questionnaire 	<ul style="list-style-type: none"> Analysis of variance

		Kajiado		
	Lodging in a self contained hotel	<ul style="list-style-type: none"> Hotels in the various zones 	Interview Participant Observation	Analysis of variance
Average cost	Development cost	<ul style="list-style-type: none"> City planning department Town clerk Nairobi County Councils of Machakos & Kajiado AAK.KIP 	Interview Questionnaire	Compute average costs Analysis of variance

Source: Authors construct 2005

Appendix Iv – The Process of Computing t-Test Statistic

MEANS - LANDCOST

Zones	Mean	N	Std. Deviation
Nairobi	733750.0000	4	293637.38976
Kajiado	703500.0000	4	211145.28963
Machakos	393750.0000	4	222087.63285
Total	610333.3333	12	273639.55500

DEV COST

Zones	Mean	N	Std. Deviation
Nairobi	220000.0000	4	.00000
Kajiado	18188.7500	4	25187.47552
Machakos	17188.7500	4	25748.70074
Total	85125.8333	12	101372.60637

BDRMVAL2

Zone	Mean	N	Std. Deviation
Kajiado	2437500.00	4	657488.910
Machakos	1562500.00	4	426956.282
Nairobi	2812500.00	4	375000.000
Total	2270833.33	12	710780.088

C1C2C3

Zone	Mean	N	Std. Deviation
Kajiado	71188.75	4	27205.127
Machakos	76188.75	4	32986.749
Nairobi	433000.00	4	.000
Total	193459.17	12	178329.011

$$t = \frac{\bar{X}_T - \bar{X}_C}{\sqrt{\frac{\text{var}_T}{n_T} + \frac{\text{var}_C}{n_C}}}$$

Formula for t test.

The t-value will be positive if the first mean is larger than the second and negative if it is smaller. Once we compute the t-value we have to look it up in a table of significance to test whether the ratio is large enough to say that the difference between the groups is not likely to have been a chance finding. To test the significance, we need to set a risk level, the alpha level. In most social research, the "rule of thumb" is to set the alpha level at .05. This means that five times out of a hundred one would find a statistically significant difference between the means even if there was none (i.e., by "chance"). We also

determine the degrees of freedom (df) for the test. In the t-test, the degrees of freedom is the sum of the persons in both groups minus 2. Given the alpha level, the df, and the t-value, we can look the t-value up in a standard table of significance to determine whether the t-value is large enough to be significant. If it is, we can conclude that the difference between the means for the two groups is different.

t-ESTS Group Statistics

	ZONE	N	Mean	Std. Deviation	Std. Error Mean
BDRMVA L2	Nairobi	4	2812500.00	375000.000	187500.000
	Kajiado	4	2437500.00	657488.910	328744.455

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means							
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference		
										Lower	Upper
BDRMVA L2	Equal variances assumed	.652	.450	.991	6	.360	375000.00	378456.294	-551049.192	1301049.192	
	Equal variances not assumed			.991	4.765	.369	375000.00	378456.294	-612460.567	1362460.567	

The calculated t value for bedroom values of Nairobi and Kajiado is 0.991. At the degree of freedom of 6 and alpha value at 0.05 the t table value is 2.571. Evidently the calculated t value is less than the table value of t ($0.991 < 2.571$) which implies that there is no statistically significant difference of bedroom values between the two zones.

Group Statistics

	ZONE	N	Mean	Std. Deviation	Std. Error Mean
BDRMVA L2	Nairobi	4	2812500.00	375000.000	187500.000
	Machakos	4	1562500.00	426956.282	213478.141

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means							
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference		
										Lower	Upper
BDRMVA L2	Equal variances assumed	.000	1.000	4.399	6	.005	1250000.00	284128.785	554761.908	1945238.092	
	Equal variances not assumed			4.399	5.902	.005	1250000.00	284128.785	551946.375	1948053.625	

The calculated t value for bedroom values of Nairobi and Machakos is 4.399. At the degree of freedom of 6 and alpha value at 0.05, the t table value is 2.571. Evidently the

calculated t value is greater than tabled t value ($4.399 > 2.571$) which implies that there is a significant difference of bedroom values between the two zones.

Group Statistics

	ZONE	N	Mean	Std. Deviation	Std. Error Mean
C1C2C3	Nairobi	4	433000.00	.000	.000
	Kajiado	4	71188.75	27205.127	13602.563

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means							
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference		
										Lower	Upper
C1C2C3	Equal variances assumed	8.672	.026	26.599	6	.000	361811.25	13602.563	328526.976	395095.524	
	Equal variances not assumed			26.599	3.000	.000	361811.25	13602.563	318521.822	405100.678	

The calculated t value for C1C2C3 values of Nairobi and Kajiado is 26.599. At the degree of freedom of 6 and alpha value at 0.05, the t table value is 2.571. Evidently the calculated t value is far greater than the t table value ($26.599 > 2.571$) which implies that there is a high significant difference of C1C2C3 values between the two zones

Group Statistics

	ZONE	N	Mean	Std. Deviation	Std. Error Mean
C1C2C3	Nairobi	4	433000.00	.000	.000
	Machakos	4	76188.75	32986.749	16493.374

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means							
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference		
										Lower	Upper
C1C2C3	Equal variances assumed	6.822	.040	21.634	6	.000	356811.25	16493.374	316453.417	397169.083	
	Equal variances not assumed			21.634	3.000	.000	356811.25	16493.374	304321.972	409300.528	

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means							
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference		
										Lower	Upper
LANDCOST	Equal variances assumed	.472	.518	.167	6	.873	30250.0000	180835.04223	-412237.40795	472737.40795	
	Equal variances not assumed			.167	5.448	.873	30250.0000	180835.04223	-423337.92749	483837.92749	

The calculated t value for C1C2C3 values of Nairobi and Machakos is 21.634. At the degree of freedom of 6 and alpha value at 0.05, the t table value is 2.571. Evidently the calculated t value is far greater than the t table value ($21.634 > 2.571$) which implies that there is a high significant difference of C1C2C3 values between the two zones.

Group Statistics

	ZONE	N	Mean	Std. Deviation	Std. Error Mean
LANDCOST	Nairobi	4	733750.0000	293637.38976	146818.69488
	Kajiado	4	703500.0000	211145.28963	105572.64482

The calculated t value for land cost values of Nairobi and Kajiado is 0.167. At the degree of freedom of 6 and alpha value at 0.05, the t table value is 2.571. Evidently the calculated t value is less than the t table value ($0.167 < 2.571$) which implies that there is no significant difference of land values between the two zones.

Group Statistics

	ZONE	N	Mean	Std. Deviation	Std. Error Mean
LANDCOST	Nairobi	4	733750.0000	293637.38976	146818.69488
	Machakos	4	393750.0000	222087.63285	111043.81643

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means							
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference		
										Lower	Upper
LANDCOST	Equal variances assumed	.256	.631	1.847	6	.114	340000.0000	184082.74860	-110434.25915	790434.25915	
	Equal variances not assumed			1.847	5.586	.118	340000.0000	184082.74860	-118651.23659	798651.23659	

The calculated t value for land cost values of Nairobi and Machakos is 1.847. At the degree of freedom of 6 and alpha value at 0.05, the t table value is 2.571. Evidently the

calculated t value is less than the t table value ($1.847 < 2.571$) which implies that there is no significant difference of land values between the two zones

Group Statistics

	ZONE	N	Mean	Std. Deviation	Std. Error Mean
EVCOST	Nairobi	4	220000.0000	.00000	.00000
	Kajiado	4	18188.7500	25187.47552	12593.73776

Independent Samples Test

		Levene's Test for Equality of Variances	t-test for Equality of Means								
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference		
										Lower	Upper
EVCOST	Equal variances assumed	8.694	.026	16.025	6	.000	201811.2500	12593.73776	170995.48383	232627.01617	
	Equal variances not assumed			16.025	3.000	.001	201811.2500	12593.73776	161732.35580	241890.14420	

The calculated t value for development costs between Nairobi and Kajiado is 16.025. At the degree of freedom of 6 and alpha value at 0.05, the t table value is 2.571. Evidently the calculated t value is far greater than the t table value ($16.025 > 2.571$) which implies that there is a highly significant difference of development costs between the two zones

Group Statistics

	ZONE	N	Mean	Std. Deviation	Std. Error Mean
DEVCOST	Nairobi	4	220000.0000	.00000	.00000
	Machakos	4	17188.7500	25748.70074	12874.35037

Independent Samples Test

		Levene's Test for Equality of Variances	t-test for Equality of Means								
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference		
										Lower	Upper
DEVCOST	Equal variances assumed	8.987	.024	15.753	6	.000	202811.2500	12874.35037	171308.84951	234313.65049	
	Equal variances not assumed			15.753	3.000	.001	202811.2500	12874.35037	161839.32124	243783.17876	

The calculated t value for development costs between Nairobi and Machakos is 15.753. At the degree of freedom of 6 and alpha value at 0.05, the t table value is 2.571. Evidently the calculated t value is far greater than the t table value ($15.753 > 2.571$) which implies that there is a highly significant difference of development costs between the two zones

Group Statistics

	Zone	N	Mean	Std. Deviation	Std. Error Mean
DEVELOPMENT COSTS	Nairobi	4	7687.50	1675.497	837.749
	Kajiado	4	8125.00	853.913	426.956

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means		Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
		F	Sig.	t	df				Lower	Upper
DEVELOPMENT COSTS	Equal variances assumed	.916	.376	-.465	6	.658	-437.50	940.274	-2738.267	1863.267
	Equal variances not assumed			-.465	4.460	.664	-437.50	940.274	-2945.292	2070.292

The calculated t value for rent levels between Nairobi and Kajiado is -.465. At the degree of freedom of 6 and alpha value at 0.05, the t table value is 2.571. Evidently the calculated t value is far less than the t table value ($-.465 < 2.571$) which implies that there is no significant difference of rent levels between the two zones

Group Statistics

	Zone	N	Mean	Std. Deviation	Std. Error Mean
RENT LEVELS	Nairobi	4	7687.50	1675.497	837.749
	Machakos	4	6625.00	946.485	473.242

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means		Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
		F	Sig.	t	df				Lower	Upper
RENT LEVELS	Equal variances assumed	.681	.441	1.104	6	.312	1062.50	962.175	-1291.858	3416.858
	Equal variances not assumed			1.104	4.738	.322	1062.50	962.175	-1452.610	3577.610

The calculated t value for development costs between Nairobi and Machakos is 1.104. At the degree of freedom of 6 and alpha value at 0.05, the t table value is 2.571. Evidently the calculated t value is less than the t table value ($1.104 < 2.571$) which implies that there is no significant difference of rent levels between the two zones

Group Statistics

	Zone	N	Mean	Std. Deviation	Std. Error Mean
RENTLEVE	Kajiado	4	8125.00	853.913	426.956
	Machakos	4	6625.00	946.485	473.242

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
RENT LEVE	Equal variances assumed	.033	.862	2.353	6	.057	1500.00	637.377	-59.606	3059.606
	Equal variances not assumed			2.353	5.938	.057	1500.00	637.377	-63.592	3063.592

The calculated t value for development costs between Kajiado and Machakos is 2.353. At the degree of freedom of 6 and alpha value at 0.05, the t table value is 2.571. Evidently the calculated t value is less than the t table value ($2.353 < 2.571$) which implies that there is no significant difference of rent levels between the two zones

Rent Levels

ESTATE	Mean	N	Std. Deviation
Athi river	8000.00	1	.
Katani	6000.00	1	.
Kitengela	8000.00	1	.
Mulolongo	6500.00	1	.
Nairobi	7687.50	1	.
Ngong-ngong	8500.00	1	.
Ngong town	9000.00	1	.
Ongata rongai	7000.00	1	.
Syokimau	6000.00	1	.
Total	7,409	9	1,087

Even at the cluster/estate level a comparison of rent values yields a mean of Kshs 7,409 with a standard deviation of just Kshs 1,087. Considering that Syokimau and Katani presents rather outlying figures the rent values are still within a very slim range as to allow for near similarity of rent accruing from the studied cluster/estates.

SUBZONES	Mean (Kshs.)	N	Std. Deviation Kshs
Athi River	1,750,000	1	.
Embakasi	3,250,000	1	.
Katani	1,000,000	1	.
Kayole	3,000,000	1	.
Kitengela	1,500,000	1	.
Mulolongo	2,000,000	1	.
Ngong-Ngong	2,750,000	1	.
Ngong town	2,500,000	1	.
Ongata	3,000,000	1	.
Rongai			
Satelite	2,500,000	1	.
Syokimau	1,500,000	1	.
Zimmerman	2,500,000	1	.
Total	2,270,833	12	710,780

The Machakos region with Athi Rver, Katani, Kitengela and Syokimau clusters here presents quite outlying figures which therefore has raised the standard deviation to Kshs 710, 780 about 31% of the mean.

University of Nairobi
 Department of Urban and Regional Planning
 Household Questionnaire

This questionnaire is part of the survey that seeks to establish peri-urban land use control and management problems in peri-urban areas of the city of Nairobi. The information given will be treated confidentially and for the purpose of the survey and not any other.

Date/time

Area/ zone/ sub-zone

Name of the interviewee

Name of the interviewee (optional)

Type of developer

- Land owner who inherits it from parents but subdivides the land later to sell [D1ii][.....
- Individual buys land and subdivides it to sell [D1ii].....
- Individual buys land to build home for family [D2i].....
- Individual owner inherits land from parents but decides to build houses to rent [D3i].....
- Individual owner buys land to build house for rent [D3ii].....
- Individual owner inherits land from parents and builds house to sell [D4i].....
- Individual owner buys land and builds a house to sell [D4ii].....

1) Which one of the following categories best describes the ownership status of the land/house in which you stay?

- Land owner who inherits land from parents but decides to subdivide it for sale [D1i][if Yes, Go to Q2].
- Land owner who buys land to subdivide and sell [D1ii][if Yes, Go to Q2]
- Land owner who inherited land and built house for his family [D2i][if yes, Go to Q16]
- Land owner who bought plot and built house for family [D2ii] [if Yes, Go to 16]
- Land owner who inherited land from parents and built house for rent [D3i][If yes, Go to Q59]
- Land owner who bought land and built house for sale [D4ii][if yes, go to Q50]
- Other, specify

2) If land inherited from parents or bought for resale [D1i and D1ii], have you ever subdivided and sold any part of the land?

Yes

Other, specify

No

By which of the following issued you with the above-mentioned document?

- Commissioner of lands
- Local council
- District land registrar
- Any other, specify

- 3) If plot was bought for resale which factors in terms of importance influenced you to buy a plot in this particular neighborhood?
- Availability of cheap land
 - Proximity to the city
 - Accessibility to the means of transportation
 - Availability of essential services [water, electricity, etc]
 - Others, specify
- 4) If plot inherited or bought but subdivided to sell part of any portion/portions, what motivated you to sell?
- Need for money
 - In order to make profit?
 - In order to invest in alternative ventures [please specify which]
 - Other [specify]
- 5) Who among the following approved your subdivision scheme?
- Commissioner of lands
 - Land control board
 - Local authority
 - Any other
- 6) Did your subdivision follow the existing physical development plan?
- Yes
- No
- 7) Who was the final authority that approved your land subdivision scheme?
- Land control board
 - Local authority
 - Commissioner of lands
 - Cooperative/company committee
 - Any other [specify]
- 8) Who prepared the land subdivision scheme that was presented to the above-mentioned authority for approval?
- Registered physical planner
 - Registered land surveyor
 - Registered architect
 - Draftsman
 - Any other [specify]
- 9) What certificate of land ownership were you issued with after the subdivision was approved?
- Leasehold
 - Title deed
 - Letter of allotment
 - Any other, specify
- 10) Who among the following issued you with the above-mentioned document?
- Commissioner of lands
 - Local council
 - District land registrar
 - Any other, specify

- 11) Did the commissioner of lands, area councilor or district land registrar [whoever appropriate] give you any conditions in order to issue you with the land ownership document mentioned in number 9 above ? yesNo
- 12) If yes, kindly tick the conditions below as appropriate?
- Advertise the proposal in the print media
 - Carry out an environmental impact assessment survey
 - Have the plan prepared of physical planning compliance from the district physical planner.
 - Receive consent to subdivide from area land control board
 - Certificate of mutation from the land surveyor
 - Any other [specify]
- 13) If the answer to question [11] above is yes, which among the following conditions appeared to be mandatory requirements before you were issued with title deed, certificate of lease or letter of allotment for the resulting land subdivision parcels?
- Prove of print media advertisement
 - Prove of environmental impact assessment report
 - Certificate of compliance to prove the scheme was prepared by a registered planner
 - Mutation plan from registered land surveyor
 - Consent to subdivide from area land control board
 - Approval from local authority
 - Prove of endorsement by various relevant authorities [DPPO, DLO, DS]
 - Any other [specify]
- 14) How much money did you spent at every stage before you were issued with a title deed, certificate of lease of letter of allotment to your land parcels?
- Advertisement in the print media
 - Cost of carrying out environmental impact assessment reports
 - Cost of having plan prepared by physical planner [per one parcel]
 - Cost of acquiring a certificate of compliance from the district physical planner
 - Cost of surveying the parcels of land [per one parcel]
 - Cost of having the mutations approved by the district surveyor
 - Cost of land registration before one is issued with title deeds.
 - Cost of acquiring approval by local authorities.
 - Cost of acquiring land control board consent
 - Any other [specify]
- 15) a; Do you know of any consequences incase the subdivision scheme does not follow the existing plan?
- Yes.....No.....
- 15) b; If yes, which among the following would be the likely consequences?
- Can't get title, lease certificate or letter of allotment
 - Can't get land board approval
 - Can't get Nema approval
 - Can't get physical planning approval
 - Can't get local authority approval
 - Would be prosecuted by relevant authorities [specify which]
 - Any other

Section B [To be filled by developers who have built and own family homes where they stay [D2i and D2ii]

16) If developers belong to the category that builds a house and makes it a home [D2i) and D2ii] then kindly answer the following questions

What is your relationship with the head of the household?

- Father
- Mother
- Son
- Daughter
- Male relative
- Female relative
- Female worker
- Male worker
- Any other

17) Are you the household head

- Yes
- No

18) How many people including yourself are in this household?

19) How many people in the household including yourself fall within the following age groups:-

- Under 5 years
- 5-14 years
- 15-18 years
- 18-25 years
- 26-35 years
- 36-40 years
- 41-45 years
- 46-50 years
- 51-60 years
- Over 61

20) How many people including yourself have either attained or pursuing the following levels of education.

- University education
- Secondary education
- Primary level
- Middle level colleges

21) Kindly indicate where the household spouses fall in the educational categories shown....University level.

- University education
- Secondary education
- Primary level
- Middle level colleges

- 22) How long have you resided in this location?
- Less than a year 02 03 04
 Between 2-3 years 02 03 04
 Between 3-4 years 02 03 04
 Between 4-5 years
 Between 6-7 years 02 04
 Between 8-9 years
 Between 9-10 years
- 23) If this plot was brought and build for purposes of making it a home [D2i and D2ii], where were you residing before you come to this neighborhood?
 Zone 0₁, zone 0₂, zone 0₃, zone 0₄
- 24) What reasons among the following and in terms of importance motivated you to move to this neighborhood?
- Cheap land
 Accessibility to city
 Clean neighborhood
 Secure neighborhood
 Larger space than in the city
 Quiet than the city centre
 Availability of services [water, electricity, police care et cetera]
 Availability of means of communication
 Availability of big plots that afford a house and a garden
 More privacy
 Near places of employment
 Any other
- 25) How many people in the household including yourself are employed in the following categories [D2i and D2ii]
- Salaried employment
 Self employed
 Casual employment
 Not employed
 Other – specify
- 26) Where do people employed in the following job categories go to work
- Nairobi
 Salaried 0₁ 0₂ 0₃ 0₄
 Self employed
 Casual employed
 Other – specify
- 27) Where do the salaried workers in this household fall in the salary brackets indicated below?
- 0-500
 500-1000
 1000-2000
 15000 and above
- 28) How many children in your household go to school?
- Under 5 years
 5-10 years
 15-18 years

- 29) Where do the following categories of children in your household go to school?
- | | | | | |
|---------------|----|----|----|----|
| Under 5 years | 01 | 02 | 03 | 04 |
| 5-10 years | 01 | 02 | 03 | 04 |
| 15-18 years | 01 | 02 | 03 | 04 |
- 30) Where do you mostly go for your daily shopping
- 01 02 03 04
- 31) Which categories of goods do you buy in Nairobi?
- Lower order goods-sugar, soap
- Middle order goods
- High – orders goods – clothes, Hardware etc.
- 32) How many times in a week do you buy the following goods from Nairobi?
- Lower order goods Daily once twice thrice others[specify]
- Higher order goods Daily once twice thrice others [specify]
- Middle goods
- 33) What is your faith?
- Christian
- Muslim
- Atheist
- Any other
- 34) Where do you go to church/mosque?
- 01 02 03 04
- 35) Is your house connected with water?
- Yes
- No
- 36) How about sewerage connection?
- Yes
- No
- 37) What is the source of your water?
- Borehole
- Piped from river
- Dam
- Roof water catchment
- Any other
- 38) Where do you get your piped water?
- 01 02 03 04
- 39) Where do you get your sewerage services?
- Private entrepreneur
- 01 02 03 04
- Any other
- 40) Where do you obtain the following services?
- | | | | | | |
|---|----|----|----|----|--------------------------|
| <input type="checkbox"/> Police care | 01 | 02 | 03 | 04 | <input type="checkbox"/> |
| <input type="checkbox"/> Post office | 01 | 02 | 03 | 04 | <input type="checkbox"/> |
| <input type="checkbox"/> Water supply | 01 | 02 | 03 | 04 | <input type="checkbox"/> |
| <input type="checkbox"/> Banking services | 01 | 02 | 03 | 04 | <input type="checkbox"/> |
| <input type="checkbox"/> Sewerage | 01 | 02 | 03 | 04 | <input type="checkbox"/> |

[01 Stands for Nairobi, 02 stands for Kajiado, 03 for Machakos and 04 for any area further than the current location of any other rural area in Kenya]

- 41) Do members of your family sometimes go to the cinema, concert, theatre, or gym?
 Yes
 No
- 42) If yes, where do you go for these facilities
 01 02 03 04
- 43) What are the three most important products or economic activities, selected in terms of importance, produced in your farm?
 Poultry keeping
 Livestock zero grazing
 Growing beans
 Growing flowers
 Growing vegetables, tomatoes, onions
 Others
- 44) Please identify two market destinations of the above products in terms of importance?
 01 02 03 04
- 45) How much income approximately do you earn per day/week/month/yearly from your three most important farm products?
 Sale of eggs day week month year
 Sale of Vegetables day week month year
 Sale of onions day week month year
 Sale of milk day week month year
 Sale of meat day week month year
 Sale of flowers day week month year
 Sale of maize day week month year
 Any other
- 46) Do you have a councilor?
 Yes
 No
- 47) Do you get these services; electricity, sewer, garbage collection, from the local council?
 Yes
 No
- 48) Have you ever felt like you made a wrong decision to move to this neighborhood?
 Yes
 No
- 49) What among the following makes you comfortable with the current neighborhood?
 Choose three in terms of importance
 Insecurity
 Lack of water
 Lack of sewer
 Lack of electricity
 Lack of employment
 Far from the city centre
 Improper planning
 Undesirable neighborhood
 Any other

- 50) If emigrated from the city center, what pushed you to peri-urban?
- Congestion in the inner city
 - High rent
 - High food prices
 - Pollution
 - Frequent insecurity
 - Others
- 51) If emigrated from the rural area [specify where from], why do you prefer the peri-urban and not the city per se for your destination ? Categorise in terms of importance
- Availability of cheap land
 - Availability of employment in the formal sector
 - Availability of informal employment [specify]
 - Less crime than the inner city
 - Others [specify]
- 52) Which among the following languages, apart from English and Kiswahili does the household head speak?
- Kikuyu
 - Kisii
 - Luhya
 - Luo
 - Meru
 - Kalenjin
 - Others [specify]
- 53) Do you intend to make this neighborhood as your permanent lifetime home?
- Yes
- No
- 54) If no, which of the following areas do you intend to relocate to?
- Original rural area after retirement from work
 - To the inner parts of the city proper
 - Other rural areas
 - Other towns
 - Others [specify]
- 55) Do the following public service vehicles serve this neighborhood? Please tick as appropriate
- KBS
 - City Hoppa
 - Nissan route 110-111
 - Private car
 - Any other [specify]
- 56) Which among the following modes of transport does the family use quite often?
- KBS
 - City Hoppa
 - Nissan route 110-111
 - Private car
 - Any other [specify]

57) Does this family own a car?

Yes

No

58) If yes, how many times a week do you use it ply to the city?

Daily

Others [specify]

Section C: [To be filled by developers who have build houses for homes, rent or sale]

D2i, D2ii, D3i, D3ii, D4i and D4ii

59) If plot bought for purposes of building a house for renting or selling or home for family

[2i, D2ii, D3i, D3ii, D4i and D4ii] why did you choose this location and not the inner city? Please categorize in terms of importance.

Availability of cheap land

Rent/property values are high in the peri-urban area

Availability of people to rent/buy [specify]

Can build type of house you desire at the peri-urban

Don't need to follow zoning ordinances at the peri-urban

Development requirements are few.

Any other [specify]

60) If you had to build in the peri-urban and not in the inner city area for the reasons already state above, why didn't you choose a location further than the current one? State in terms of importance.

Availability of services [Water, electricity, sewer, police care et cetera]

Availability of infrastructure facilities [Goods roads, telephone]

Availability of tenants

Accessibility of land

Affordability of land

Any other [specify]

61) Do you know what a physical plan is

Yes

No

62) If yes, are you aware that a neighborhood like yours is usually covered by a physical development plan?

Yes

No

63) If yes, did you follow the requirements of the physical development plan?

Yes

No

64) Is your house plan approved

Yes

No

- 65) If yes, who among the following approved your house plan?
- Local authority
 - District physical planner
 - District public works
 - District environmental officer
 - Commissioner of lands
 - District public health officer
 - DDC, District land officer
 - Any other
- 66) Did you get a building permit from either the council or commissioner of lands?
- Yes
- No
- 67) If yes, which of the following conditions or institutions were you asked to meet before getting a building permit?
- Commissioner of lands
 - Local authority
 - Any other, specify
- 68) If issued with permit which of the following conditions or institutions were you asked to meet before getting a building permit?
- Compliance with zoning ordinance by obtaining certificate from district physical planner
 - Architectural drawings from registered architect
 - Structural Engineer's drawings and specifications
 - Environmental expert report
 - Neighbors consent [Advertisement]
 - Electrical engineers drawings
 - Change of user report from registered planner
 - Scrutiny of house plan by relative authorities [District Physical Planner, District public health officer, District public work officer]
- 69) If you were ever asked to meet the conditions in number 68 above did you spend any money and how much in order to get the following services?
- Approval from local authority
 - Advice from planning expert
 - Advice from architect
 - Advice from structural Engineer
 - Advice from the environmental expert
 - Advertisement to get neighbors consent
 - Scrutiny by District physical planner
 - Scrutiny by District public health officer
 - Scrutiny District environment officer
 - Any other

- 70) How long did you take to obtain the building permit?
- Within one day
 - One week
 - Two months
 - Three months
 - Four months
 - Six months
 - More than six months
- 71) Were you concerned about the cost of development incurred in number 69 above?
- Yes
- No
- 72) If yes, how would you categorize the cost of development?
- Too high?
 - Fair
 - Unfair
 - Do not know
- 73) What in future would you like to be improved in the process of obtaining? development permission?
- Lower development cost
 - Reduce the period of time in the approval process
 - Reduce the number of requirements in obtaining development permit [specify which]
 - Any other [specify]
- 74) If your house did not get a building permit, have you ever been told to demolish it?
- Yes
- No
- 75) Who among the following has ever visited your house for inspection?
- Local authority
 - Physical planner
 - Nema
 - Land control Board
 - Physical planning liaison committee
 - District environmental committee
 - District development committee
 - Any other
- 76) Who among the following officials stated above asked you to
- Stop your construction
 - Advice on renovation
 - Demolish your structure
 - Ask for building permit
 - Any other
 - Take you to court
 - Take you to a liaison committee
- 77) How did you resolve the problem incurred at question 77 above?
- Sought for retrospect approval
 - Paid court fine
 - Got reprimanded from Local Authority, Nema' Liaison committee
 - Talked to the officers and amicably resolved the problem
 -

Any other

78) Is the house currently connected with water? Yes.....No.....

79) If yes, what is the source of water

- Borehole water
- River water
- Roof water catchment
- Piped water

81) What is the main method of liquid waste disposal in your house?

- Conventional sewer
- Septic tanks
- Other

82) What is the main source of power used in this house?

- Solar energy
- Electricity
- Paraffin [lamp]
- Others, specify

83) What size of land does your house occupy?

No

Architectural

Yes

No

What is the cost of the following professional services?

Planning services

Electrical Engineer

Architect

EIA

Structural Engineer

Others

Are the above services compulsory for any citizen before he obtains development permit?

Yes

No

Appendix vi: Questionnaire for The Professional Institutions – [Engineers Board, AAK, KIP]

1. Do members of your institute offer professional services in the peri-urban areas of the city of Nairobi?

Planning services

Yes

No

Electrical Engineer

Yes

No

Structural Engineer

Yes

No

Architectural

Yes

No

2. What is the cost of the following professional services?

Planning services

Electrical Engineer

Architect

E.I.A

Structural Engineer

Others

3. Are the above services compulsory for any citizen before he obtains development permit?

Yes

No

4. If yes, how do you ensure compliance?
- Frequent monitoring of development
 - Those found are prosecuted
 - Liaison with local authorities
 - Any other [specify]
5. Is there provision in the statute to enable your office prosecute either the developer or local authority who carries out development without your professional input?
- Yes
- No
6. Kindly, specify the relevant legal section and the type of action that you will take in No. 5 above.....
7. How many times in a year have you been involved in apprehending development offenders?
- Monthly
- Quarterly
- Yearly
- Specify
8. Have you ever been involved in community sensitization [in your area of professional interest] within the last
- One week
- Yes
- No
- One month
- Yes
- No
- One year
- Yes
- No
- Others
9. Have you ever been involved in preparation of any legislation that controls development?
- Yes
- No

10. If yes, how were you involved in the above (9) above? *Old-Juadoll County Council, Mazaku Municipality*

Prepared a memoranda *Mazaku County Council, Mazaku Municipality*

Presented a paper *University Of Nairobi*

Government sought your views through debate *Department of Urban and Regional Planning*

Others (specify) *Old-Juadoll County Council, Mazaku Municipality*

11. How do you rate the current development control legislation?

Effective 2

Very effective 3

Not effective 1

Clerk after approval by Town planning committee

Director of city planning

Any other

3. Suppose any other authority, other than the council approves development, can it be valid?

Yes

No

4. Do you usually require the following documents and professional services before issuing a development permit?

Architectural Engineers drawings

Electrical Engineer's drawing

Planning level

Environmental expert

Health officers comments

Any other (specify)

5. If yes, do you have a development control section, with authenticates of vets the above documents required in question 4 above, before you accord the plan your final approval?

Yes

No

6. Is there occasions when the council can approve development without regard to the above document/services?

Is your area of jurisdiction covered by a level physical development plan/regional plan/zoning ordinance?

Yes

No

If yes, do you ensure that the approved building plan by the council conforms to the area physical plan?

Yes

No

Does your department/ council have an enforcement section?

Yes

No

Appendix vii: Institutional Questionnaire (Nairobi City, Olekejuadoil County Council, Masaku County Council, Mavoko Municipality)

University Of Nairobi

Department of Urban and Regional Planning

Institutional Questionnaire (Nairobi City, Olekejuadoil County Council, Masaku County Council, Mavoko Municipality)

1. Zone 01, 02, 03, 04
01_i, 02_i, 03_i
01_{ii}, 02_{ii}, 03_{ii}
01_{iii}, 02_{iii}, 03_{iii}
01_{iv}, 02_{iv}, 03_{iv}
2. Who in your department approves housing development?
 Town clerk
 Clerk after approval by Town planning committee
 Director of city planning
 Any other
3. Suppose any other authority, other than the council approves development, can it be valid?
Yes
No
4. Do you usually require the following documents and professional services before issuing a development permit?
 Architectural Engineers drawings
 Electrical Engineer's drawing
 Planning brief
 Environmental expert
 Health officers comments
 Any other [specify]
5. If yes, do you have a development control section, with authenticates of vets the above documents required in question 4 above, before you accord the plan your final approval?
Yes
No
6. Is there occasions when the council can approve development without regard to the above document/services?
Is your area of jurisdiction covered by a local physical development plan/regional plan/ zoning ordinance?
Yes
No
7. If yes, do you ensure that the approved building plan by the council conforms to the area physical plan?
Yes
No
8. Does your department/ council have an enforcement section?
Yes
No

9. What are the qualification of the enforcement officer, Engineer.....Planner....., clerk....., Surveyor....., Other, specify.....?
Does the enforcement officer have a vehicle to facilitate fieldwork?
Yes
No
10. Is there budgetary allocation for development control section?
Yes
No
11. If the council does not have an enforcement section/officer, how do you ensure no illegal development takes place?
 Daily site inspection
 Weekly site inspection
 Monthly site inspection
 Other – specify
12. Do you have the capacity to control development in terms of the following?
Legal backing
Vehicles
Manpower
Money
Others
13. If yes, how do you deal with illegal development?
 Apprehend and take to court
 Negotiate and approve in retrospect
 Can't do anything
 Demolish the building
 Issue and enforcement notice to the developer as we pursue the law.
 Any other.
14. Do you won the court that deals with illegal development?
Yes
No
15. If No, do you get assistance from other courts?
Yes
No
16. If yes, how do you rate the efficiency of these courts?
 Slow on prosecution
 Decision influenced by development offenders
 Decisions always against the council
 The process is slow and expensive
 Any other.
17. Does your council have a town planning committee?
Yes
No

18. If yes, how often do you hold meetings?
- Monthly
 - After two months
 - After one week
 - Once a year
 - Other [specify]
19. What does the town planning committee do?
- Allocate plots
 - Approve building plan
 - Resolve development disputes
 - Discuss area planning needs
 - Any other [specify]
20. Can a plan be approved by the Town Clerk without the endorsement of the town planning committee?
- Yes
- No
- Any other
21. How long does development applications take before it's approved?
- One day
 - One week
 - One month
 - Two months
 - More than two months
 - Any other
22. Do you have a town-planning department/section in your council?
- Yes
- No
23. If yes, are they involved in the following activities?
- Preparation of the plan
- Yes
- No
24. Do you have a research section?
- Yes
- No
25. If Yes, what does the research section do?
- Monitor development trends and report to the town plan
- Yes
- No
26. Collects books for staff- reading?
- Yes
- No
- Any other
27. Can the clerk issue a development permit without consulting the local councilor?
- Yes
- No
28. What is the role of the local councilor in development control?

- Identify and endorse the developer in his area/ward
 - Assists in identifying illegal development
 - Other
29. Can the town clerk issue a permit without consulting the
- Chief planning officer
 - Chief housing officer
 - Public health officer
 - Engineers' department
 - Work officer
 - Town architect
30. What happens if the developer who is denied approval is dissatisfied with the council's decision?
- Appeal to liaison committee
- Yes
 - No
- Appeal to court
- Yes
 - No
 - Any other
- See the councilor
- Yes
 - No
- See the Town Clerk for consideration?
- Yes
 - No
31. How long does and appeal take to take dispensed?
- One week
 - One month
 - Two months
 - More than three months
 - Others
32. Apart from the council, who among the following institutions approves development?
- Land control Board
 - Ministry of Agriculture
 - Nema
 - Commissioner of lands
 - The area councilor
 - The chief
 - The DDC
 - The DC
 - Other.
33. Can development approved by the above authorities proceed without your council's approval?
- Yes
 - No

34. Do all development applications in your area of jurisdiction receive development permission from your council?
Yes
No
35. How much revenue in rates, rents do you earn from specified zone of your jurisdiction?
Monthly revenue
Yearly revenue
36. Which of the following projects have you initiated or is under process in the zone specified in the last 10 years?
Sewerage works
Damping site
Water works
Road opening/grading
37. Do you have any budgetary allocation for the regions?
Yes
No