



**UNIVERSITY OF NAIROBI  
DEPARTMENT OF URBAN & REGIONAL PLANNING**

**ASSESSING DRIVERS AND EFFECTS OF PERI-URBAN DEVELOPMENT IN  
SECONDARY TOWNS: A CASE STUDY OF KITUI TOWN IN KITUI COUNTY,  
KENYA.**

**BUR 604: RESEARCH PROJECT**

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**A RESEARCH PROJECT SUBMITTED IN FULFILLMENT OF THE REQUIREMENTS  
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## **Abstract**

The peri-urban development phenomenon has been of concern since the 20<sup>th</sup> century. Governments, scholars, and institutions have invested heavily in attempts to understand how this phenomenon manifests and models developed on how to address it. Despite these efforts, the problem persists, raising the critical question of why urban areas grow beyond their boundaries. The study sought to contribute to the debate on the urban-rural interface with a focus on the form, nature, and character of peri-urban development. Assessing the forces behind peri-urban development, how this affects the PUAs (Peri-urban areas) socially, economically, and environmentally and evaluating the best ways to sustainable urban-rural linkages.

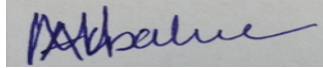
To achieve the objectives of the study various methods were used. On acquiring the targeted households, a buffer of one kilometer from the town's boundary was developed, after which the target household was stratified based on sub-locations while for the key informants the study used purposive sampling. On spatial data, the study used Landsat 5 images for the years 1987,1997,2007,2017, and 2021 to map land use and land cover changes as well as peri-urban development forms. The study further used observation and photography as well as mapping of institutions and basic facilities.

The peri-urban area of Kitui town exhibits; the ribbon peri-urban development form, compact peri-urban development form at the edges as well as scattered ones. The peri-urban area has also seen an increase in built-up area from 1.5% in 1987 to 10.9% in 2021 while land under agriculture has declined from 77.5% in 1987 to 68.5% in 2021. Even with agriculture being the dominant land use, the venture is majorly for subsistence. On management, the peri-urban region is entirely under municipality boundary but held under freehold and zoned as agricultural land. On the force behind peri-urban development, cheaper rent in peripheries scored highest with 18.2% while serene environment scored 14.6%. Other major factors motivating factors were; population growth localization of facilities/institution in the town, the pro-urban approach of using the town as a growth pole, Lack of town and county spatial plan, therefore, leaving the regulatory authority with no instruments to use for development control.

From the findings of the study, it is evident that even with different locations and regions the drivers of peri-urban development are similar but the replication of approaches to provide a solution to the problem does not yield fruits therefore necessary for countries in the global south to develop local solutions. The urban and countryside embrace integrated management this will ensure approaches of management adopted do not make any of the divide worse off.

## Declaration

I Mbaluka George do declare that this research dissertation is my original work and has never been submitted anywhere else for examination.



Date.....

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This dissertation has been presented for examination through our approval as university supervisors



..... Date **16th February 2023**

Dr. Musyimi Mbathi (Supervisor)

## **Dedication**

To My parents Mbaluka Munuve and Timinah Mbaluka, my lovely sisters, and all scholars who want to use the knowledge generated by this study.

## **Acknowledgment**

Grace be to The Almighty God without him this undertaking would not have been possible. To the supervisor Dr. Mbathi, the intellectual support has been outstanding, and I cannot find the right words to thank you enough. To the course coordinator Dr. Fridah Mugo, the concern about the study's progress kept pushing me to work hard, thank you.

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## Abbreviations

<b>ADB</b>	Asian Development Bank
<b>AUC</b>	Africa Union Commission
<b>Asal</b>	Arid and Semi-arid areas
<b>CBS</b>	Central Bureau of Statistics
<b>CBD</b>	Central Business District
<b>CGoK</b>	County Government of Kitui
<b>CSI</b>	Continental Scholar Initiative
<b>CoK</b>	Constitution of Kenya
<b>EC</b>	European Commission
<b>EU</b>	European Union
<b>EEA</b>	European Environment Agency
<b>EMCA</b>	Environmental Management and Coordination Act
<b>FAO</b>	Food and Agricultural Association
<b>GoK</b>	Government of Kenya
<b>GPS</b>	Global positioning system
<b>IDP</b>	Integrated Development Plan
<b>KMTC</b>	Kenya Medical Training College
<b>KNBS</b>	Kenya National Bureau of Statistics
<b>KIG</b>	Key Informant Guide
<b>Ksh</b>	Kenyan Shilling

<b>MoK</b>	Municipality of Kitui
<b>NLC</b>	National Land Commission
<b>PUAs</b>	Peri-Urban Areas
<b>SEKU</b>	South Eastern Kenya University
<b>SPSS</b>	Statistical Package for Social Science
<b>TDR</b>	Transfer of Development Rights
<b>UGBs</b>	Urban Growth Boundaries
<b>USA</b>	Urban Service Area
<b>USB</b>	Urban Service Boundary
<b>UN-HABITAT</b>	United Nations Human Settlement Programme
<b>OECD</b>	Organization for Economic Co-operation and Development



## Chapter One: Introduction

### 1.1 Background of the Study

Peri-urban development has resulted in the extension of urban areas further into rural areas (Webster, 2002). With the global urban population projected to reach 55% by 2050 as per the World Bank urbanization report of 2019, peri-urban developments are likely to accelerate posing threat to the peripheries all over the world (Lasisi et al, 2017). Even though the phenomenon is not new in the global North, it started being experienced in the early 20<sup>th</sup> century, and attempts were made to establish what motivates it and models developed to address it (Hall, 2002). Despite these attempts, the phenomena have persisted and further spread into the global South where models have been developed/adopted especially in Asia.

In Africa scholars and land, managers have also not been left behind with western models adopted in the management of urban and countryside as well as studies on what motivates the phenomena. Africa's peri-urban development has been majorly driven by the path to urbanization with the colonial phase being the defining moment (Watson, 2009; Fox, 2012; Home, 2012, 2022; Ayonga, 2019b). Rural-urban migration (Fox, 2012). Salem et al. (2018), Ng'ayu (2015), and Jordaan et al. (2004) noted that improved individual mobility is an accelerator in Peri-urban development. The cost associated with formality has also seen urbanities relocate to peri-urban regions (Musyoka, 2004; Andreasen et al., 2017). Ng'ayu (2015), Appiah et al. (2014), and Owusu and Chigbu (2020) note disjointed approach has led to lacunae in management in which capitalists move in and exploit the opportunity.

In Kenya, the problem dates back to the colonial period when urban planning was done based on racial segregation (Home, 2012; Hay and Harris, 2006). Ayonga (2019a), and Hay and Harris (2006) posit that development on the fringes is a response to housing shortage as well as the cost of housing. GoK (2017) acknowledges Peri-urban development as a challenge resulting from a disjointed approach in the management of PUAs and unharmonized land management policies. Ayonga (2019b) notes urban decay as a factor pushing urbanites into PUAs, while Home (2012) points to a dual approach in land management. Mwangi (1994) and Ayonga (2019b) point to ambiguity in planning law as the reason for sprawl. Ng'ayu (2015) and GoK (1969, 2017) note that sprawl has been accelerated by a lack of planning and institutional capacity in managing

development. Mandere et al. (2010), in their study in Nyahururu, a secondary town, noted that Peri-urban development was an attempt by urbanites to complement their incomes. Migration from the hinterland and outmigration from other urban areas have seen population growth and demand for housing met in PUAs(Mandere et al.,2010).

On the implication of Peri-urban development in Kenya on the hinterland, Ng'ayu (2015) and Thuo (2013) note that sprawl has compromised environment quality in PUAs due to poor waste management. Mandere et al. (2010) and Ng'ayu (2015) found out that sprawl provided PUA communities with an opportunity for higher economic return ventures. Thuo (2013) posits that sprawl weakens strong social bonds exhibited in rural communities.

## **1.2 Statement of Research Problem**

The purpose of establishing urban boundaries is to contain urban growth and peri-urban development and ensure urban services are adequately provided for. However, in Kitui town despite having the urban containment boundary urban growth is insensitive to the boundary. The problem is further complicated by a municipal boundary that transcends rural landscape hindering adequacy in service provision. Despite attempts to plan the town, the planning efforts have not focused on why the urban development keeps leapfrogging into the rural landscape to delineate boundaries that are sensitive to the findings of why the developments are taking place in peri-urban regions deficient in services and basic infrastructure. Therefore the study sought to find out the nature and character of the peri-urban development in the peripheries of Kitui town as well as the driving forces behind this phenomenon. Further looking at viable planning intervention towards more controlled and coordinated urban growth.

## **1.3 Research Questions**

1. What is the nature, character, and form of peri-urban growth of Kitui town?
2. What are the factors responsible for the Peri-urban development of Kitui town?
3. How has peri-urban growth impacted on the study area?
4. What are available viable planning interventions that can be employed to prevent Peri-urban development?

#### **1.4 Research Objectives**

1. To establish the nature, form, and character of peri-urban development in Kitui town.
2. To establish factors responsible for the Peri-urban development of Kitui town.
3. To investigate the impact of peri-urban development in the area of study.
4. To propose possible spatial planning and policy intervention in addressing the negative impact of Peri-urban development.

#### **1.5 Scope and Limitation of the Study**

The study is limited to establishing the form, nature, and characteristics of peri-urban development, the factors that motivate the phenomena as well as the implication it has on the PUAs and mitigation measures. The study is generally interested in sublocations adjoining the Kitui town boundary however due to resource limitations the study used a one-kilometer buffer from the town boundary. The buffer covers only eleven square kilometers in an area that forms the study area.

#### **1.6 Justification**

Urban areas growth has always occupied the center stage of scholars from nearly all fields, policymakers, conservationists, and economists. The debate seems to gather pace as each work attempts to explain the relationship between urban areas and their hinterland. Peri-urban development has been studied quite widely; however, most of these studies have focused on large urban areas except Mandere et al. (2010). However, their focus was majorly on livelihood change and household income. Of concern is that even with these studies' Peri-urban development is persisting, especially in secondary towns. The study sought to establish drivers of Peri-urban development in secondary towns in Kenya and their impacts from three-dimension; Environmental, Economic, and Social. The study is critical since it comes at a time when Kenya's urban support program seeks to establish and delineate urban boundaries that can ensure adequate service provision as well as sustainable urban growth.

The study will inform local authorities and the government on policy readjustment to manage urban growth and rural development sustainably.

The study will inform local authorities and the government on policy readjustment to manage urban growth and rural development sustainably.

### **1.7 Definition of Terms as Used by the Study**

**Urbanization** is the process of concentrating population in one area (Tisdale, 1942; Marzluff, 2008); this concentrated working population must be earning a livelihood from off-farm activities (Chaolin and Cook, 2012). This paper defines *urbanization* as a process of economic transformation from rural to urban ones and is usually characterized increase in population densities. **Urban growth** is a spatial and demographic process and refers to the increased importance of towns and cities as a concentration of population within a particular economy and society (Bhatta, 2010). **Peri-urban development** is when rural areas located on the peripheries of established cities transform from rural to urban; this transformation can be physical or functional (Webster,2002). The process is characterized by social and economic transformation from dominant agricultural activities associated with rural areas to manufacturing, real estate establishments, and more economical alter Locals (ibid). **Peri-urban area** has many definitions, some based on a place while others are based on livelihoods. Wandl and Magoni (2017), Ng'ayu (2015), Appiah et al. (2014), and Tacoli (2003) refer to PUA as a Transition zone with some degree of intermingling of urban and rural uses. The study adopted meaning as postulated by the quoted scholars. **Urban sprawl** is defined by Brueckner and Fansler (1983) and Habibi (2011) as excessive growth of urban areas putting pressure on urban boundaries, while EEA (2006), Mancebo (2008), and Ng'ayu (2015) define it as the advancement of the urban area into the rural area. The study used urban sprawl as the horizontal growth of urban areas to the adjacent land uses in the hinterland. **Land use** refers to activities on land or the classification of land according to how it is being used (Bhatta, 2010).

**The environment** can be described as the physical factors of the surroundings of human beings, including land, water, atmosphere, climate, sound, odour, taste, the biological factors of animals and plants, and the social factor of aesthetics and includes both the natural and the built environment (GoK, 2015).

**Service** Smith et al. (2016), quoting Hill (1977), define service as an activity performed or provided by the government or any other group or institution or an individual to urbanites. He further points such services do not have to be only for the urbanites and not accessible to all

urbanites. Quoting Ottensman (1994) opines that these services are provided through three spatial patterns; fixed infrastructural networks, mobile delivery (street cleaning), and fixed services like a library.

### **1.8 Organization of the Report**

The report is organized into six chapters. Chapter one is generally on the background from the global perspective with a look at phenomena in the global North, parts of Asia, then the situation in developing nations, especially in Africa. An introductory statement with an overview of the subject under study. The report in this section sets questions that were aimed at helping research respond to the problem of concern to the research. The study attempted to determine the nature, form, and characteristics of peri-urban development in Kitui town as well as the causes of this development. The third question sought to find out how peri-urban development has impacted the community in the peri-urban region and the environment. Lastly, the research sought to establish viable remedies to the phenomena in the peri-urban. Based on the questions objectives were developed. The chapter further sets the scope of the study to 11 square kilometer ribbon on the edge of Kitui town and the limitation of the study as well as the definition of terms used in the study.

Chapter two presents a review of information on the urbanization process, the conceptualization of Peri-urban development, and the interaction of the Peri-urban development process. The chapter also looks into the nature, form, and character of peri-urban areas. The chapter goes further into interrogating the factors responsible for the phenomena as well as the impact brought forth by the transformation of rural landscapes into semi-urban. The chapter also delves into approaches to mitigating uncontrolled growth of urban areas as well as farm preserve approaches to bring the dichotomy in urban and rural management, through this effort the chapter also looks into two case studies in the south of Africa. The whole of chapter two is then summarized through a conceptual framework that notes the interaction of independent variables responsible for peri-urban development, dependant variables as a result of independent variables, and intervening variables that once employed result in ideal urban and rural spaces.

Chapter three outlines the methodology adopted in carrying out the research. The chapter shows the research design adopted, gives a detailed outline of the study's target population, and further

breaks it down to sampling methods and samples settled for. The chapter further looks into to data required and outlines the sources of the data by the study. To acquire the targeted data

Chapter four of the report presents brief insight into the study area on the town's evolution, demographic trends, geophysical character, and social and physical infrastructure, while chapter five presents the study's analysis and findings. Finally, chapter six summarizes the findings and presents the conclusion arrived at in this study. This last chapter also presents the recommendations on the findings of the study.

## **2.0 Chapter Two: Literature Review**

### **2.1.1 Concept of Urbanization**

Urbanization is the process of population concentrating in a particular area from an area of low concentration (Tisdale, 1942). Chaolin and Cook (2012) redefine urbanization as a socio-economic transformation from agricultural-oriented occupations to non-rural populations focusing on modern urban civilization and industrialization accompanied by modern urban infrastructure investment and public service facilities. Marzluff et al. (2008) and Friedmann (1966) summarize urbanization as a process of agglomeration of activities and aggregation of people in a particular area engaging in non-agricultural activities and usually characterized by heterogeneous settlements.

### **2.1.2 Early Urbanization**

Darwin argues that man's undertakings are geared towards survival. This survival approach justifies the man's effort to urbanize. Boyden (2016) and Davis (1955) point out that man embraced agriculture in an endeavour to survive. This social transformation ensured steady food supply and surplus. The surplus meant that part of the members of agrarian society could be released from active farming and still be fed. The surplus in agricultural production led to the realization of "early towns," which were parasitic. These new settlements evolved into centres of power with occupational specialism leading to heterogeneity (Boyden, 2016; Davis 1955). Davis (1955) "the towns" yielded power over the hinterland with the birth of peasants and lords. Occupational specialism led to the birth of trade with the "new towns" acting as centres of trade and later foci economic points. However, these were pathogenic cities experiencing deaths due to diseases; the innovation in medicine ensured population growth not just in the urban areas but also in the hinterland (Fox, 2012).

Agriculture alone though critical, could not realize rapid urbanization. Thanks to man's bid to survive, innovations were brought to the centre of the evolving societies, from ironworks in Mesopotamia to textile industries in Britain; the new dawn for urbanization was taking shape. Hall

(2002) argues that even in the wake of these innovations, the pace of urbanization was slow, but advancements were made with the discovery of coal in the course of industrialization. He further argues that with the mechanization of agriculture, more population was released for off-farm work prompting rural-urban migration (Davis, 1955). The considerable challenge was on transport for early “towns” they had to be located along navigable rivers which served as means of transport, poor transport and high cost are credited for the fall of the Roman Empire in her effort to ensure steady wheat supply to her urbanites (Fox, 2012). Hall (2002) notes that with this challenge, labourers would reside closer to the industries, and so was the genesis of the urbanization problem. Hall (2002) points to railway transport for the growth of industrial towns.

Hall (1998) notes that urban innovations were developed to solve these problems of transportation, sewer, crimes, and lack of essential service provision. The advancements would mark the journey to modern urbanization.

### **2.1.2 Urbanization in Kenya**

Urbanization in Kenya has been in phases, one being the precolonial, colonial, and post-colonial periods. In the precolonial period, much of the urbanization took place along the coastal line, which was majorly motivated by trade between Kenya’s hinterland and the outside world.

However, the colonial period is credited for shaping urbanization in the hinterland through the development of critical infrastructures like the East African railway and the development of administrative centres (Morgan, 1969). During this era, legislation on land use, land ownership, and movement of the African population would later haunt development in the urban arena.

The post-colonial era is, however, acknowledged for rapid urbanization since the restriction in the movement was done away with; this allowed massive rural-urban migration, which is arguably attributed to the massive development of urban areas at the expense of hinterland this meant urban centres retained the advantageous economic status (Hope, 2012). This approach to development would later be carried on by the new government after independence through sessional paper 10 of 1965 and further amplified through Kenya’s human settlement strategy of 1977.



Table 1: Urbanization trends in Kenya from 1948-2019

Year	Number of Urban areas	Total Urbanized Population	Percentage of the total population
1948	17	285,000	5.3
1962	34	747,651	8.7
1969	47	1,079,908	9.8
1979	91	2,315,696	15.1
1989	139	3,878,697	18.1
1999	180	5,429,790	19.3
2009	230	10,608,203	27.5
2019	307	14,831,700	31.2

Source: (CBS, 1988; CBS, 1996; KNBS, 2010; KNBS, 2019)

Kenya's urban population has been on the rise since 1948; as shown in the table, the native urban population stood at 5.3% of the total population. In 1962 native population grew to 8.7%, 9.8% in 1969, registering only 1.1% from that of 1962, which could be attributed to the economic boom courtesy of agriculture retaining rural population, 15.1% in 1979, 18.1% in 1989 even with the poor economy, Kenya witnessed in the late 1970s and 1980s. According to the 1999 household census report, the percentage of urban population growth was 1.2%, the second-lowest increase in the percentage of urban this could be attributed to the poor economy in the country. In the last 13 years, the country has seen a significant increase in the urban population, with 31.2% of the total population living in urban areas. This percentage increase will keep increasing if the annual urbanization rate of 4%, as noted by World Bank (2019). What implication will this have on the urban sphere? Demand for housing will keep on growing, and so will the demand for essential services and infrastructure. All of this can be met through the availability of land as the core resource in meeting the demand of the urbanites. In scenarios where the urban governance is not

so strong and in a position to meet the demand, the informality that has led to the birth of Peri-urban development will continue to accelerate.

### 2.1.3 Development of Secondary Towns in Kenya

Like overall urbanization, the development of the secondary towns gained momentum during the colonization era, with these towns forming part of the colonial administration network (Richardson, 1980).

In the wake of independence, Kenya was faced with the challenges of rural-urban migration. The migration put much pressure on resources available in urban areas. To curb this, the country's policy through the rural district focus and further amplified through the human settlement strategy of 1978. The strategy used the central place as well as growth pole theories in the provision of infrastructure and service to attract those who sought "blight light" while at the same time accelerating regional equity in terms of development (Otiso, 2005; Mireri, 2006; Evan, 1989). These efforts to reduce pressure on primary towns bore no desired fruits since these primary towns retained the lion's share in infrastructure and employment centres, so rural-urban migration continued with a preference for secondary towns.

**Table 2: Some of Kenya's Secondary Towns Population Growth Trends**

Urban Area	Urban population growth trends						
	Year of Enumeration	1969	1979	1989	1999	2009	2019
<b>Machakos</b>		6,312	84,320	116,293	28,891	40,819	63,767
<b>Kitale</b>		11,573		56,218	63,245	98,071	162,174
<b>Meru</b>		4,475	72,049	94,947	126,427	43,146	80,191
<b>Kericho</b>		10,144		48,511	30,023	40,183	53,804
<b>Kisii</b>		6,080	29,661	44,149	65,235	60,222	112,417
<b>Malindi</b>		10,757		34,047	53,805	82,747	119,859
<b>Karatina</b>		2,436		5,554	6,852	8,362	23,552
<b>Nyeri</b>		10,004	35,753	91,258	46,969	61,187	80,081
<b>Naivasha</b>		6,920		34,519	32,222	91,898	198,444
<b>Kakamega</b>		6,244	32,025	58,862	57,128	67,170	107,227
<b>Kitui</b>		3071		9,305	13,244	19,067	29,062
<b>Bungoma</b>		4,401		26,805	44,196	54,469	68,031

Source: (CBS, 1988; CBS, 1996; KNBS, 2010; KNBS, 2019)

From statistics in table 2, it is evident that the national urban population proportionate share is on the rise. Roberts (2014) noted that projected subsequent urbanization is taking place in these towns. There is a need to focus on their management and the factors of their growth. The focus on their management and growth factors will ensure sustainability and liveability is enhanced so as to absorb the increasing urban population.

## **2.2 Concept of Peri-urban development**

Peri-urban development is a process where an unplanned form of urban growth in which urban areas grow into rural areas outside the urban boundaries (Webster and Muller, 2009; Mancebo, 2008).

### **2.2.1 Peri-urban area**

A wide range of approaches has defined peri-urban areas; the place-based definition approach, the definition based on livelihoods, and land management. The place-based definition approach has many synonyms, with some referring to it as urban fringe, Periphery, and Suburbs. Wandl and Magoni (2017), Mbuligwe (2011), Ng'ayu (2015), Appiah et al. (2014), Tacoli (2003), Saxena and Sharma (2015), Rahayu and Mardiansjah (2018) refer to PUA as the transition zone between a well-defined urban area and rural area. These zones are foci of the dynamic process of city transformation with competing land uses and demand (Mandere et al., 2010; Lupala, 2015; Shaw et al., 2020).

Thuo (2013) and Ng'ayu (2015) from the management approach refer to PUAs as zones of lacuna in the management of development due to legal and policy guidelines' inadequacies. These inadequacies arise from institutional overlaps and responsibilities being either too small or large for the institution in charge to control land management. They are further complicated by the hybrid character of PUAs (Spanier, 2021). The PUAs are edges of urban areas, associated with accessibility problems compared to the urban area, with informality rather than planned area. Their growth is horizontal, consuming rural land, land pricing lower than those of the urban areas, the areas still have agriculture to earn livelihoods.

### **2.2.2 Process of Peri-urban development**

Lupala (2015) perceives Peri-urban development as a process in which rural areas located in the peripheries of an urban area transform to be more urban both physically and socio-economically. This phenomenon is a result of the movement of population and firms out of the city center. This

movement is motivated by many factors, which Shaw et al. (2020) and Nuissl and Siedentop (2021) broadly categorized into; Economic, Biophysical, Demographic/Social, and Spatial policies. Technological; additionally, Christiansen and Loftsgarden (2011) group them into societal factors, Housing preferences, Transport, and Accessibility as well as political (governance) and regulatory frameworks. Even though Peri-urban development is a global phenomenon subject to regional dynamics, which make factors motivating it vary from place to place (Christiansen and Loftsgarden, 2011), the variance in drivers has been validated by studies in the global North and South. In the global North, preferences for better social amenities, infrastructure investments, technological innovations, inner-city population growth, flight from blight, and relocation of centres of employment have been pointed to as some of the factors driving Peri-urban development (Brueckner, 2000; Bayoh et al., 2002; Christiansen and Loftsgarden, 2011; EEA, 2006; Fertner et al., 2016; Glaeser and Kahn, 2003; Hiller et al., 2013; Mieszkowski and Mills, 1993; Nechyba and Walsh, 2004; Shaw et al., 2020).

In the global North inner-city population growth is a significant factor, whereas, in the South, much of the population growth is from rural-urban migration (Fox, 2012; Kleeman et al., 2017; Lupala, 2015), which raises demand for housing which Olajuyigbe (2016) and Appiah et al. (2014) notes PUAs offer the opportunity to meet the demand. The land conversion for housing is further accelerated by ambiguity in land management policies (Ayonga, 2019a; Ng'ayu, 2015; Thuo, 2013; Owusu, 2013; Mwangi, 1994) and laissez-faire approach to inland markets in the fringe (Ayonga, 2019b). Land pricing is critical in urbanities choosing the PUAs since land pricing is inversely proportional to the distance from the core so is the space (Jordaan et al., 2004). The development of major roads has also been a significant catalyst for peri-urban developments (Ng'ayu, 2015; Owusu, 2013; Salem et al., 2018), giving rise to ribbon developments. As pointed out by Otiso (2005) and Evan (1989), public development policies on urbanization and peri-urban development may be a deliberate effort, especially by the third-world nations, to spur growth and achieve regional equity and balance.

Mbuligwe (2011) notes as the urban print advances into the fringes, it alters social, economic, physical, and environmental character. This alteration on social surfaces is marked by heterogeneity with invasion from non-locals, which may erode the social values marked by weak

community cohesiveness, landlessness, and social ills like crime, turning these into conflict zones (Appiah et al.,2014; Ng'ayu,2015; Owusu and Chigbu,2015; Thuo,2013). These zones' development may be patchy and disjointed, while those motivated by infrastructure development take ribbon shape (Salem et al., 2018; Owusu G., 2013, Ng'ayu, 2015). Owusu and Chigbu (2015) found out these zones had better social amenities, while Turok and McGranahan (2013) dispute by noting that Africa's urbanization has a mismatch with infrastructure and access to essential services. Thuo (2013) notes that these regions have poor management of waste since no institution takes responsibility for managing waste.

### **2.2.3 Processes In Peri-urban Landscape**

Shaw et al. (2020) point to PUAs as a zone of a dynamic process. These processes are land transformation, land fragmentation, planning change, and socio-economic transformation. These areas are also characterized by fragmented institutions that are charged with managing them and are further complicated by the independence of decision-makers within this landscape (Bhatta, 2010).

### **2.2.4 Nexus Between Peri-urban development Processes (Social, Spatial & Economic process)**

Peri-urban development is typically characterized by the co-occurrence of multiple change processes in the same region (Shaw et al., 2020). Shaw et al. (2020) opine that planning is a critical process in achieving sustainable development; however, failure to plan or planning that falls short of future needs is the genesis of peri-urban development; it is further accelerated by the change in planning between the urban landscape and the fringe.

Another process is land transformation; Jordaan et al. (2004), and Alonso (1960) notes that maximum marginal returns drive space allocation in an urban landscape and its environs. Brueckner (2000) and Fertner et al. (2016) opine that the traditional land uses in the fringe are unable to match marginal returns from new land uses; Ng'ayu (2015) notes this makes land conversions inevitable. The increase in the utility value of land in the fringes increases demand for land, which motivates parcellation. These new land-use intrusions alter the physical character as well as the socio-economic welfare of the edges. The appreciation of land values encourages locals to sell their land, which renders some landless (Thuo, 2013; Ng'ayu, 2015; Owusu and Chigbu, 2020). Fragmentation of land and invasion by non-locals forces the Locals to migrate (Dieleman

and Wegener, 2004; Ngayu, 2011; Ricci, 2019); this leaves land for urban land uses. The inadequacies in spatial policies and institutions further accelerate parcellation and conversion (Mwngi, 1994; Thuo, 2013; Ng'ayu, 2015; Allen, 2003 as quoted by Karg et al., 2019; Ayonga, 2019a).

The communities are left in limbo on how to earn a livelihood due to land market dynamics. To survive, they are forced to venture into non-agricultural economic activities (Lupala, 2015). The ruralist social character is also lost, paving the way to urbanity, driven by the heterogeneity of the intruding population (Thuo, 2013; Owusu and Chigbu, 2020), as the population keeps increasing, a gap in access to basic amenities increases (Ng'ayu, 2011).

Clark and Harvey (1965) note that peri-urban development may take different shapes, but their densities are lower than the central city. Ewing (1997), Webster (2002), Al jarrah et al. (2019), and Salem et al. (2018) note that in the event where Peri-urban development is motivated by transport corridor ribbon developments, occur with densities declining as you move away from the designated city. Nechyba and Walsh (2004) note cities also develop dense and compact PUAs motivated by the relocation of centres of employment and housing. While peri-urban development can also take a leapfrogging form where developments are scattered, this reflects independence in decision-making by the actors in the peri-urban regions. Land speculation as well as the poor geophysical character of the land (Ewing, 2008).

## **2.3 Nature, Form, and Character of Peri-Urban Development**

### **2.3.1 Nature**

Defining the nature of peri-urban areas has remained a challenge due to their ever-shifting nature (McConville, 2014). However, attempts have been made to point to peri-urban areas as zones of mixed informality and formality in housing (McConville, 2014).

### **2.3.2 Spatial Form of Peri-urban Growth**

Williams (2014) refers to form as physical characteristics that make up a built-up area which include size, shape, density, and configuration of settlement while Bhatta (2010) summarizes form as the spatial distribution of a built-up area. Peri-urban growth may take various forms; leapfrogging form is characterized by discontinuous urban developments with intervening and

scattered vacant land (Ngoran and Xu, 2015; Frenkel and Ashkenazi, 2008; Angel et al, 2007; Clark and Harvey, 1965; Galster et al, 2001; Ewing, 1997). Ewing (1997) notes that in the scattered form of peri-urban growth people must pass through undeveloped land on their way to developed ones.

The second form of peri-urban growth is ribbon development. Ribbon development is semi-contiguous strands of a built-up area that are less than a hundred metres wide (Angel et al, 2007). Ribbon developments follow major transport corridors (Ngoran and Xu, 2015; Tamilenthir et al, 2011). Harvey and Clark (1965) note that ribbon peri-urban growth pattern has segments of compactness that extend axially but leave adjacent land undeveloped, Angel et al (2007) further note that even though land neighbouring ribbon developments may be developed the densities are usually low and take a scattered form.

The third form is the polynucleotide developments or edge cities, this form results from spatial urban extension of already developed urban edge (Hai et al, 2019), however, Egidi et al (2020) note edge city form of peri-urban growth is witnessed in developing economies.

### **2.3.3 Characteristics of PUAs**

Peri-urban areas are zones of continuous evolution (Narain et al, 2013). These zones are usually at the edge of a well-defined urban area and rural areas that are neither urban nor rural (Shaw et al, 2020). Clark and Harvey (1965) note that as peri-urban is in its infancy the peri-urban developments are usually scattered. The scattered development is attributed to the fact that peri-urban regions are faced with institutional delinquencies and policy inadequacies in their management (Akhter and Noon, 2015; Narain et al, 2013; Hadi and Ellisa, 2021; Thuo, 2013; Olajuyigbe, 2016). The patchy form of development is further attributed to the independency of decision makers with some actors holding land on speculation. Salem et al (2018) posit that patchy development is a product of those owning the land availing it for urban development either through sale or transformation. Densities in the peri-urban regions are usually lower than those in the core urban areas which are attributed to poor accessibility and the absence of public transport system (Heikkila and Peiser, 1992; Barnes et al, 2002; Andreasen et al, 2017; Tiwari, 2019; Angel et al, 2007).

As peri-urban development accelerates the rural physical characteristics are altered to a hybrid form that is neither urban nor rural (Žlender, 2021). This alteration of physical characteristics is realized through competition between traditional rural land uses and urban ones. The traditional land uses are made less competitive through lower marginal returns compared to the urban land uses (Narain et al,2013; Salem et al,2018; Hadi and Ellisa,2021; Le,2020; Abdulai et al,2021; Piorr et al,2011; Coulibay and Li,2020; Thuo,2010,2013; Ng'ayu,2015; Mandere et al,2010;Lupala,2015;Lasisi et al,2017).

An increase in demand for land triggers land values upwards (Coulibay and Li, 2020). Appreciation of land with declining farm incomes motivates the rural poor to fragment land to sell it off (Thuo, 2013). Peri-urban regions are also characterized by economic transformation as a way of coping with the traditional land uses being inferior to new urban land uses (Lupala, 2015; Muller and Webster, 2009; Mandere et al, 2010; Owusu and Chigbu, 2020; Hadi and Ellisa, 2021; Appiah et al, 2014). Migration by the urbanites and population from other regions transforms social structure from a homogeneous one to a heterogeneous one (Thuo, 2013; Le, 2020; Narain et al, 2013; Woltjer, 2014). Loftsgarden and Christiansen (2011) note that in the global North peri-urban regions are occupied by the affluent however Mandere et al (2010) and Ng'ayu (2015) posit that in the global south these regions are occupied by the poor and middle class.

Peri-urban areas are not however uniform in character, developing nations' peri-urban areas are characterized by deficiencies in access to basic services and facilities (Turok and McGranahan, 2013; CSIS, 2018; Dodman et al, 2017). One unique challenge is poor waste management in the peri-urban regions because no authority can bear responsibility for proper management of waste, this has been pointed out by studies by Olajuyigbe in 2016, Ng'ayu in 2013, EEA in 2006, and Simon in 2008.



## **2.4 Factors Encouraging Peri-urban development**

### **2.4.1 Net Population Growth**

Peri-urban development is a product of population growth. Bhatta (2010) notes that there are two factors responsible for the growth of the population in urban areas that is the internal population growth in the urban areas. This internal urban population growth is realized through birth rates exceeding mortality rates. The second factor is the rural-urban migration which is attributed to push factors in the hinterland. Population growth responsible for peri-urban development differs in the global North and South. In the global North, Latin America and other developed nations' population growth responsible for Peri-urban development emanate from urban areas (FAO, 2011; Webster, 2002), However Cerrutti and Bertonecello (2003) quoting Celade (1997) note that even with urban areas natural population growth the urban areas in Latin American cities are still experiencing a lower rate of rural-urban migration. In developing nations the internal population growth in urban areas cannot be ignored either. Studies by Appiah et al in 2014 in Bosomtwe, Mutua in 2013 in Machakos, Aljarah et al in 2018 in Sulaymaniah city, and Mohammed et al in 2020 in Ethiopia point to inner-city population as a significant factor responsible for Peri-urban development.

Rural-urban migration which is attributed to urbanization and peri-urban development in developing nations is driven by what Zhang and Xi (2019) posit as Push-Pull factors. One of the push factors in the hinterland is the inferior economies as compared to urban areas (Hall, 2002; Fox, 2012). The pull factors are '*bright lights*' associated with the urban areas that is; good social amenities and infrastructure (Turok and McGranahan, 2013). The argument by Turok and McGranahan (2013) agrees with finds of Aljarah et al in 2018 on peri-urban development drivers in Sulaymaniah city. The '*bright lights*' are a result of urban areas being used as regional growth poles with centralization of service provision and economic poles (Otiso, 2005; Mireri,2006; Evan,1989). Turok and McGranahan (2013) commenting on Africa's urbanization note that urbanization in the region is driven by push rather than pull factors.

The inner city population growth triggers demand for housing which results in ex-urbanization and displaces the urban population (Zasadi et al, 2011).). Bhatta (2010) notes that due to the net

population the city is incapable of meeting housing demand as well as that of other services which then results in peri-urban development.

### **2.4.2 Economic Growth**

Bhatta (2010) posits economic growth of urban areas as a significant driver of peri-urban development. He further notes as urban areas grow economic base expands this trickles to the individual and firm incomes within the city. Doxiadis (1968) postulates that the rise in per capita income triggers the need for better settlement/housing. Dung-Gwom and Rikko (2015) point out that better settlement can be realized in peri-urban areas due to undisturbed environments and larger spaces. Urbanites' desire to relocate to the peri-urban region is further motivated by lower land rents and prices compared to that of urban areas (Adedire and Iweka, 2017; Jordaan et al, 2004; Kivell, 1993). Duranton and Puga (2014) note that growing per capita improves individual mobility. Urbanites and firms can relocate to the peripheries by trading off commuting and rent costs. Glaeser and Kahn (2003) observe that car ownership attributed to the rise in per capita income has been a significant driver of peri-urban development since the people living in peri-urban regions plan for their trips without concern about mobility in absence of a functional public transport system.

### **2.4.3 Urban Decay**

Urban areas experience an evolution cycle. One of the stages which spur growth in the peri-urban region is the urban decline (Ayonga, 2019a). Ayonga (2019a) posits this cycle is undergone by preplanned urban areas. Bayoh et al (2002) posit that during the planning of an urban area in its infancy the population planned for is usually smaller so is the provision of services. As the urban area grows, it attracts population (Fox,2012) due to the centralization of employment or agglomeration of economic activities (Bhatta,2010; Hall,2002) and the centralization of provision for basic services (Appiah et al,2014; Otiso,2005; Evan,1989). Mieszkowski and Mills (1993) posit that the central city exceeds 'the *carrying capacity*' that the city had planned for. This makes the city's infrastructure overwhelmed and the central city is then characterized by poor sanitation, overcrowded schools, congestion, old and dilapidated housing as well as traffic jams (Ibid). Bayoh et al (2002) note during this phase of urban evolution the central city suffers economic deprivation leading to higher rates of unemployment. Jacobs (1961) posits that with urbanites suffering

economic deprivation they turn to the streets to commit social ills like crime and prostitution. Owusu (2012), Ayonga (2019a), Adedire and Iweka (2017), and Al jarah et al (2019) note that urban ‘*blight*’ forces the urbanites to ‘*fly*’ to the peri-urban regions. The peri-urban zones offer a serene and quality environment as well as a rural experience that connects the occupants with their ancestral homes (Clark and Harvey,1965). The argument by scholars of urban decay may not entirely apply in developing nation, on better social amenities study by Appiah et al in 2014 note that peripheries had better social amenities, however, other studies point to peri-urban regions in developing nations as regions of basic services and infrastructure deficiency (Mohammed et al, 2020; Basorun and Daramola 2015; Ng’ayu,2015; Trivelli,2010; Tiwari,2019; Cermeño, 2021 ). In Kenya the zones where informality manifest itself lack basic services and infrastructure (GoK, 2016; GoK, 2009).

#### **2.4.4 Housing Preferences**

EEA(2006) report notes that desire to realize new lifestyles in the peripheries as one of the significant drivers of peri-urban development. One of these lifestyles is the preference for larger spaces (Christiansen and Loftsgarden, 2011; Simon, 2008) and modern housing (Mieszkowski and Mills,1993; Hall,2002; Klaufus,2013). However, housing developed during the infancy of urban areas is usually characterized by smaller spaces (Mieszkowski and Mills,1993). Zasada et al (2011) posit that the preference for larger spaces can only be met in the fringes. Jordaan et al (2004) posit that this is made possible due to cheaper land and rents in the peripheries.

Barnes et al (2002) posit that peri-urban development may result from urbanites constructing second homes in the periphery. The occupants of these homes are ex-urbanites who seek solitude, treating these homes as rural retreats, they also treat these homes as investments (Ibid). Clark and Harvey(1965) posit that peri-urban zones may offer childhood experiences to the urbanites, therefore, attracting them to develop residential with others settling because peripheries offer a completely different scene to that of the central city.

#### **2.4.5 Lack of Affordable Housing in the Urban area**

Lack of affordable housing within the central city prompts migrants and urbanites to relocate or choose peri-urban regions over the central city (Bhatta, 2010; Jordaan et al, 2004; Adedire and Iweka, 2017; Adeboyejo and Abolade, 2009; Arvanitis, 2013; Agyeman, 2018; GoK, 2016).

Mieszkowski and Mills (1993) and Williams and Shiels (2000) point out that as urban areas evolve demand for housing surpasses the supplied housing units, in free markets the rise in demand triggers skyrocketing house rents forcing urbanites to move to the peripheries. Brueckner (2000) posits housing in peri-urban regions are made cheap by overall economic incentives for developing housing; cheap land due to less accessibility and failure of the market to internalize the cost of locating in peri-urban regions. Andreasen et al (2017) note that lacunae in management allow construction not to abide by building regulations in the urban areas. The informality in peri-urban regions makes the cost of housing development cheaper (Ayonga, 2019a; Musyoka, 2004; Trivelli, 2010). The cheaper construction cost is then passed to tenants through cheaper rents.

#### **2.4.6 Demand for Housing**

Peri-urban development is an attempt by an embryonic city to meet housing demands (Mieszkowski and Mills, 1993). Embryonic urban area in the pre-planned urban scenario are usually planned for a smaller population so housing provision become inadequate in the long run. The same scenarios are true for organic urban development (Ibid). As the urban areas grow population increases demand for housing which surpasses supply creating housing deficit (Al Jarah et al, 2019; Adedire and Iweka, 2017; Arvanitis, 2013). Housing deficit results to built-up leaping into open spaces and farmlands beyond urban boundaries (Mieszkowski and Mills, 1993).

#### **2.4.7 Increase in Household Size and Household Numbers**

Mieszkowski and Mills (1993) note that an increase in household size increases the demand for more space and this can only be met in peri-urban regions. However, Christiansen and Loftsgarden (2011) quoting Karecha and Couch (2006) note that living arrangements are significant drivers in peri-urban development, pointing out that even with declining household sizes, living arrangements are on the rise increasing number of households which creates demand for larger spaces.

Hasse et al. (2013) note that movement to fringes is not only limited to an increase in household size through marriage but living arrangements. However, Ravetz et al. (2013), Christiansen and Loftsgarden (2011), quoting Karecha and Couch (2006) and Wu (2006), note that the migration to fringes is mostly by young couples, but Olajuyigbe (2016) notes much of the population is that of the working class (31-50yrs) with the illiterate population being dominant in the PUAs while Ng'ayu (2015) found the Old (50-59yrs) made the highest number in the fringe, Appiah et al. (2014) registering highest number in age group (26-45yrs). (Piorr et al, 2011) opine that migration to the fringes is mostly by well-educated and groups of high income.

#### **2.4.8 Land Pricing**

Land pricing and rent have always played a critical role in location preference in the urban landscape. Brueckner (2002), EEA (2006), Appiah et al. (2014), Ng'ayu (2015), and Ayonga (2019b) posit that fringes land rents are affordable to urbanites compared to the land within the urban landscape. Fertner et al. (2016) attribute this to higher marginal returns associated with urban land uses. This uncompetitive nature of traditional land uses the locals to sell off their land (Appiah et al., 2014 quoting Lawson et al., 2010) or transform it to a new use (urban). Christiansen and Loftsgarden (2011) argue that PUAs attract the wealthy and middle class due to lifestyle changes and affluence. However, Mandere et al. (2010) note that the flight from urban centres to the PUAs in developing economies is driven by the need for the “flying” population to complement their incomes through agricultural activities.

The PUAs also provide informal pro-poor access to land in developing nations (Musyoka, 2004; Leduka, 2004; Rakodi, 2004). This movement to the PUAs is further motivated by a trade-off between the cost of commuting and land rents (Glaeser and Kahn, 2003; Jordaan et al., 2004; Brueckner, 2000; Duranton and Puga, 2013; Salem et al., 2018), but Guneralp et al. (2018) point that Africa's urbanization unlike that of the western world is faced with a mismatch in infrastructure.

Christiansen and Loftsgarden (2011) point out that peri-urban development can be a deliberate effort by the local authorities to increase their revenue collections; this is made possible through the location of employment centres motivated by incentives advanced to the investors and developers.

The economic advantage held by urban areas has always made them magnet to the population in the hinterland and other urban areas (Hefferan, 2014). This mass movement of the hinterland population to urban areas is motivated by inferior rural economies (Hall, 2002; Fox, 2012; Morgan, 1969). As the urban area's economy keeps on growing, it impacts positively firm and individual incomes (Hefferan,2014). With the growing incomes so is the lifestyle change (Mieszkowski et al, 1993). Demand for larger spaces, car ownership, and an increase in household size are some of the changes experienced (Bhatta,2010). Also, with the increased income, investments are made possible with some urbanites buying land for a speculative purpose (Bhatta, 2010). Land held on speculation is made unavailable for development, therefore, making developments leapfrog to the fringes (Clawson, 1962; Trivelli, 2010).

Nuissl and Siedentop (2021) note that fringes have pull factors: a serene environment, low taxes, and good amenities; however, Ngayu (2011) notes that access to basic services in developing nations is a challenge.

#### **2.4.9 Spatial elements**

Clawson (1962) opines that the Burgess model of the concentric model, though made irrelevant by technological gains, can replace agriculture with the quality physical quality of the land. He opines that urbanization will mostly happen in the best land with the best quality in terms of fertility and topography. Urban development will leapfrog to better land in situations where land quality is questionable, like mountains, rivers, swamps, lakes, and valleys.

Urban developments are likely to avoid such difficult terrain and fragile ecosystem and leapfrog further into the fringes where development costs are relatively cheap. There is a sense of human safety, an argument that Clark and Harvey (1965) concur with. Their arguments agree with Salem et al. (2018) findings on drivers of peri-urban development in greater Cairo.

Fox (2012) and Jordaan et al. (2004), quoting Segal (1979), note that the natural environment has been critical in locating urban areas as well as their growth with areas that have quality fertile soil as well as flat areas experiencing much urbanization. Nkurunziza (2004) and Trivelli (2010) note that even though the topography may render some areas in the city unfit for habitation, it is in these regions that the poor will occupy.

#### **2.4.10 Land Speculation**

Expectations for the evolution of land and housing prices and industrial use may play a crucial role in the pattern of urban fabric expansion over time (OECD, 2018). The decision to postpone the use of undeveloped land or land under agriculture is informed by a trade-off between its current use and returns with future long-term investment and its return (ibid). Clawson (1962) further explains land speculation as a major factor in peri-urban development, by opining that land held on speculation is temporarily unavailable for urban development. He further explains its unavailability because the landholder waits for the right offer, which is unpredictable. The uncertainty on when the right offer will come means even the non-urban land uses are neither active on this parcel of land since the owner is in impermanence mode (Clawson, 1962; Trivelli, 2010). The speculated land being unavailable, then development leapfrogs further into the peri-urban areas.

Both Clark and Harvey 1965 and Clawson agree that speculation is the responsibility of institution fragmentation and high taxes imposed on land after being serviced. They further acknowledge it's not a stand-alone factor since it relies on elements like zoning, provision of basic facilities, and neighbouring developments. Many institutions and even individuals desire to own land. Often these lands are left vacant within the core of the city and making infill policies unsuccessful (Harvey and Clark 1965). As a result, the city grows outward, leaving the undeveloped land within the city and to the fringes.

The other factor making land speculation a difficult affair to correct is that mostly is driven by those in power (Home, 2012). The power they yield makes it possible to buy rural-zoned land and lobby to have it rezoned for urban purposes (Hiller et al., 2013). This power approach is attributed to access to information on any plans to regulate or any plans for capital investment by those in power and rich. Before actualization, conversations are held about any future interventions (Trivelli, 2010). Appiah et al. (2014), in the study of drivers of peri-urban development in Kumasi, found out that land speculation was one of the key drivers.

#### **2.4.11 Transport and Individual Mobility**

Jordaan et al. (2004) posit that invasion of new land uses into traditional ones as a function of accessibility. Heikkila and Peiser (1992) these invasions are motivated by the influence of

accessibility on land. Duranton and Puga (2013) and Brueckner (2002) also note that accessibility influences commuting costs. Duranton and Puga (2013) opine that it is based on these two critical variables in the urban landscape that location choices are made.

Bhatta (2010) notes that improved accessibility through the construction of freeways accelerates sprawl since it will reduce travelling time, reducing commuting costs; Glaeser and Kahn (2003) note car ownership also increases individual mobility, which is motivating people to live on the fringes.

Hall (2002) notes the effect of the railway and their terminus on England's peri-urban development. Salem et al. (2018), Appiah et al. (2014), and Ng'ayu (2015) agree with Bhatta's sentiments; however, Dodman et al. (2017) and Andreasen et al. (2017) posit that there is a mismatch between Peri-urban development and accessibility. Sun et al. (2011) also note that improved accessibility within the central city will push the poor to the fringes since the land rents will automatically rise.

#### **2.4.12 Impermanence Syndrome**

Brueckner (2000) posits that traditional land uses in the peri-urban region as less competitive compared to new urban land uses. Pennsylvania land trust association (2017) quoting Berry D. (1978) notes that the stability of farms is anchored on the adjacent farms. When one farmland is lost it triggers instability of the next one which prompts transaction for new land use. These transactions put peri-urban regions as zones of land transformation which accelerate the peri-urban development process (Thuo, 2010; Lasisi et al, 2017; Chazan and Cotter, 2001; Dung-Gwom and Rikko, 2006; Coulibay and Li, 2020; Lupala,2015).

#### **2.4.13 Policies and Regulations**

Zoning has been accused of driving extensive growth by withholding land from development in the name of conflict. Calder (2017) argues zoning reduces the supply of housing, triggering a rise in average housing cost; this supply is reduced through enforcement of densities, and minimum lot size as a well-exclusionary approach. The enforcement of designs through Zoning has implications on the cost of construction, which may prompt urbanites to move to the fringes where such regulations may apply (Andreasen et al., 2017). This aspect of withholding land has led to a rise in housing costs (Wickersham, 2000) forcing urbanites and developers into peri-urban regions



where land is cheaper (Brueckner, 2000; Olajuyigbe, 2016; Jordaan et al, 2004; Al Jarah et al, 2019). In cases where building heights are not allowed to be so high enough to accommodate densities, this automatically leads to leapfrogging of built-up areas into farmland to respond to the demand for housing but where building heights are highly encouraged the urban area is dense and hence promoting a compact city (Brueckner and Kim, 2003; Christiansen and Loftsgarden, 2011).

Ayonga (2019b), and Hayombe and Owino (2021) notes that African have inherited much of their urban laws from their colonialist like building codes and urban area by-laws which set building standards beyond reach for the locals as well as discourage urban agriculture. These inherited laws are unresponsive to current dynamics in spatial planning (Ayonga, 2019b; Hayombe and Owino, 2021). To cope with unresponsive laws Andreasen et al (2017) posit that urbanites move to the fringes to avoid house construction overhead associated with formality and stringent raw materials to be used in urban areas, in the fringes the colonial standard are avoided by lowering the cost of own occupier. Mandere et al (2010) and Ng'ayu (2015) findings also show that urbanites move to the peri-urban regions to practise agriculture which is not permitted in urban areas.

The dichotomy approach in the management of urban and countryside have accelerated Peri-urban development since lacunae in the management of peri-urban regions due to their nature of being neither urban nor rural (Hall, 2002; Narain et al, 2013; Žlender, 2021; Tiwari, 2019; Thuo, 2013). Ayonga (2019a) argues this as a major undoing in any attempt towards managing the two divides sentiments echoed by Hall (2002) by pointing out that management of the two divides would only be sustainable through regional planning and management approach. The gap in laws and regulations makes peri-urban regions attractive to the developers and urbanites because of the reduced cost associated with informality (Musyoka, 2004; Thuo, 2013; Ng'ayu, 2015; Akhter and Noon, 2015; Ayonga, 2019a).

#### **2.4.14 Lack of Institutional Capacities**

Saxena and Sharma (2015) posit that PUAs are characterized by the absence of an institutional structure in managing their development. Lack of administration structure leaves them managed through a multi-sectorial players approach (Ahmed and Dinye, 2011; Ng'ayu, 2015; Thuo, 2013;

Ricci, 2019), Bhatta (2010) notes through this disjointed approach, every player acts alone, each guided by their objective.

Dodman et al. (2017) posit this approach leaves the fringes vulnerable to developers who seek to exploit lacuna in their management. Basorun and Daramola (2015) Perceive peri-urban development in developing nations as a product of failure in policy implementation by authorities in charge of both urban areas and the countryside. Hayombe and Owino (2021) note the planning authorities are reluctant to prepare for unprecedented growth. Owusu (2013) further posits that the institution in charge of land management is usually weak. While Bhatta (2010) and Pablo (2014) note that institutions in charge of the management of urban growth lack capacity due to understaffing, unqualified personnel, and financially constrained. Owusu (2015), Ng'ayu (2015), and Al Jarah et al. (2019) also note that failure by authorities in developing plans that are critical in guiding development instead of opting to use old and obsolete plans is a major driver of peri-urban development.

Ng'ayu (2015) points out that the institution in charge has only been left to do land approvals. Even in areas with a plan and enough staff, enforcement is still a challenge due to lack of logistics (Ahmed and Dinye, 2011); this is further worsened by corruption and lack of political goodwill toward spatial planning (Bhatta, 2010).

While Salem et al. (2018) point to inadequacies in the law, making it impossible for local authorities to manage growth in agricultural land. Christiansen and Loftsgarden (2011), quoting Dosch (2009), posit that Peri-urban development may be deliberate efforts by local authorities in an attempt to make wide their revenue 'net,' Muller and Webster (2002) opine that this made possible through infrastructure investments as well as tax breaks.

#### **2.4.15 Access to land**

The land is the basis of all human existence (Nkwae, 2006). All development (social, economic, environmental) is dependent on it (Ibid). Of concern to the study is how land is accessed for urban development. The land is presented for urban development through formal and informal modes of delivery. In the formal model, land delivery is through government-laid procedures (Kironde,

1995); however, Musyoka (2004) notes that the formal model has been unable to meet the ever-rising demand for land for urban development.

The complexity can explain this inability of the formal way to meet demand and the expensive nature of the process, making it unfavourable for the urban poor who opt for informality (Lekuda, 2004; McGranahan and Satterthwaite, 2014).

The informal approach to urban land delivery is through private actors who may own it through virtue of previous occupation or acquisition or by customary law (Kironde, 1995); he further argues that such land is usually unplanned instead of land delivered through formal models. UN-HABITAT (2005), quoting the works of Clichevsky (2002), notes that for success to be realized, the two land delivery modes of land for urban development complement each other.

The delivery modes are of concern to access to land though of much concern is equitable access for both urban affluent and vulnerable urbanites. Land econometrics plays a critical role in this, the utility value being a significant driver (Jordaan et al., 2004). This utility value is driven by factors like accessibility, with well-serviced lots attracting higher prices than less serviced ones (Ibid).

The other element is the physical environment; as argued by Clawson (1962), Clark and Harvey (1965), Fox (2012), and Jordaan et al. (2004) that land values tend to be more expensive in areas that have good soil as well as relatively flat areas. These zones with quality soils and relatively flat tend to be zones for the urban rich and middle class, while poor environment quality tends to be the preferred zone for the urban poor due to lots of low pricing (Nkurunziza,2004; Jordaan et al.,2004; Clawson,1962; Trivelli,2010; Ngayu, 2011).

Access to good public services and amenities as fronted by Charles Tiebout model. He argues that people will pay more to have access to the best services and infrastructure which means that places with few and poor services are likely to attract the urban poor these sentiments are shared by Trivelli (2010).

Trivelli (2010) points at taxation as an element in play on land pricing and access to land, the land with high tax is considered to be high in returns so is the pricing, which tends to exclude the urban poor pushing them to zones of low economic returns.

This pricing approach then leads to the critical question of access to land by the urban poor. Various attempts have been carried out to ensure access to all urbanites, with the public acquisition advocated by scholars like Leduka (2004) on experiences in Botswana. However, he notes they were subject to corruption, while Musyoka (2004) points to the lack of information by poor urbanites in access to land. The free-market approach to access to land by all has always excluded the urban poor, which forces them to move to public land and environmentally sensitive areas where they set up temporal structures (Nkurunziza, 2004; Ng'ayu, 2011). The other approach embraced by the Kenyan government in the wake of independence was through purchase through cooperatives and self-help groups (Musyoka, 2004). These cooperatives and self-help approach was still not practical because it was beyond poor people's ability; even with government loans, it remained beyond reach (GoK, 1969). Owusu (2013) points the inability of the local authorities to control land transactions due to different tenures within the urban and the peripheries; he notes that potential buyers locate vacant land and negotiate through willing buyer willing sellers.

## **2.5 Effects of Peri-Urban Development on Peri-Urban Regions**

Changes that occur infringe due to urban sprawl have often been viewed as negative, but not all that is a result of Peri-urban development is evil. Peri-urban areas are foci of dynamic processes; during these processes, much of the transition zones character is altered.

### **2.5.1 Loss of Social Cohesion**

Peri-urban communities before urban intrusion are usually held together by strong social networks, and much of their events are communal; these are events like weddings (Bahaydar, 2013). Thuo (2013) argues that these strong bonds are due to ancestral bonds that usually occur in traditional communities where you find people of the same lineage occupying a particular area. Méndez-Lemus et al. (2017), quoting North (1994), opine that people engage in social networks when they share similar interests. However, Dieleman and Wegener (2004) argued that intrusion by urbanites into PUAs brings heterogeneity. The transforms PUAs from zones of maximum social interaction that are a character of rural areas to zones of minimal social interaction (Torres, 2011; Tiwari and Goel, 2017; Bahaydar, 2013; Owusu and Chigbu, 2020). Thuo (2013), explaining the weaker social interaction, acknowledges that the intruding urbanites already had their networks and had no connection to the peri-urban region.

Even though the argument fronted earlier quoted scholars justifying minimal social interactions, Brueckner and Largey (2008) refer to such arguments as an improper anti-sprawl argument. They further note such arguments as misguided because they are ignorant social interactions and densities involve externalities. However, these externalities are unaccounted for during land transactions, which Brueckner (2000) refers to as market failures. Through hypothesis testing, Nguyen (2010), Brueckner, and Largey (2008) found out that social interaction are lower in areas with high-density area.

### **2.5.2 Displacement of Locals**

As the city leapfrogs into these urban fringes, some of the locals relocate. Literature from the global North argues that PUAs are the zones where those ‘flying’ from the central city can reside based on their affluence and race, transforming PUAs into zones of social segregation. Even though Trivelli's (2010) arguments that segregation is driven majorly by land econometrics may be factual, this is debatable in developing nations. Unlike the fringes in the western world, characterized by good social amenities and physical infrastructure, the opposite is true in the developing nation's edges. A careful look at the studies by Thuo (2013), Appiah et al. (2014), Ng'ayu (2015), Olajuyigbe (2016) give a contradiction to segregation argument as fronted by western scholars. Africa's Peri-urban development is characterized by all classes unless there is a distortion of the Peri-urban development process through infrastructure provision hence out pricing some of the class of members of the society. Dieleman and Wegener (2004) posit the phenomenon of relocation of some locals through the ecological theory that once invasive species move in, it works very fast to colonize the new habitat. This migration by locals is the inability of the Locals to complete the available resources. Lupala (2015) noted that when urbanites intruded on the PUAs, the locals moved. The relocation was due to the space consumptive nature of traditional land forcing locals further into the hinterland. The relocation responds to land econometrics. The utility value of the land held by Locals grows, making it uneconomical for them to keep it on traditional use (Ng'ayu, 2015).

### **2.5.3 Loss of Social Character**

Peri-urban regions homogeneous character is altered with non-locals moving into the region (Le, 2020; Lupala, 2015; Coulibay and Li, 2020; Olajuyigbe, 2016; Shaw et al, 2020; Bahaydar, 2013). The moving in of people with different cultures social transformation takes place (Tiwari, 2019).

This means the rural conservative nature is replaced with urban culture (Thuo, 2013). Owusu and Chigbu (2020) Further posit that in case of unemployment due to landlessness and traditional land uses decline social decay manifests in attempt to respond to these challenges. Haller et al (2017) argue that one of these social ills are indulgence in crime and prostitution as coping mechanism ,they further note that the regions register rise in other social ills like drug abuse.

#### **2.5.4 Increase in Disputes and Landlessness**

Land in Africa is very emotional and complicated by the African customs associated with it. Most African cultures place the husband, the household head, as the owner, while in other parts of the continent like Ghana, the chief wields much power. With, Peri-urban development land values appreciate exponentially, and demand. The appreciation of land values and rise in demand motivates the household heads and those who wield power to sell land to urbanites. This selling, in most cases, leaves the vulnerable landless (Ng'ayu, 2015; Owusu and Chigbu, 2020). The locals who sell land to the urbanites may resell it when the owner takes long before developing it (Musyoka, 2004). When land is commoditized, vulnerable groups are likely to be excluded from accessing land due to speculative purchases (Mahendra, 2019).

#### **2.5.5 Livelihood Reconstruct**

Jordaan et al. (2004), Alonso (1960) notes that maximum marginal returns drive space allocation in an urban landscape and its environs. Brueckner (2000) and Fertner et al. (2016) opine that the traditional land uses in the fringe are unable to match marginal returns from new land uses; Ng'ayu (2015) notes this makes land conversions inevitable. The increase in the utility value of land in the fringes increases demand for land, which motivates parcellation (Coulibay and Li, 2020). The reduced farm size mark decline in farm incomes (Wanjiru, 2015), this impacts negatively on employment and per capita income (Piorr et al, 2011). In attempt to cope with the inevitable changes the locals venture in off farm income generating activities (Ng'ayu, 2015). Among these ventures as noted by Lupala (2015) and Adeboyejo and Abolade (2009) are shoe cobbling,tailoring,masonry ,hawking,motorcycle taxi and hair cutting.

#### **2.5.5 Food Insecurity**

Agriculture is the primary economic activity on the fringes (Narain et al, 2013). However, Wanjiru (2015) finding noted that returns from agriculture were way lower compared to residential

ventures. The decline in agricultural income motivates decline in agricultural activities including subsistence farming (Wegedie, 2018). The situation is further made worse by land parcellation motivated by land commodification (Kahn and Chen, 2021), with persuasion from the non-locals, the locals sell off their land (Wanjiru, 2015). The parcellation, selling off and land transformation leads to decline in farmland sizes (Adedire and Iweka, 2017), and Landlessness (Thuo, 2013; Ng'ayu, 2015; Lupala, 2015). The decline in farm land sizes and abandonment of agriculture leaves significant number of locals food insecure (FAO, 2011; EEA, 2006; Nechyba and Walsh, 2004; Sun et al., 2011; Omasire et al., 2020; Wegedie, 2018; Thuo, 2013; Mohammed et al., 2020; Oduro and Adamtey, 2017; Ng'ayu, 2015; Lupala, 2015). The argument of reducing farm productivity vis-a-vis land size is misplaced because the urbanites can optimize their small lots by doing dairy, poultry, and crop husbandry to complement their incomes (Appiah et al., 2014; Mandere, 2010; Ng'ayu, 2015). FAO (2017), in response to productivity, notes that demand for food is on the increase, and with technology, these small farms can be optimized, but the inability of these peri-urban farmers to afford such technology is a challenge. Wu (2008) is afraid that agriculture may soon be a thing of the past in the fringes due to impermanence syndrome and lack of capital to carry out farm intensification.

### **2.5.6 Poor Access to Basic Services**

Smith (2016) notes that essential services are a critical component to any form of human settlement. However Bahaydar (2013) posits that peri-urban areas are areas characterised by lack or poor access to basic services and infrastructure. The lack of these basic services and infrastructure is explained by uncontrolled and uncoordinated nature of peri-urban developments (Akhter and Noon, 2015; Lorens, 2008; Ngayu, 2011; Tiwari, 2019). The independence of decision making among the actors impacts negatively on densities which are critical parameters for service and infrastructure provision because of scattered developments (Li, 2017). Brueckner (2000) notes that failure to correct market failures and internalise cost of Peri-urban development makes it hard for local authority to finance basic service and infrastructure in areas that are not within their tax nets. Ngayu (2011) argues that this limited access to education for the poor is a pivotal contributor to social ills since it denies the youth an opportunity to employment.

### **2.5.7 Increase in Emission of Greenhouse Gases**

Peri-urban development is associated with reduced densities beyond urban boundaries aided by individual mobility (EEA, 2006; Piorr et al, 2011). Bahaydar (2013) posits that peri-urban areas lack functional public transport which has resulted into car dependency. Over reliance on the car and industrialization has a positive correlation with fuel consumption (Tiwari, 2019). Consumption of fossil fuels contributes significantly to emission of greenhouse gases the carbon (EEA, 2006; Patacchini et al, 2009). The car carbon emissions are challenge in ensuring countries stay committed to the goals in reducing emissions that are responsible for climate change (EEA, 2006; Putta and Ravadi, 2014).

### **2.5.8 Land Cover Change**

Urban sprawl has been associated with altering the natural environment on the fringes. One of the critical processes is transforming farmlands and vegetated areas into concrete jungles (EEA, 2006). This affects food security and adversely affects biodiversity and the hydrological cycle. The loss of vegetation cover compromises the health of watersheds (Simon, 2008). Lupala (2015) and Haller et al. (2017) note that the displacement of farmers from the fringes affects the environment beyond PUAs since the demand for land is met elsewhere with more land cover lost to give way to agriculture.

### **2.5.9 Degrading Environmentally Sensitive Areas**

The other environmental concern brought about by urban sprawl is the demand for building raw material; Simon (2008) notes that some of this demand is met through extraction in ecologically sensitive areas like rivers where they harvest sand, rocks, and timber from forests.

### **2.5.9 Poor Waste Management**

As the population keeps relocating in PUAs zones already characterized by lack of primary infrastructure challenge in waste disposal manifests, Thuo (2013) points this to poor waste management strategies in the fringes is attributed to indiscriminate solid and liquid waste disposal. With improved accessibility and higher individual mobility, so are an increase in greenhouse gases and noise pollution (EEA, 2006).



### **2.5.10 Economic Transformation**

Peri-urban development renders large spaces demanding traditional land uses uncompetitive due to the rise in the utility value of the land on the fringes. The competitiveness of conventional land use is further worsened by poverty levels that trigger the impermanence syndrome among the Locals. In an attempt to survive, the Locals diversify their livelihood strategies. Ricci (2019) and Owusu and Chigbu (2020) note some of these survival ventures include trade and small businesses, others being artisans, carpentry, masonry, and plumbing while others seek employment.

Ng'ayu (2015), Owusu, and Chigbu (2020) note that financially well-off venture into rentals while others maximize their small parcels of land for optimal production like poultry and dairy farming.

### **2.5.11 Increased Productivity and Access to Market**

Peri-urban development positively impacts farmers in the peri-urban since the population moving to their areas presents a market for their produce, especially the perishable products, promoting productivity and increased marginal returns from farming.

This also brings about access to information by farmers due to technologies brought into peri-urban space, enabling them to learn about the fluctuation of supplies and demand as well as extension services through internet extension services and infrastructure (concrete carpets) that allows them to access the central urban markets and can respond to consumer preferences as well as reduced cost of production due to lesser cost incurred by farm input firms in transporting their products to their areas (Simon, 2008).

Simon further points out that due to the exploitative nature of free markets, the households or farmers in peri-urban space can come together and sell their produce as an organization, this increases their bargaining power and others to extend of value addition which ensures farmers get maximum returns from their ventures.

### **2.5.12 Provision of Employment**

The movement of industrial establishments and other establishments in the peri-urban space presents employment for the peri-urban population.

The relocation of the centre seeks labour, but the population living in the urban cores find it expensive to commute daily to the peri-urban. An argument that Haller (2017) and Sun et al. (2011)

partially disagrees, pointing out that many of these establishments would require skilled labour, which is missing in the peri-urban but will employ semi-skilled and unskilled from these peri-urban spaces. There is also the phase when construction is high in these regions. The unskilled and semi-skilled nature of the peri-urban population is hired as Mason, casual labourers. In contrast, others turn to food vending in response to the demand for food created in these construction sites (Lupala, 2015).

### **2.5.13 Increased Opportunities and High Return Ventures**

Peri-urban development presents an opportunity for locals to venture in investment with higher marginal returns like housing this ensures that they do not suffer much from inflation of global and local economies hence ensuring reliability in terms of economic investments in the peri-urban regions (Clark and Harvey, 1965; Ng'ayu, 2015; Mutua, 2013; Mandere et al, 2010).

### **2.5.14 Increased Cost of Service Provision and Infrastructure Investment**

The fringes are characterised by discontinuous development. This lack of densities makes it costly to provide essential services like solid waste management and the provision of social infrastructure and physical infrastructure (EEA, 2006).

Mancebo (2008), Brueckner (2000) and (Ng'ayu 2015) point out that cost provision is made costly by the fact that local authorities rarely pass the cost of these infrastructure investments and service provisions to the developers and new homeowners, which makes developing in these regions cheaper. The price is shared with all populations, which are considered a market failure.

Mancebo (2008) points out that for the local authorities to provide services, they must increase their revenue generation. Barnes et al. (2002) note that this can only be achieved by imposing higher taxes raising on residents.

### **2.5.15 Land Hoarding and Speculation**

Private and public sector actors tend to hoard land because it is expected to be more significantly appreciated than other assets. Farmers cease production and leave land fallow as they wait for urban development opportunities to arise in the city's periphery; once they appear, they sell the land and move their agricultural production further away.

After making gains from sales of land near the city, they move away from Government-controlled land and wait for the town to grow closer to the newly acquired land, then sell it at a higher price (Mahendra, 2019; Lupala, 2015; Ralph and William, 2001) this then distorts the perfect market on supply and demand for land. Distorts the perfect market on supply and demand for land.

## **2.6 Peri-Urban Growth Management and Governance Options**

Peri-urban development is the trickle-down effect of urban areas (Van Dijk and Fransler, 2008). Though noted as the process of providing a solution to a city's problem and deprived rural areas; from urban planning, natural resource management, and economics critical view sustainability of this model of urban expansion is questionable (Allen, 2003). Resources are scarce, the land is finite, and climate change is of concern as humans seek to satisfy their eternal needs. From the concerns raised, there is a need to urbanize sustainably. Allen (2003) notes that complexity in Peri-urban development process cannot be addressed from focus on urban areas alone, Tacoli (1998) further notes that dichotomy approach in managing the two divides make peri-urban growth persist. Therefore it is illusion to propose models on managing the city to avoid Peri-urban development and failing to propose countryside approaches. This section therefore reviews approaches to managing growth of peri-urban areas in two broader categories that is the urban and countryside management.

### **2.6.1 Previous Planning Efforts on Managing Urban Growth**

Planning has presented many options in managing the growth of urban areas. Therefore, it would be ignorant of this study to propose models of managing urban areas without a review of Kenya's efforts, which paint a glimpse picture of all Anglophone countries. Urban growth management in these former colonies can be understood very well if discussed in phases of urbanization as experienced in these nations. Therefore, this section discusses management approaches during the colonial period and post-independence.

### **2.6.2 Urban Management during Colonial Period**

The dual mandate guided colonial laws and regulations. Their primary goal was to balance developing colonial resources and protecting indigenous ways of life (Hay and Harris, 2006; Home, 2012). The dual mandate was to be achieved by regulating the African population in the urban areas through native passes regulation of 1900 and an ordinance of 1903 (Home, 2012). The

dual approach was followed by a differentiation land tenure system (Home, 2012). The birth of white settlers and tribal trust land system took away customary land management system with all responsibility placed on the colonialist through the crown land ordinance. The colonizers further felt urbanization was not African; this excluded their endeavours in land allocation and ownership within towns (Ayonga, 2019a; Hay and Harris, 2006; Home, 2012; Home, 2021; Kitur 2019).

The colonizer further planned for Asians and Europeans a move that ensured that Locals were excluded in the urban areas (Ayonga, 2019a; Home, 2012; Home, 2021); however, Hay and Harris (2006) argue that this wasn't the case because accommodation of the Locals was the responsibility of the employer under master and servant ordinance of 1919. The compliance to the responsibility wasn't adhered to, which led to African working in towns moving to the fringes (Hay and Harris, 2006). These fringes weren't planned and lacked "decent housing" and basic facilities (Hay and Harris, 2006), this description befits same picture painted by Hall (2002) on settlement in Europe in the wake of the industrial revolution. Hay and Harris (2006) note that the employees would still move to the fringes even where housing was provided for. The unaffordability of the housing partially drove the relocation to the fringes (Hay and Harris, 2006). The Locals felt that the fringes had a sense of identity (Ayonga, 2019a). On infrastructure development, the urban areas were characterized by high infrastructure investment compared to the hinterland; access to essential services made urban areas of the colonial era "bright area". This colonial legacy shaped and informed the trajectory of urban development in the years and decades after independence (Ngai, 2013; Home, 2021).

### **2.6.3 Post-Colonial Urban Areas Management**

Attaining independence marked a beginning for the young nation; so were the reforms in the law. One of the critical undoing that would accelerate informality was **dismantling planning laws**, creating a dichotomy in the management of urban areas and the countryside (Ayonga, 2019b). Home (2012, 2021) notes **that dichotomy in land administration** further accelerated informality with politicians grabbing urban land banks. **The lifting of colonial pass laws** saw massive rural-urban migration (Morgan, 1969). However, the country in sessional paper 10 of 1965 played ignorant of these movements. It further argued that **capital investments were only focussed in high potential areas** encouraging migration from low productive areas to these high potential zones (GoK, 1965). By the late 1960s, the pressure was mounting in the primary towns,

and the government sought to address these challenges through **the development of secondary towns and models for service provision** (GoK, 1969). It further sought to **delocalize centres of employment** (GoK, 1969); however, these efforts yielded no fruit (Evan, 1989), which meant primary towns remained essential centres of employment. The failure brought with it a housing problem, with the government unable to meet the demand and economic decline, much population moved to the fringes and constructed houses (GoK, 1969). Squatters were now faced with a lack of essential services which government sought to provide through **site and service**. Housing being the primary challenge government devised a solution where was to **purchase land, promote densification, and rent controls** (GoK, 1969).

GoK (1973) pointed that the organic growth of towns was no longer sustainable. It, therefore, proposed **the preparation of comprehensive physical plans** to guide development. The housing problem persisted, but local authorities were unable to initiate housing projects, and so were delays in land acquisition as proposed in GoK (1969). This prompted the government to **encourage the private sector to invest in housing to meet housing demand**; this was to be complemented by **rent controls** and promoting **the use of local materials to lower the cost of housing**. However, Evan (1989) notes that **failure to implement the policies** promoted state of disorder in urban growth and deprived countryside.

### **2.6.5 Urban management towards regulating growth of peri-urban areas**

Yin and Sun (2007) opine that urban sprawl is caused by some government action and further point out that the government can solve its undoing, sentiments that Christiansen and Loftsgarden (2011) concur. Governance is critical in dictating the development and management of land so is the role of planning entrusted to the authorities. However, the question of the effectiveness of the public sector has always been a subject of interest to scholars. Many scholars point out the multi-disciplinary approach and multilevel governance in managing areas beyond the urban space.

Pierr et al (2011) recommends that disjointed approach failure can only be addressed through special public administration arrangements. Either through the introduction or empowerment of metropolitan government structure or compulsory association of lower-level administrative units or through planning policies that give control function to the higher government over the lower government plans in the rural-urban region.

### 2.6.6 Growth Management Strategies

Growth management is usually strategic plans and not a muddling-through approach to urban undesirables. They are usually adopted with a broader goal that programs are designed to achieve; this is usually with wide-ranging objectives; an overall statement keeps the citizens and the political class focussed on what they want to achieve (Lennon, 2001).

However, they are faced with a challenge on consequences of a choice made by the local authorities as well as the political wing in planning exercises (Fertner et al., 2016), Cilliers (2016) further points out that despite the development of more tools towards shaping urban growth recent development challenges show that urban spaces are becoming more complex and urban form is influenced by growing economic sector and expanding road transport network which operates across boundaries and between local jurisdiction.

Cilliers' (2016) argument acknowledges economy and transport as critical sectors in the urban and rural arena. She further acknowledges that city growth is driven by the centripetal and centrifugal forces.

Various approaches have been put forward as a remedy to curbing Peri-urban development with some guided by compact city hypothesis then question of densities being increased because it doesn't indicate which densities are being proposed, is it densities on residential areas or densities in terms of commercial activities, or mixed-use? Does this compactness address the challenges in the core? Even with the urban renewal, is it as per the preference of the urban population? The compact approach seems unrealistic to point at issues on demands of economics, environmental sustainability, and social aspects of society.

On decentralization school of thought that new town development concept as witnessed in new towns act of England in 1946 a solution, and going as per England experience most of the urban population refused to move to the new towns despite incentives on employment (Prakasa et al, 2018; Clapson, 2017).

### **2.6.7 Urban Growth Boundaries**

UGBs act as growth limits of an urban area. With the limits of compactness, development is promoted in turn, preserving the countryside. This approach to managing urban growth is a necessary evil in the urban sphere (Loughman et al., 2011).

However, Fertner et al. (2016) note that their efficiency is questionable without strong integrated governance and strong stakeholder engagement. Success has been dramatically achieved in Copenhagen and Oregon through strong participatory and multilevel land use and planning (Miljković et al., 2012).

For their effectiveness, it has been used with the green belts (Fertner et al., 2016) while (Hall 2002) brings the concept of urban service boundary famous in some parts of North America. Brueckner (2000) argument these boundaries need to be strategically demarcated with future demand for land adequately addressed. Failure to correctly predict future needs is a danger of being too stringent which restricts the city from meeting the demand of urbanites. Stringed boundaries will lead to over densification and higher rents as well as accelerated decay. However, to address the dynamic city demands, timely boundary reviews are done in regions like Oregon and Copenhagen (Fertner et al., 2016; Loughman et al., 2011). These reviews are also guided by zoning, which ensures infill's to less active land uses in the city region (Hiller et al., 2013; Nechyba and Walsh, 2004). The integrated approach ensures that infrastructure developments that are some key drivers to Peri-urban development are sustainably managed.

### **2.6.7 Urban Services Area Boundary**

Also popularly referred to as the USA, This strategy used by local authorities focuses on investing both social and physical infrastructure only in its sphere of influence based on need present or projected. To address the challenge of sprawl, it sets boundaries upon which it cannot provide services (Hall, 2002).

This strategy has been employed by Kings county local authority by reducing the sphere of influence through service provision; this reduces sprawl motivated by speculation and price inflation and any chances of rendering agriculture economically unviable (American Farmland Trust, 2013). The efficiency of this strategy relies on good spatial planning, which can correctly project future land needs and enforcement. The urban sphere of influence is further made

successful through regular review and revising of the sphere of influence. However, as this strategy tries to find its relevance in urban space, it's blind to the fly-in fly-out concept where the people living on the fringes tend to move in the city to access facilities and services, later going back to their homes in the periphery.

### **2.6.8 Green Belts**

GBs ensure effective control of peri-urban development, promote ecological environment protection, and contribute to the development of satellite cities and provide recreational space for Metropolis residents (Xie et al., 2020). Xie et al. point out they have been implemented in Europe, North America, Asia; however, their success still in question; in case of England, Hall (2002) points that 1950s with governments had a negative stand on the growth of urban areas, it actively encouraged county authorities to make plans for a green belt around all her cities, this was majorly aimed at stopping greenfield developments as well as protecting conservation areas.

However, Hall (2002) notes that despite this strict urban containment, the population was over spilling beyond the green belts with urban areas experiencing a lot of flight; he argues that could be attributed to the weak regional planning. Shimizu (2017) notes that for efficiency, urban planning has to correctly project future demands of the city failure, which would lead to events as pointed by Hall (2002) and Tokyo and Shanghai where the government was forced to abandon the containment efforts to meet rising housing demand.

Xie et al. (2020), in their comparative study on efficiency strict implementation of the green belt as urban growth control against sprawl, pointed there is no evidence to show they can control sprawl.

Green belts have come under criticism for causing havoc in the urban core since, in its attempt to control the growth of urban areas, this puts pressure on housing. Due to limited land supply, the housing cost rises to put it beyond some of the residents, so are negatives associated with increased densities (Kong, 2012; Hall, 2002).



### **2.6.9 Enhancing Urban Attraction and Accommodation Capacities strategy**

Aesthetics and quality of life in the urban centres are critical factors that drive urbanites to PUAs. To address bright urban areas, carry out urban renewal projects in deprived areas to retain or increase accommodation capacity.

Infrastructure plays a vital role in urban renewal as well as in the implementation of urban development strategies. Many cities use infrastructure projects to trigger urban development in particular areas and pressure others (Fertner et al., 2016; Hiller et al., 2013).

However, this urban renewal has to take place in the context of new urbanism where in case of transport network has to cater for all road users while at the same time factoring in connectivity between commercial areas, residential and places of work (Prakasa et al., 2018). However, Jacobs (1961) warns that the rationality approach in carrying out this strategy is detrimental, proposing a public participation approach for success and emphasising streets and sidewalks as venues where society interacts.

Urban renewal seems to be a success story but a blind eye to the economics of housing and land delivery markets, especially when ownership isn't public. Essential economics point that when improvements are made, the value of any commodities rises, so will the housing cost in these renewed urban areas. UN-HABITAT (2015) notes that urban renewal tends to displace the urban poor from renewed areas to areas that can afford to house.

### **2.6.10 Market-Based Tools and Incentives**

Market-based approaches are seen as a breakthrough in farm preservation because traditional approaches have been arguably ineffective (Wang et al., 2020). One market-based approach has been employed in Marin County, where agriculture is the main economic activity. Threatened by the development of transport corridor and establishment of an urban centre, environmentalists, landowners and political leaders came together to plan for farmland preservation; the forum further started paying off ranchers and farmers to relinquish development value of their land and purchasing agricultural easement, thereby protecting farmlands (American Farmland Trust, 2013) this is further made successful through zoning reinforcement. Fertner et al. (2016) posit that The Hague land purchasing approach is one most successful market-based approaches where local

authorities seek financing from the National government and purchase land that serves as a land bank but is leased to farmers. Land banking puts land in the fringe under local authority control.

The other market approach in farm preserve is the transfer of development rights popular as TDR. The application of these TDRs is not uniform; however, McConnell et al. (2005) note that they are guided by one fundamental principle: landowners are allowed to sell development rights to their buyers who use them to increase densities more than permitted in basic zoning. This approach is anchored on zoning (McConnell et al., 2005; Wang et al., 2020). The land management system under TDR zones areas into two broader regions “the sending area,” which usual area areas zoned for preservation characterised by low densities, with “Receiving areas”, which are areas of high densities can trade rights for more densification than those indicated in zoning regulations(McConnell et al.,2005). The TDR approach in Calvert County in Maryland is a success story; however, Malibu in California has not achieved much. McConnell et al. (2005) posit that the success of TDR is also dependant on the general objective for land use planning, where the objective of the two conflicts means the failure of TDRs.

Beyond North America, China has adopted the TDR approach through the Chongqing Land quotas trading program, which started in 2008 (Wang et al., 2020). The land was first consolidated and zoned into development, sending rural areas with rural farmers to reclaim constructed land to viable farms and register it with Chongqing County land exchange; the rural farmlands are leased to large-scale farmers for agriculture. While receiving areas where demand for land for urban development is high, development rights are sold to real estate developers (Wang et al., 2020). Wang et al. (2020) found out this program was practical and was able to increase farmland through the restoration of constructed land to viable farmlands.

### **2.6.11 Zoning and Land Use Planning**

Hall (2002) defines Zoning as the segregation of different land uses. He further notes that American Zoning shouldn't be mistaken as planning but anchored on policing power and doesn't need a plan to direct its course. Hall (2002) credits zoning with the separation of incompatible land uses in the British planning system. However, he acknowledges the inability of the tool in safeguarding the hinterland from urban intrusion where the British planning system applies.

In general, zoning and land use planning are standard measures to influence the urban form and are arguably cheaper. However, Zoning has been accused of driving extensive growth by withholding land from development in the name of conflict. Calder (2017) argues Zoning reduces the supply of housing, triggering a rise in average housing cost; this supply is reduced through enforcement of densities, and minimum lot size as a well-exclusionary approach. The enforcement of designs through Zoning has implications on the cost of construction, which may prompt urbanites to move to the fringes where such regulations may apply (Andreasen et al., 2017). This aspect of withholding land has led to a rise in housing costs (Wickersham, 2000).

Lai and Han (2012) note that even though Zoning is pointed to as a reason for redirecting developments in the greenfield that is not the case since the economics of target marginal returns drives developer decisions to develop. This psychological approach then makes greenfields a favourable site for development.

Mancebo (2008), quoting the works of Crouzet (2003), blames zoning for car dependency by pointing out that the economic growth in the core makes offices intrude into residential zones forcing urbanites out since these areas are rezoned. This makes the working population move elsewhere in search of housing with more preference to peri-urban areas where space for housing is available.

Most above quoted scholars' arguments create an illusion that Zoning is a vital tool in development control, an argument that Hall (2002) squashes by pointing its prone to abuse, especially where the proponent yields power or s/he is persistent enough s/he will get the change of use. The other critical challenge is correctly estimating land demand and allocation. Urban areas are subject to shocks responsible for the outward growth and shrinking of urban areas, rarely planned for. To address such challenges, constant reviews are critical and solid for law enforcement and commitment (Fertner et al., 2016; Hiller et al., 2013).

Land use planning is considered a critical process toward sustainable urban growth. However, it has some challenges because its success lies in preparation, with implementation being critical (Hersperger et al., 2018).

Land use planning is a political process that, if not anchored on the critical pillar of citizen participation, can lead to only the interest of the rich and powerful being taken care of (Ibid). The

challenge of fragmentation of institutions and weaker laws and capacity of spatial plans to coordinate infrastructure development beyond its jurisdiction significantly when National & local government priority infrastructure differ (PLUREL, 2011).

### **2.6.12 Growth Management Policies**

Yin and Sun (2007) opine that urban sprawl is caused by some government action and further point out that the government can solve its undoing. Christiansen and Loftsgarden (2011) and Webster and Muller (2002) note the public sector as a critical player in dictating the development and management of land. Anthony (2004) posit government have come up with legislation aimed at ensuring smart growth, these regulations can be at the local scale, and regional scale. However Yun and Sun (2007) argue there is a need for the regional governments to be involved in the management of urban areas since the spill overs happen beyond the urban containment boundaries, these spill overs may be a deliberate action by those in power in local management authority in these urban areas to serve self-interest, or the municipality having different competing objectives that are geared towards revenue generation as opposed to compactness as well as lack of capacities due to limited resources. The regional government involvement is further critical since it develops mega policies on land uses, non-land policies, and capital investments that may significantly impact land uses.

### **2.6.13 Anti-Sprawl and Anti-Peri-urban development Policies**

Failure of free markets results in suboptimal use of land within urban cape for the local authorities to realise compactness in development, they can come up with policies that seek to internalise the cost of public infrastructure from loss of open space at the urban fringe and congestion taxes could be imposed to internalise externalities from an individual location. However, committing decisions (Nechyba and Walsh, 2004) may lead to segregation, and further drive sprawl since the urban poor who cannot meet the cost of moving to the fringes are left in the central city, which may magnify blight. On property tax Brueckner and Kim (2003) pointed out that there was a relationship between peri-urban development and taxation in a situation where substitution of housing and other goods is low, further suggesting that high-density development was subjected to higher tax, a move that encouraged low-density development, addressed incentive for development that encourages compactness.

Transport has been pointed out as one of the critical drivers of peri-urban development; Nechyba and Walsh (2004) opine that to address this concern, a mass transit commuter system must be put in place with outer transit stations same sentiments shared by Paterson et al. (2003), this strategy seems to have worked in Copenhagen with its finger plan. Still, it has been integrated with non-motorized with enhanced walkability, as pointed out by Theart (2007), however in the case of England, these stations proved to be the catalyst of peri-urban development. Nechyba and Walsh further propose the radical idea by Glaeser and Kahn and Kahn (2003) that to address the issue of the poor being left in the central city, it would be good to subsidise the cost of owning a car as well as a taxi to open up opportunities an idea that is ignorant of the role car in peri-urban development.

The increase in car ownership is one of the key contributors to blight in the core since they lead to longer travel hours and carbon emissions. Any transport policy towards curbing sprawl should discourage car ownership and encourage public transport. This can be achieved by having few parking spaces within the urban core and a high parking fee charge, as is the case with Copenhagen. Paterson et al. (2003), on addressing sprawl recommended policy action on transport like raising the cost of gasoline through taxation, road pricing, tolls roads, distance-based tax, and parking restrictions, this strategy as per Paterson's recommendation on meeting the travel demand, should be accompanied by the development of light railway system, rapid bus transport however some radical ideas like the rising cost of gasoline may have a considerable impact on the cost of living in the urban core as well as magnifying the segregation aspect as pointed out by Nechyba and Walsh (2004).

#### **2.6.14 Applicability of these Approaches in Kitui Town**

Ayonga (2019a) notes that western borrowed concepts of planning are the genesis of failure in developing nations. However, Western countries' approach provides a path toward fostering a sustainable urban-fringe relationship. One of the proposals for the management of the urban-fringe divide is an integrated approach. In Kitui town, this would not be a solution since the town falls entirely in Kitui county and Kitui municipality. However, the law creates two bodies, the County government, and the Municipal; all agents in a management report to the municipal board report to the minister in charge of physical planning.

The Peri-urban development problem could be solved through integrated development planning. The future town's needs should be projected while preserving farms, and urban growth boundary demarcated subject to review after a specific period. The consideration to address the growing demand for future urban land can embrace the transfer of development rights. But with the low marginal returns of agriculture due to parcellation, a radical approach towards land consolidation is of the essence. Consolidation would ensure agricultural land is not vulnerable but productive as well. The approach would also see coordinated urbanization rather than leapfrogging developments. The Municipal board could also set funding aside for incremental urban land banking, which may serve as open spaces as the land awaits demand from the city.

On anti-sprawl policies like lack of car parks and discouraging car, ownership may not be applicable in Kitui town since the town doesn't have a functional public transport system.

The other applicable effort in the town would be the involvement of the national government in implementing key infrastructure projects where corridor planning is done to discourage TODs.

## **2.7 Case Studies**

### **2.7.1 Gauteng Province in South Africa**

The province is home to some of the largest cities in Africa that are Johannesburg and Pretoria were faced with peri-urban development problems just like other urban areas in the world (Britz and Meyer, 2006). To address this concern it delineated the Gauteng urban edge in 2001. In this edge delineation it came up with three distinct lines to protect environmental assets, one of the lines was the green line which was meant to protect valuable environmental assets (Britz and Meyer, 2006). The second one was the Red line which was aimed at managing the disjointed growth of the city then there was the coastal protection line aimed at protecting eroding coastal lines against urban development(Ibid). The primary aim of the policy was to farm preserve while enhancing urban areas accommodating capacity through densification. The red line was however amendable after evaluation of the demand for land for urban development. However, the policy was faced with challenges from its conception, during the delineation of the edges municipalities' engagement was limited, which meant that demarcation didn't take into account growth projections and demand for land for urban development(Horn,2009). Horn (2009) further notes that the policy lacked legal backing and acceptability in all municipalities within the province

(Horn, 2009). This ambiguity in law and lack of political goodwill saw peri-urban development problem persist. The approach to urban containment as per the policy was a short term however Horn (2009) notes that there is no broader strategy to aid the urban edge policy which means the edge with a provision for annual review making it rigid and unresponsive to medium and long-term changes. The other reasons for the failure of the policy were that every municipality acted alone in management, and the disjointed approach to implementing the policy hindered its effectiveness (Horn, 2009).

### **2.7.2 City of Cape Town South Africa**

The city of Cape town having suffered low-density development and immense Peri-urban development came up with the urban edge policy in 2001 (Horn,2019; Future Cape Town, 2013; CitySpace). The objective of the policy was to protect and conserves natural, agricultural, and historical resources, while sustainably managing these resources; prevent Peri-urban development, and curtail the pattern of low-density, haphazard and discontinuous development; promote a more efficient, safe, equitable, and accessible urban structure through containing and intensifying urban development; support the development of a viable public transport system and improve levels of access, especially by the poor, to the City's resources and amenities; rationalize infrastructure and service delivery to designated and consolidated urban areas; and provide landowners and property investors with certainty regarding where urban development is envisaged in the short-term, and where it is not envisaged (CitySpace; Future Cape Town, 2013). To address uncontrolled development, the policy encouraged densification and more compact development (CitySpace). This edge is reviewed once every ten years informed by the city's plans and directives, review must be guided by long-term future, this review should be done through public participation, amendments must be guided by a focus on compactness, and public areas must be maintained, agricultural land must be protected. The edge is regarded as a success but just like the Gauteng edge, it lacks statutory force (Sinclair-Smith, 2014). The policy is also criticised for ambiguity which has led to the approval of developments that are out of character with areas zoned to be areas of no growth. In its implementation, the edge was criticised for a sharp increase in land prices

due to its constraining nature (Sinclair-Smith, 2014) The approach also suffered from a lack of political goodwill since the political class and private developers made edges porous (Future Cape Town, 2013; Sinclair-Smith, 2014) , which made the city work on how to correctly project on future demands of land for urban development. The challenge was that Cape Town city is However in the year 2017 the city adopted an alternative method of managing growth since the urban edge was considered problematic to the city's objective because the city is a low-density development oriented. The Cape Town city spatial framework of 2017 adopted the urban service boundary (USB) this approach only allows development in areas where basic infrastructure is available (Horn, 2019).

#### **2.7.4 Lessons Learnt from Case Studies**

As argued by system theory, urban areas are not isolated spaces and are subject to what happens beyond their jurisdiction affects them. Therefore, the management of these entities should not limit their power in managing them as separate entities experiences from the city of Cape Town and Gauteng province point towards the need for an integrated approach guided by political goodwill as well as citizen participation in decision-making. Land supply for urban development should be formally delivered if urban areas are to develop sustainably.

#### **2.8 Theoretical Framework**

This chapter helps research maintain focus as well as help the analytical approach because studies are carried out based on established explanations of a phenomenon and relationship in an attempt to approve or disapprove of the existing explanation (Grant and Osanloo, 2014) The chapter has focused on social and economic theories that attempt to explain the driving force to Peri-urban development.

##### **2.8.1 Bid Rent Theory**

The theory's primary focus is on cost related to location choices and marginal returns by various land use. Alonso fronted this theory in 1960 in an attempt to improve on the works of Von Thunen. *The urban land market theory* postulates that land allocation is about competitiveness between key urban land uses, the commercial, industrial, residential and agricultural, with accessibility as a critical component to their utility value (Alonso, 1960; Kivell, 1993; Jordaan et al., 2004).land utility value as a function of distance from the urban core where there is maximum



accessibility. This theory explains why utility value will always dictate land use in urban areas and their surroundings. Land uses with higher marginal returns will always invade and succeed in less competitive ones. All activities are optimally located at a point where utility value is maximised (Duranton and Puga, 2013; Jordaan et al., 2004; Bochnovic, 2014). Due to these trade-offs, the private household and firm's location choices reflect maximum utility (Kleeman et al., 2017).

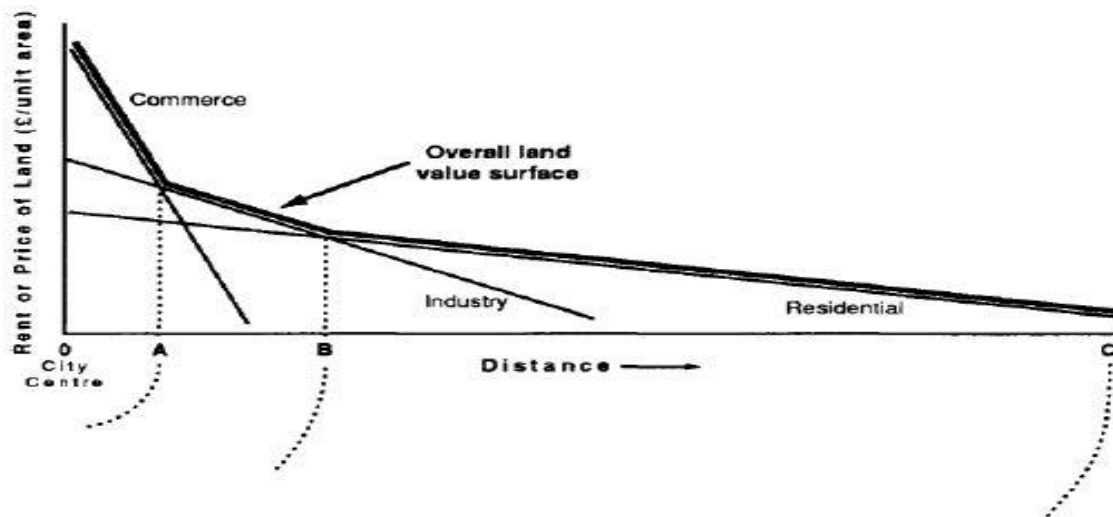
Chidi (2019) posits that commuting costs influence residential location choices; Duranton and Puga (2013) further note these choices are made based on a trade-off between the cost of rent in the inner city and the cost of commuting which is further influenced by income.

According to this model, the location choice, especially in residential, would mean that those living closer to the core are wealthier. However, this is not usually the case because the choice of residential location is mostly dictated by the ability to pay for overheads associated with larger spaces. So the poorer will be near the core where densities are high with smaller parcels of land but associated with reduced cost of transport while the rich population with personal preference for larger spaces but the higher commuter cost (Bochnovic, 2014; Jordaan et al., 2004; Kleeman et al., 2017).

From the understanding of the theory, low returns from agriculture in the PUAs (Peri-urban areas) may be the driving force behind the rural population opting to sell off their land and the conversion of their land to uses that have higher marginal returns. In the choice of residential location, the preference for larger spaces complemented by higher income and accessibility are pointed out as critical factors that may propel growth beyond urban areas. The theory further informs the study on how technological advancement, good infrastructure, and rising household incomes trigger urbanites to the resident on the edges due to increased individual mobility and changing lifestyles. In efforts to keep urbanites in the city area, the theory informs the study that urban renewal may not be successful because it improves accessibility which triggers rents upward.

In the study area, the competition between land uses may be a factor since proximity to the urban areas allows the locals to invest in high-return ventures. The increased individual mobility has also disrupted the need for the public system so people can locate away from the urban core without the need to worry about how to travel to their place of work and back home.

**Figure 1: Bid-Rent Model**



Source: (Kivell, 1993)

### 2.8.2 Ocean Wave Analogue Theory

The focus of the is on how embryonic urban area serves as a magnet to population and activities which in turn become repulsive due to the high cost of space per person as well as degradation of the quality of the urban environment. Fronted by Hans Blumenfeld in 1964 the theory is an attempt to explain the urban growth pattern. He argues that traditional cities will always grow to the fringes. The embryonic city has all activities centred in the urban core (Mieszkowski and Mills,1993). The centralization of economic activities triggers two-wave the pull factor responsible for migration from the hinterland to the city, and the short distance wave, the push factor, which is responsible for the urbanities moving to the peripheries (Blumenfeld, 1964). In 1971, Boyce advanced Blumenfeld’s work by positing that the core is the origin of the ocean waves (Van Dijk and Fransler, 2008). He opines that the core is responsible for what happens on the fringes.

Boyce identifies three critical “waves”; the recession wave, precession wave, and tidal wave. During the recession wave, the urbanites “flee” to the fringes due to blight in the city; however, the transformation processes are unnoticeable (Ayonga, 2019b).

This wave is followed by attempts to restore the core’s attractiveness through regeneration, which generates the second wave, “precession,” and triggers turbulence, causing a rise in land rents and a change in land ownership. This rise in property values generates the tidal wave, which alters the

fringes' character through massive movements to the fringe by firms and households (Van Dijk and Fransler, 2008).

This theory points in the same direction as flight from blight and bid-rent theory. Still, it is informative to the study since it notes that urban regeneration is not a solution to Peri-urban development. This attempt only forces the poor out of the city since the cost associated with accessibility forces them to areas less accessible. In the study area, attempts are being made to regenerate the urban core

### **2.8.3 Flight from Blight Theory**

The theory was advanced by Mieszkowski and Mills in 1993. The theory is an attempt to explain how choices are made on where to locate firms and households in reaction to the blighted core. The theory argues that Peri-urban development is a product of fiscal and social stress related to the city's core. Urban decay is a push factor for affluent city populations to the peripheries in search of a serene environment, a homogenous society that will see them get a taste of social amenities that match their income and their preferences (Owusu and Chigbu, 2020; Mieszkowski and Mills, 1993; Bayoh et al., 2002). Clark and Harvey (1965) note that due to this congestion people move to the peripheries in an attempt to reconnect with village life. The relevance of the theory to the study is the attempt to explain why people relocate to the peripheries which is one of the key questions the study sought to address.

## **2.9 Legal and Policy Framework**

This chapter reviews relevant policies and legal documents to have a deeper understanding of the motivating factors and measures to counter Peri-urban development.

### **2.9.1 Sustainable Development Goals**

Sustainable development goal one seeks to reduce extreme poverty, securing land tenure, service provision, and access to all while goal eleven seeks to achieve land use efficiency and effective management of urban growth.

SDG 11 is critical to the study since it acknowledges the challenges in the city that lead manifestation of the Peri-urban development phenomena which are; urban decay, inaccessibility

to affordable housing, transport infrastructure, limited citizen participation which lead to exclusion, and expansion of urban areas to its hinterland. The goal also offers a solution to the urban-rural planning dichotomy through its advocacy for regional and national planning which are argued to be the solution to the phenomenon. While goal one is sensitive to poverty which is key to land transfers, insecurity in land tenure as well as poor service access.

### **2.9.2 Agenda 2063 Africa We Want**

Agenda 2063 is an African blueprint and a master plan for transforming Africa into a global powerhouse of the future. The urbanization agenda acknowledges challenges facing Africa in its urbanization course and seeks to achieve sustainable urbanization that is people-centered structural transformation supported by industrialization, infrastructure, agriculture, regional integration, and trade. It further points out the need to enhance peri-urban agriculture not as a survival mechanism but as a viable venture towards food security (AUC, 2015).

The agenda notes the need to promote peri-urban agriculture which points to the argument that failure in promoting competitive land uses then land in the peripheries is likely to be converted to urban land uses.

### **2.9.3 The Kenya Vision 2030**

Kenya vision 2030 is 22 years blueprint covering a period from 2008 to 2030. The primary goal of the blueprint is to make to transform Kenya into a newly industrializing, middle-income country providing a high quality of life to all its citizens by 2030 in a clean and secure environment (GoK, 2007).

The blueprint focus on housing and urbanization it acknowledges that the country will be predominantly urban, with half its population being urban by end of 2030 (GoK, 2007). The blueprint acknowledges that urban areas are faced with challenges like housing supply vis-à-vis demand, urban decay, poor urban planning, and Peri-urban development, which it seeks to address through growth containment and urban renewal. On housing, it further recommends increased output of housing units in a year, emphasizing low-income earners' access. One of the key flagship programs proposed by the blueprint was the preparation of metropolitan and investment plans for key regions which included Kitui (GoK, 2007).

The relevance of this blueprint to the study is that it looks critically at the factors that the earlier literature points to as motivating factors to peri-urban development as it also proposes strategies on how to curb peri-urban development.

#### **2.9.4 National Spatial Plan (2015-2045)**

The primary aim of the development plan is to provide a national spatial structure to define how national space is utilized optimally and sustainably (GoK, 2016). The policy through its review of urban land use patterns notes that the lack of a framework to guide urban development is a motivating factor for haphazard developments. This has also caused Peri-urban development leading to the fragmentation of land into uneconomical lots (GoK, 2016). On land use, the plan further provides strategies for addressing the urbanization challenge. One key strategy is to strengthen rural-urban interlinkage which will see improved rural economies and minimise rural-urban migration. The study area lies in zone 6 the eastern and southern region which the plan proposes several strategy towards enhancing rural economies like; the provision of infrastructure to enhance value addition initiatives, the creation of small and medium centres to take away pressure from existing main towns, rural development through infrastructure and agricultural development projects(GoK,2016).

The plan is key to the study since notes the causes of haphazard urban growth as it proposes strategies to overcome peri-urban development.

#### **2.9.6 Sessional paper 01 of 2017 National Land Use Policy**

The principal objective of sessional paper 01 of 2017 was to provide legal, administrative, institutional, and technological for optimal utilization of land and related resources in a sustainable manner at the national, county, sub-county, and local levels (GoK, 2017).

The policy notes that Kenya is experiencing significant challenges due to a lack of a coordinated and collaborative approach to land management, which has led to a haphazard approach towards management and use of land, further pointing to continued uncoordinated legal and policy framework. In urban space, the policy notes that due to clustering and continued population growth so is the demand for housing is on the rise; due to this, informality has moved in the urban space

as well as its hinterland, leading to the consumption of land suitable for crop and animal husbandry. The clustering and increasing number have also led to urban decay (GoK, 2017).

In response, the policy recommends an integrated approach to the management of land. This integrated approach can be realised through Nation's spatial plan which other inferior plans (County integrated plans and urban integrated plans) will borrow from. Land tenure being a critical factor in land management, the document suggests that allocation and issuance of title deeds should be done based on approved physical development plans, approved survey plans, and approved local area zoning regulations and guidelines. Through this, activities within the peri-urban will be regulated to control Peri-urban development, subdivision, and land conversion.

On enhancing liveability and attractiveness, the policy recommends that public-private partnerships on public utilities and social infrastructure be encouraged, encouraging affordable housing development, providing a financial policy towards funding affordable housing all matched by adequate amenities, and establishing land banks for serviced land for housing. It further looks into technology as an option for cheaper housing. On land and housing, it further recommends mapping and regularization of informal settlements.

On peri-urban zones, it recommends rural-urban management programs to discourage land fragmentation and re-planning of peri-urban zones for animal and crop husbandry. The policy further recommends the establishment of secondary towns, a new-urbanism concept, and a regional development concept towards decongesting major urban areas through infrastructure improvement and agro-based industries. The policy also recommends urban containment boundaries that should consider land demand and be reviewed after every ten years (GoK, 2017).

### **2.9.7 Kitui County Integrated Plan 2018-2022**

The county blueprint on matters concerning urbanization its primary focus its provision for affordable housing in Kitui municipality as well as developing a policy for county mortgage scheme, renovating county staff houses, developing sound waste management systems, formulating policy on urban development as well as enhancing security through installation of street lighting (CGoK, 2018).

## **2.10 Legal Frameworks**

### **2.10.1 The Constitution of Kenya 2010**

This is the supreme law of the land and all planning activities are anchored on it. The supreme law distributes the planning role between national and devolved governments through schedule 4, the national government is responsible for constructing and maintaining national trunk roads. In contrast, their role in planning is limited to developing general land planning policies and coordinating land use planning in the counties. While Counties are charged with land use management, construction, and maintenance of county roads, housing provision, and some essential services (GoK, 2010).

Chapter four on the bill of rights points out that every Kenyan has a right to a clean environment, access to housing, and clean and safe water to adequate standards. Article 60 Section 1 states that land should be held, used, and managed in a manner that is equitably accessed; security of right; sustainable and productive management of land resources; Transparent and cost-effective administration of land; sound conservation and protection of ecologically sensitive areas; elimination of gender discrimination in law, customs and practices related. The chapter further classifies land into public, community, and private land. In article 66, section 1 on regulating the use of land the supreme law gives the state the power to regulate the use of land on basis of public safety, public order, public morality, public health, or land use planning (GoK, 2010). In article 70 section 1 If a person alleges that a right to a clean and healthy environment recognised and protected under Article 42 has been, is being, or is likely to be, denied, violated, infringed, or threatened, the person may apply to a court for redress in addition to any other legal remedies that are available in respect to the same matter.

One of the significant breakthroughs was the creation of the National land commission, an independent body charged with the management and administration of land in Kenya this was in an attempt to free land transactions free from political interference (Boone et al., 2019).

### **2.10.2 County Government Act 2012**

Effectuated by chapter eleven of the constitution of Kenya 2010, this statute mandates County Governments to carry out the planning function at the county level outlining the objective of a

plan, with one of them being ensuring a well-balanced system of settlements and ensuring productive use of scarce land, water, and other resources for economic, social, ecological and other functions across a county. The Act on delivering services should be guided by the principle of equity, efficiency, and inclusivity. The county should also protect and integrate the rights and interests of minority and vulnerable groups while ensuring equity in resource allocation. On rural-urban dualism, the act advocates an integrated approach to developing rural and urban social and economic well-being to achieve balance. In Section 108 (2) the county governments are empowered to delineate urban edges within municipalities and develop a mechanism for managing these fringes.

It also points out the need for planning to guide development and advocate for municipal /cities plans with land-use zoning to be critical in development control. The act gives the counties authority to plan with a special focus on protecting agricultural lands and open spaces.

### **2.10.3 Urban Areas and Cities (Amendment) Act, 2019**

The act outlines the management of urban areas, which are critical to sustainable urban growth. It gives the management boards the mandate to prepare an integrated development plan, which should be in tandem with county development plans or strategies and national policies. The IDP should promote the spirit of CoK 2010 on the promotion of fundamental rights and ensure the realization of progressive socio-economic growth, which can only be achieved by providing essential services such as developing a property tax system that is friendly to the vulnerable. The act further gives the management boards to regulate land use as outlined in principles of land through regulation of subdivision, land development, and zoning; this should be guided by IDP or master plan.

The act gives the boards the power to monitor policies, services, programs, or plans' effectiveness and impact. They are also expected to undertake infrastructure development and services and facilitate and regulate public transport within the area of their jurisdiction, which should be geared towards a safe and healthy environment.



#### **2.10.4 Physical and Land Use Act 2019**

The Physical and Land Use Planning Act, 2019, gives advisory on the preparation of development plans to be for zoning, urban renewal, or redevelopment, guiding and coordinating the development of infrastructure, regulating land use and land development, and providing a framework for coordinating various sectorial agencies and giving effect to any Integrated City or Urban Development Plan (GoK, 2019). The Act further gives guidance on the matters in county-level planning, inter-county level planning, and local level planning. The Act further gives advisory on the mechanism of addressing land use challenges, including land readjustment programs in urban areas.

The Act gives the counties the authority as well as urban management bodies the power to control development. This approach aims to discourage land subdivisions and coordinate developments, emphasizing that all developments within the county must seek approval. In addressing the multidisciplinary challenge, the county executive in charge of planning shall give copies to players within urban and hinterland for comments; the approval will be further guided by existing approved National, County, local, special zones, and urban areas plans.

#### **2.10.5 Land Act 2012**

The primary purpose of this act was to consolidate and rationalize land laws; to provide for the sustainable administration and management of land and land-based resources, and for connected purposes (GoK, 2012). The eminent domain is entrenched in the Land Act as directed by the Constitution of Kenya, 2010. It is under the legal provisions of this act that the government can acquire land to provide services to the public to improve the general welfare of the people. Under public land administration in Part II of the act, the provision of leases on public land allows making land-use changes within the windows of expiry of the leases. This is an opportunity to undertake planning intervention before the land is released or delivered for urban development or use.

#### **2.10.6 National Land Commission Act, 2012.**

The act gives the National land commission the mandate to manage public land on behalf of national and county governments under principles set out in section 60 of constitution 2010 and

national land policy and oversight authority on land use planning in the country. Despite all this, the act is faced with the challenge of ambiguity in the law, more overlapping responsibilities, and lack of political goodwill, and a tussle between the ministry of lands and planning and underfunding

### **2.10.7 Land Control Act CAP 302**

The Act's applicability is limited to the only hinterland by defining agricultural land as land, not within any municipality, or township. This management approach creates a lacuna in the management of fringes and further enforces political capture, especially in the demarcation of municipal boundaries bringing in the fringe population to the urban zone of influence. The approach translates that the ruralists and agriculturalists are subjected to forces of markets and subdivision standards of an urban area. The approach also undermines principles of supreme law in protecting vulnerable inland access, which is strained by urban markets.

### **2.11 Reflections on Literature Review**

Peri-urban development debate has taken place since early in the 20<sup>th</sup> century with various words used to describe the phenomenon in the global North words like suburbanization, urban sprawl has been popular while the global South peri-urban development and urban sprawl have been some of the popular words to identify the phenomenon. Despite the use of these different words they both describe the urban growth beyond the urban boundaries. However, the debate is only applicable where urban planning has taken place either through the pre-planned urban area or where urban planning has taken place as a reactive effort to the growth of the urban area. Peri-urban development takes place in different forms one of these forms is scattered developments which are necessitated by the independence of decision-makers in the PUAs making it hard to coordinate development. Peri-urban development may be clustered especially where it happens as an extension of densely built-up areas close to the edge, and new nodes close to the edge. Ribbon peri-urban developments are also popular, especially where capital investments in road infrastructure and corridors are not preplanned or attempts to control developments are not in place.

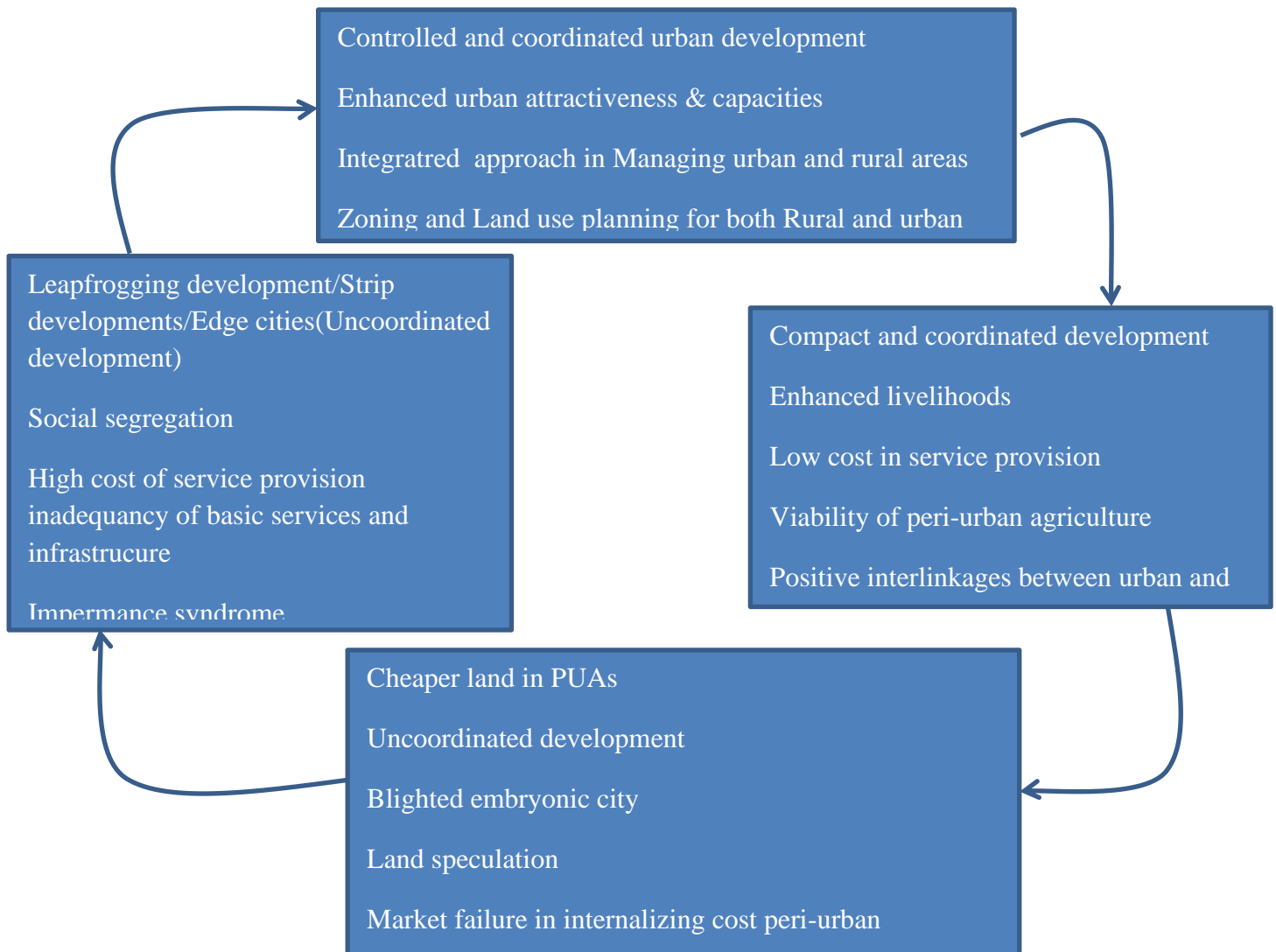
So what motivates the phenomenon? Evidently, this phenomenon has been driven by failure in planning in both divide the urban and countryside. This makes it impossible to regulate

development beyond urban boundaries. This is further accelerated by a disjointed approach to land development and a lack of common vision in managing the city and countryside by regional authorities as well as ambiguity by law in PUAs management. Attempts by authorities to manage urban growth are made impossible by a lack of legal backing. Other drivers are land tenure differentiation between urban and countryside as well as the competitiveness of urban land uses against predominant agricultural activities in the PUAs. The socio-economic evolution of the urban population also plays part in peri-urban development, these factors are namely; net population growth, rise in per capita income or decline in per capita income, increase in household size, and decline in traditional ways of earning livelihoods. This decline in the viability of traditional land uses forces the locals to sell off their lands which triggers impermanence syndrome and accelerates peri-urban development. Capital investments also play a critical role in peri-urban development, especially where the pre-planning of their area of influence is not undertaken.

This peri-urban development process has both positive and negative effects. Among the negatives are; environmental degradation, erosion of social character, rise in land disputes, loss of livelihood, increase in the cost of service provision, exclusion of the poor from owning land due to overpricing, and displacement of the indigenous communities. While the positives are; diversification of livelihood strategies, and increased land values, this makes peri-urban development a blessing and curse to the locals and the urbanites too.

In management or mitigating peri-urban development, it is important to note this cannot be addressed from either controlling urban growth or farm preserve approach but through coordinated approaches from both divides. Many approaches have been fronted by the global North, and countries in the south have attempted to embrace these approaches, but this has yielded very little or no fruits because of the local settings which have to do with a lack of political good will as well as difficult in applicability. The management of urban areas and countryside lack common goals in managing land which facilitates peri-urban development. African nations lack locally developed strategies and tools that are viable in managing peri-urban development

## Conceptual framework



Source: Author,2022

## **Chapter Three: Research Methodology**

This chapter discusses the research design and methodology of the research. It set out how the research was carried out.

### **3.2 Research Design**

Trochim (2004) points out that research design is an overall strategy used to integrate different components of a study procedurally and logically systematically, all aimed at addressing research questions. Sproull (1995) further notes that design specifies elements to be examined and procedure to be used, while Kothari (2004) summarizes it as a conceptual structure within which research is conducted. The study employed a field survey which is non-experimental and the research only studied the variable as they are happening without any manipulation.

The study research design is as outlined;

#### **I. Preliminary Research Assessment and Gap Identification**

The research started with critically reviewing the existing documents on Peri-urban development and urban sprawl in an attempt to identify the gap which the research later sought to address. Through the review, a gap was identified by noting that the earlier studies have mainly focused on primary towns with no attention being focused on secondary towns.

#### **II. Formulation Of Research Questions and Objectives**

Guided by the gap identified the research developed questions geared toward understanding what was the nature, character, and form of peri-urban development in the secondary towns, and what was motivating this phenomenon of growth in the secondary towns. The study further sought to find out what was the implication of Peri-urban development on peri-urban areas and communities. The final question formulated was about exploring how peri-urban development would be controlled. Based on these questions objectives were developed.

#### **III. Intensive Review of Information**

Upon formulation of research questions and objectives. An in-depth review on the nature, character, and form of Peri-urban development, the motivating factors towards Peri-urban

development, the implication it had on the peri-urban areas, and best practices for controlling the phenomenon. This review was done on books, policies, reports, legal documents as well as journals.

#### **IV. Research Design and Methodology**

Based on the nature of the study, the study adopted a non-experimental design. The target population was identified, data need matrix was developed. The study then developed a sample frame upon which sample for the whole study was drawn. Then data collection tools were developed and piloted to ensure reliability as well as ensure ethical issues were addressed.

#### **V. Data Collections, Analysis and Presentation**

Data collection acquire from both primary and secondary sources. On the primary sources, data was acquired from household heads through household questionnaires while on key informants, key informant schedules were used. Other instruments used were an observation checklist, a smartphone that was used as a global position system (GPS) for mapping, and a camera as well. The secondary data review of information was done with sources being journals on Peri-urban development, existing legal and policy frameworks as well as books and data acquired for classification and mapping Peri-urban development extents in Kitui town.

Upon collection of the household questionnaire data was cleaned, coded, grouped, and analysed using SPSS while spatially mapped data and spatial data acquired through secondary sources were processed using ArcGIS 10.3.1. The analysed and processed data has been presented using tables, bar graphs, pie charts, and maps.

#### **VI. Discussion On Findings**

The study compared its finding with the existing literature to see whether agree or they were taking a divergence from the existing literature.

#### **VII. Recommendation and conclusion**

From the key findings recommendations were done on best approaches towards mitigating the Peri-urban development as well as recommending areas for future study.

### 3.6 Target Population

Mugenda and Mugenda (2003) posit that the target population is the entire units of interest to the research. Kothari (2004) further notes that it is from this population that samples are drawn and general conclusions are made after the study is conducted. The target population was a total of 7 sub-locations that were partially affected by Peri-urban development. From the KNBS Kenya household population census volume two of 2019 the study found that the seven sub-locations had over 8161 households within the peri-urban region of Kitui town as shown in **Table 3** . However, since peri-urban has only affected the sub-locations understudy partially. The study opted to adopt an alternative method to get the target household population. The study opted to digitize cadastre and develop a one-kilometer buffer from the current town boundary with the assumption it is within this extent the town's influence was felt. After digitizing the lots the buffer was used to extract lots within the buffer which totalled 1956 making it the targeted household population as shown in **Table 4**. The other targeted population was the county surveyor, the assistant chiefs within the demarcated area of the study, an officer in charge of the environment, an officer from the department of housing and infrastructure, the physical planner in charge of the municipality, and the assistant municipal manager.

**Table 3: Targeted Households**

<b>Sub location</b>	<b>No.of Households</b>
Misewani	520
Mulundi	1796
Kaveta	1510
Kalundu	1974
Manyengo	1564
Tungutu	797
Mwembetayari	Not available
<b>Total Households</b>	<b>8161</b>

Source; KNBS,KPHC Vol.II (2019)

**Table 4: Extracted Target Household Population**

<b>Sub-Location</b>	<b>Target Household Population</b>
Kaveta	117
Kalundu	120
Tungutu	210
Mulundi	239
Majengo	340
Misewani	400
Mwembetayari	530
<b>Total</b>	<b>1956</b>

Source: Author, 2021

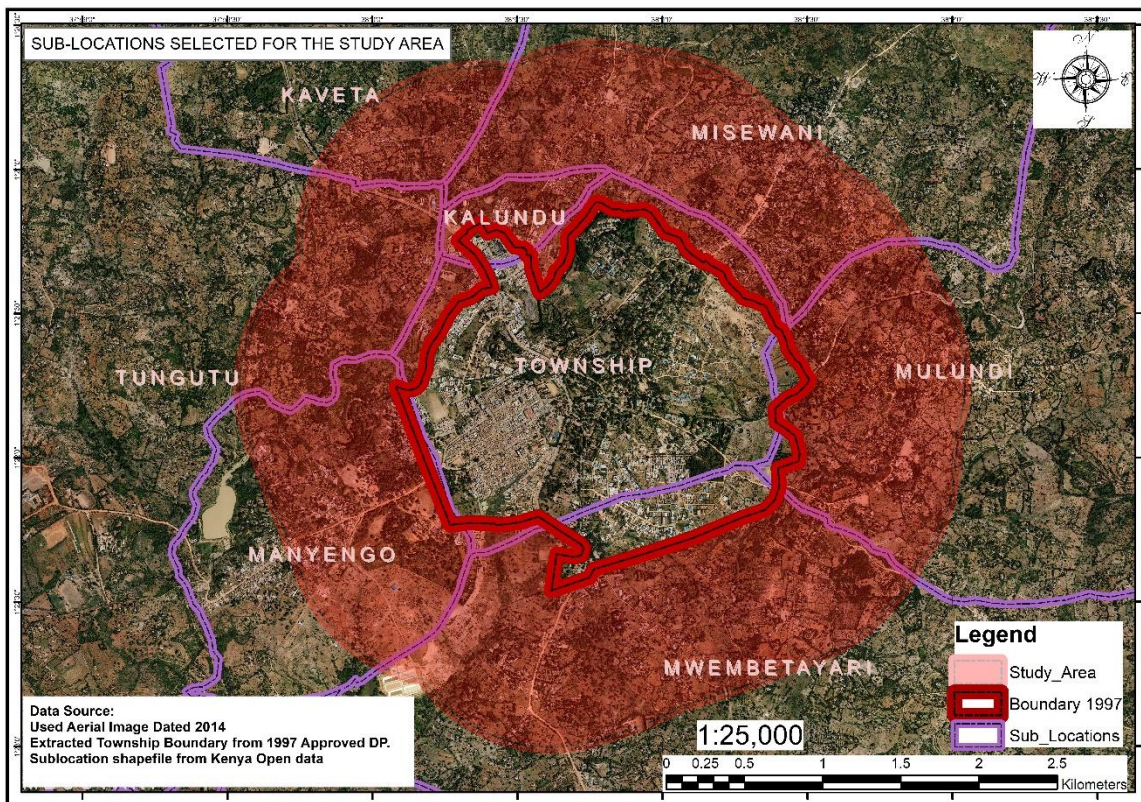
### **3.7 Sampling Frame**

Neuman W.L. (2014) defines the sampling frame as a list, directory, or index of cases from which a sample can be selected. A sample is a subgroup of the population that the researcher usually selects from a larger population to draw a generalization (Nayak and Singh, 2015; Neuman W. L., 2014).

The research adopted different sampling methods due to the different target populations involved. The study area selection was purposive, with parts of sub-locations on the edge of Kitui town forming the subject of interest to the study. Sub locations of interest to the study were; Kaveta, Kalundu, Tungutu, Manyengo, Misewani, Mwembetayari, and Mulundi. The selection was rationalized by the fact that these sub-locations being on urban frontiers were recipients of urban pressure to sustain the needs of their inhabitants.



Map 1: Sub location selected for study



Source: *Author, 2021*

To address the concerns of the study, purposive sampling was used for the key informants. The key informants targeted by the study were players in urban management, an officer working in the ministry of lands, infrastructure, and housing, and assistant chiefs in charge of the PUAs.

Sampling the household presented a considerable challenge due to the unavailability of data in the study area. The household population challenge forced the study to develop an alternative approach. The study used a digitized cadastre of 2014, then a buffer of one km from the edge of the town boundary of 1997. The buffer was deemed enough to bring representativeness to households in PUAs of Kitui. An assumption was made that each lot represented a household. Out of this exercise, the total household was 1956 extracted, as shown in Map 2. A scientific formula is used to choose a sample where a large number is involved; the study adopted Nasuirma (2000) to calculate the sample size.

$$n = \{NCv^2\} / \{Cv^2 + (N - 1)\epsilon^2\}$$

Where:  $n$  is the sample size.

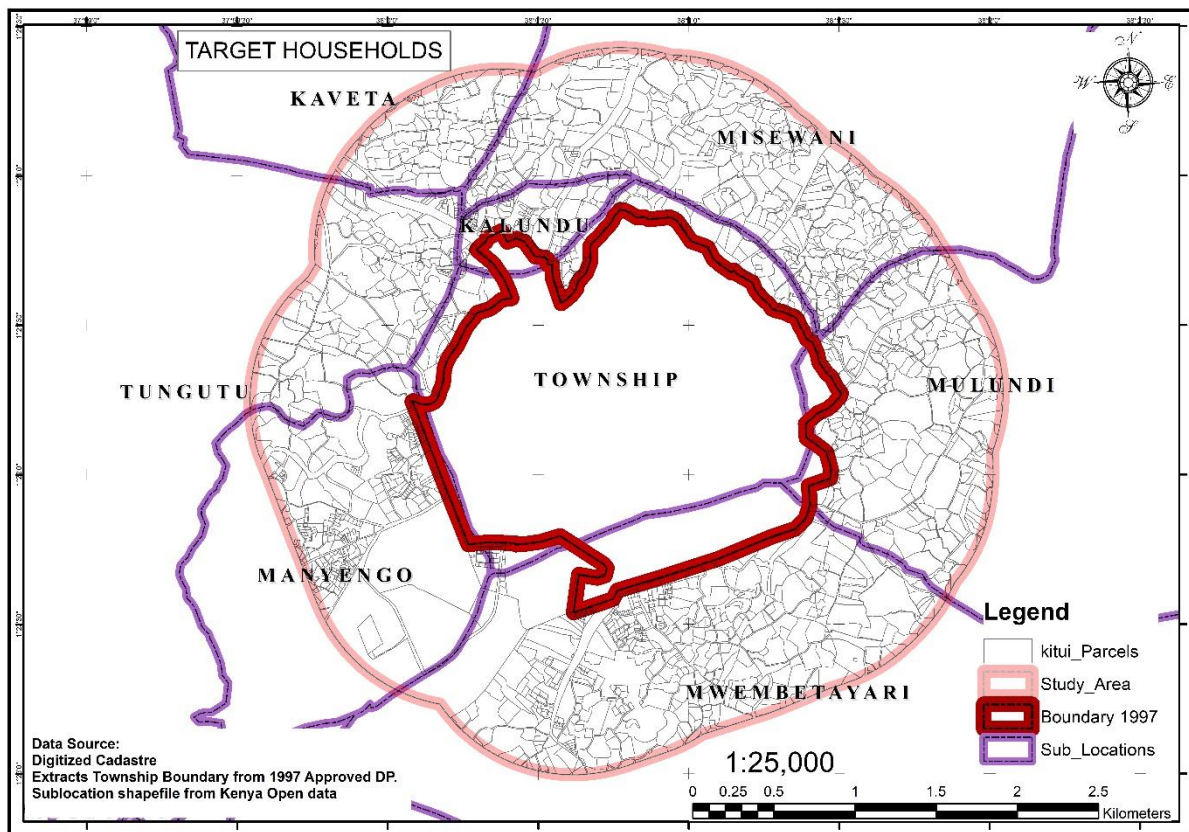
$N$  is the population.

$Cv^2$  is the coefficient of variation

Represents the tolerance of the desired level of confidence at

95% (0.05) (Nasuirma, 2000)

## Map 2: Target households in the study area



Source; Author's Edits, 2021

Therefore, the sample size for the households was

$$n = 1956(0.5)^2 / 0.52 + (1956 - 1)0.05^2$$

$$n = 95.18$$

The calculated sample size was 95 households; however, the figure was rounded off to a tenth to cater to unresponsive questionnaires. The households were then clustered using sublocations, with a figure for each sublocation calculated based on population percentage share to that of the target households.

**Table 5:** Household Numbers based on Affected Sub locations and sample size

<b>Sub-Location</b>	<b>Target Population</b>	<b>Percentage Share</b>	<b>Sample Size</b>
Kaveta	117	6%	6
Kalundu	120	6%	6
Tungutu	210	11%	10
Mulundi	239	12%	12
Majengo	340	17%	18
Misewani	400	20%	21
Mwembetayari	530	27%	27
<b>Total</b>	<b>1956</b>	<b>100%</b>	<b>100</b>

*Source: Author, 2021*

After developing a sample the phenomena were not uniform, each sub-location displayed different characteristics mainly in form of peri-urban development experienced. For each calculated sample in the affected sublocation household questionnaires were shared by dividing them based on the distinct forms for example Manyengo which had a proportionate share of 17 percent and a calculated sample of 18, had three distinct forms to ensure representativeness these 18 household questionnaires were clustered between the three distinct forms with each area with ribbon, scattered and clustered peri-urban development being allocated 6 household questionnaires which were administered through simple random sampling in the clustered areas. In Kaveta sub-location area understudy was clustered into two regions, one zone experiencing ribbon development and the other scattered with each being allocated 3 questionnaires which were administered through a simple random approach. In Kalundu the region was clustered into the ribbon and edge city region with each cluster being allocated 3 household questionnaires administered through a simple random approach. Tungutu and Mulundi sublocations were not clustered because they were all experiencing scattered form of peri-urban development, the administration of the questionnaires in these areas used the simple random approach. While Misewani exhibited both ribbon and scattered peri-urban development with clustering the region experiencing ribbon development was allocated 10 questionnaires while the area of scattered peri-urban development was allocated 11 all of which were administered using the simple random approach. In Mwembetayari which has the ribbon, clustered and scattered peri-urban development each of these areas was allocated 9 questionnaires which were administered through a simple random approach.

**Table 6; Peri-urban forms**

<b>Sub-Location</b>	<b>Peri-urban form</b>
Kaveta	Ribbon and scattered
Kalundu	More compact and ribbon
Tungutu	scattered
Mulundi	scattered
Manyengo	Compact, ribbon and scattered
Misewani	Scattered & ribbon
Mwembetayari	Compact, ribbon and scattered

Source; Author, 2021

### **Key informants**

This study used purposive sampling to get information from key players in urban management and agencies in charge of the management of peri-urban areas: Municipal board member, County Land surveyor, Physical planners in charge of the town, assistant chiefs, and officer in the department of housing and infrastructure, an officer in the department of environment

On establishing the effects of urbanization on the local livelihoods which are predominantly agriculture the used the household questionnaire through the simple random method from a stratified household target population.

### **3.8 Methods and Tools of Data collection**

Data for the study was acquired through primary and secondary sources, then analysis and presentation. The data acquisition process is as detailed below:

#### **3.8.1 Methods of Data Collection**

Kabir (2016) defines data collection as an established systematic process of acquiring information on variables of interest to the research in an attempt to address questions of concern to the research (Kabir, 2016). The study acquired data through both primary and secondary methods. The data acquired employed the method as discussed below;

#### **3.8.2 Primary Methods of Data Collection**

##### **I. Conducting Interviews**

The study used interviews as a method of data primary data collection. One of the sampled populations where this method was used is in the households; the target person for the

household questionnaire was the household head since they are critical in household decision-making. If the primary target was not available, the study opted for a spouse, assuming that decision-making was a consultative initiative within the household between spouses. In the most unfortunate situation where both spouses were unreachable, the study interviewed siblings over 18 years of age with the assumption that the grown children could be aware of how parents reached their decision on locating in a PUAs or making a critical decision on land management.

## **II. Instrument Administration**

The data was collected through the administration of a household questionnaire that had both semi-structured and open questions. The household questionnaire was organized into sections; **Section 1**; for tracking questionnaire, **Section 2** Respondent bio data, **Section 3**; focusing on drivers of Peri-urban development, **section 4**; Mode of land acquisition, and section 5 household income and expenditure. **Section 6**; focuses on access to essential services and infrastructure, while **Section 7**; focuses on the Impacts of Peri-urban development on the household and the larger PUA community. During the administration, the assumption was made that the respondent would provide correct and accurate information while retaining the right to respond or not.

The interview method was also used by administering a Key informant guide to the planners in charge of the municipality, where the study interviewed two planners, one being the senior physical planner in charge of physical planning in the county. This interview sought to know the tools the municipality used in development control, the Capacity of the institution, the Management approach employed in the management of PUAs, Challenges in managing development in the PUA, and Remedies to PUAs development. Access to land in PUAs for urbanization, Status of access to basic facilities in PUAs. The same was also asked the county land surveyor.

The study also engaged sub-chiefs through key informant interviews on the effect of Peri-urban development on areas under their jurisdiction.

## **III. Observation**

The study also used Observation as a method guided by an observation checklist as a tool/instrument. Through this approach, the study focused on the condition of infrastructure,

state of waste management, Character of the sprawl, and distribution of basic facilities and community facilities.

#### **IV. Mapping**

The primary spatial data collected using the smartphone GPS app (GPS essentials) were downloaded, converted from Keyhole Markup language (KML) into Esri shapefiles then projected into the Arc 1960 zone 37s using Arc GIS software. The Arc Map platform was also required to import and analyze Landsat images acquired from USGS, open-source. A 30-meter resolution Landsat image was used with a combination of RGB being used.

The study adopted the supervised classification method in which spectral signatures for various land uses were developed in specific and numerous locations scene vectorization. These training sites were classified into built-up areas, vegetation areas, and agricultural after which a framed classification was carried out. This process was repeated for all images from the years 1987, 1997, 2017, and 2021.

The selection of these years was informed by events on town planning in 1987, two years before the municipal boundary was drawn, 1997 a year that the DP in use was prepared, 2017 the change due to devolution, 2021 current extend of peri-urban development. The study skipped 2007 due to detector stripping. The Arc Map was also used to calculate these changes over time, and maps were produced to show changes over time.

#### **V. Photography**

The study also used photography to back up the qualitative data and quantitative data. It captures situation on waste management, and accessibility.

### **3.8.3 Secondary Methods of Data collection**

#### **I. Review of information**

Information reviewed was on Peri-urban development and urban sprawl, policies on urbanization and management of peri-urban regions as well as the constitution and other legal frameworks. Other sources of reviewed information were journals, books, and periodical reports, especially on population census. The attempt to review documents was geared toward understanding why peri-urban development keeps taking place. what impact it have on the peri-urban regions (socially, economically, and environmentally) as well as the remedy for curbing the phenomena?

The other secondary data acquired was periodical Landsat imagery which helped in quantifying the land use change over time with the study's main source being USGS

### **3.8.4 Tools of Data Collection**

Sproull (1995) defines data collection tools or instruments as any device or item that purported to measure variables, further pointing out that these instruments can be either written, oral material, or physical devices. The study used various instruments; questionnaire, key informant schedule, observation checklist, smartphone,

#### **I. Questionnaire**

Kothari (2004) opines that questionnaires are the heart of any survey that needs a very careful constructed and subjected to a pilot survey to identify its weakness, failure to do that may weaken the research. The study used a questionnaire that sought to respond to the questions raised by the research. In an attempt to ensure the reliability of the questionnaire, a pilot test was done and the questionnaire was amended to enhance its reliability. To enhance the response rate and correct information was acquired anonymity of the responded was adopted by omitting personal details as well as voluntary participation of the target household. The researcher to further enhance response rates and voluntary participation informed target households of the objective of the research. The questionnaire had both open and semi-structured questions. The questionnaire mainly targeted the household heads. The household questionnaire was organized in sections; **Section 1**; for tracking the questionnaire, **Section 2** Respondent bio data, **Section 3**; focusing on drivers of Peri-urban development, **section 4**; Mode of land acquisition, **section 5**; the focus was on household income and expenditure. **Section 6**; focused on access to essential services and infrastructure, while **Section 7**; focused on the Impacts of Peri-urban development on the household and the larger peri-urban area communities.

#### **II. Key informant schedules**

The study used a key informant schedule that targeted key sources of information. The targeted key informants were; **Assistant chiefs** in charge of sublocations affected by Peri-urban development, the schedules sought information on what the administrators thought were factors responsible for Peri-urban development, and their opinion on peri-urban development. What benefits and challenges were being witnessed as a result of Peri-urban development? And how they thought was the best way to manage Peri-urban development. The study also targeted the **municipality management** with the physical planner, and the assistant municipal manager, the information targeted was on how they were managing the town growth, challenges being

faced in managing growth, how the vulnerable agriculturist was being protected, state of access to basic services and infrastructure. The study also sought what they thought was the driving factor towards Peri-urban development as well as the best way towards controlling Peri-urban development.

**Land surveyors** were also targeted to provide information on land management as well as availing of land for urban development within the study area as well as possible Peri-urban development mitigation measures.

The county department of housing and infrastructure was also targeted to provide information on road development and accessibility.

**Officer in charge environmental** department was also targeted to provide information on environmental management with a focus on waste disposal, environmental wellbeing of the peri-urban zones, and dangers posed by Peri-urban development as well as viable options toward controlling peri-urban development.

### **III. Observation checklist**

The study also employed the use of a checklist in an attempt to ascertain the state of waste management in the peri-urban regions, house typologies, state of the roads as well as state of agriculture and other livelihood strategies.



### 3.9 Data Need Matrix

**Table 7: Data Need Matrix**

Research objective	Data need	Method of data collection	Source of data	Data instrument	Data analysis method
1. Drivers of Peri-urban development	1. Population growth (natural & net migration)  2. Household size  3. Household number.  4. Increase in household income	Review of literature  Interviews	Households within study area.	HH questionnaire	<ul style="list-style-type: none"> <li>Statistical analysis Spss.</li> </ul>
	1. Distribution of social amenities and	Mapping  Interviews.	<ul style="list-style-type: none"> <li>Households within study area (access and</li> </ul>	<ul style="list-style-type: none"> <li>HH questionnaire</li> </ul>	<ul style="list-style-type: none"> <li>Statistical analysis Spss</li> </ul>

	<p>their state and access.</p> <p>2. Distribution of schools.</p> <p>3. Urban decay.</p> <p>4. Infrastructure investment and improved connectivity</p> <p>5. Land prices</p> <p>6. Institutional capacities.</p> <p>7. Land speculation and hunger.</p>	<p>Observation.</p> <p>Mapping</p>	<p>reason for choosing location)</p> <ul style="list-style-type: none"> <li>• County planning department</li> <li>• Municipal board member (on capital investment plans and policy on urbanization).</li> <li>• Institutional capacities (county department of physical and land use planning).</li> <li>• State of infrastructure and environment in the core (observation, Municipal board member).</li> </ul>	<ul style="list-style-type: none"> <li>• Key informant guides.</li> <li>• Digital camera</li> <li>• Gps</li> <li>• Observation guide</li> <li>• ArcGIS.</li> </ul>	<ul style="list-style-type: none"> <li>• Descriptive analysis</li> </ul>
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	8. Topography and natural environment.				
<b>Effect of Peri-urban development</b>  Environmental effects	Waste management in peri-urban space	Interviews.  Observation.	<ul style="list-style-type: none"> <li>• Households.</li> <li>• Local administrators</li> </ul>	HH questionnaires  Key informant guides.  Observation guide  Digital camera	<ul style="list-style-type: none"> <li>• Statistical analysis using SPSS.</li> <li>• Descriptive analysis.</li> </ul>
	Traffic volume and noise pollution	Interviews	Households  Key informants (local administrator, county department of environment,	HH questionnaires  Key informant guides.	<ul style="list-style-type: none"> <li>• Statistical analysis using SPSS.</li> <li>• Descriptive analysis.</li> </ul>

	Mining activities (sand harvesting and brick making (soil quality, avenues for vector diseases)	Interviews Observation.	Key informants (local administrator) Households	Key informant guides. Observation guide Digital camera	<ul style="list-style-type: none"> <li>• Descriptive analysis</li> </ul>
	Increased concrete carpets	Observation	Aerial image	ArcGIS for visualization	<ul style="list-style-type: none"> <li>• Descriptive analysis</li> </ul>
<b>Social effects</b>	Migration by peasant farmer further to hinterland	interview	Key informants (local administrator). Household	Key informant guide Household questionnaire	<ul style="list-style-type: none"> <li>• Descriptive analysis.</li> <li>• Statistical analysis using SPSS.</li> </ul>
	Landlessness	Interview	Key informants (local administrator).	Key informant guide	<ul style="list-style-type: none"> <li>• qualitative</li> </ul>

	Food security	Interview	Key informants (local administrator) Household	Key informant guide Household questionnaire	<ul style="list-style-type: none"> <li>• Descriptive analysis.</li> </ul>
	Social decay	Interview	Key informants (local administrator) Household interview	Key informant guide Household questionnaire	<ul style="list-style-type: none"> <li>• Qualitative analysis</li> </ul>
	Minimal social contact and cohesiveness	Interview	Key informants (local administrator) Household interview	Key informant guide Household questionnaire	<ul style="list-style-type: none"> <li>• Descriptive analysis.</li> </ul>
<b>Economic effects</b>	Land subdivision	Interview	Department of lands Household	Key informant guide Household questionnaire	Statistical analysis using ArcGIS
	Economic transformation	Interview	Household Key informant (local administrator)	Household questionnaire Key informant guide.	<ul style="list-style-type: none"> <li>• Descriptive analysis.</li> <li>• Statistical analysis</li> </ul>

					using SPSS
	Increased cost of service provision and infrastructure.	Interview	Key informant (municipal board member)	Key informant guide.	<ul style="list-style-type: none"> <li>• Descriptive analysis</li> </ul>
<b>Interventions</b>	Management of urban growth	Review of literature Interview	Key informant (County charge of physical and land use)  KIG (farmers)	Key informant guide.	<ul style="list-style-type: none"> <li>• Descriptive analysis</li> </ul>

### **3.10 Data Processing and Analyses Techniques**

The data collected is both qualitative and quantitative. The quantitative data from households were analysed using SPSS and presented in tables, graphs, and charts. The qualitative data included information from key informants and observations as well as impacts of Peri-urban development on PUAs. The qualitative data has used photo illustrations as well as narratives and descriptive text format. The spatial data were analysed using ArcGIS, and Qgis and then presented in maps; these form the urban footprint, essential critical services, and facilities.

The analysis on access to essential services borrowed heavily from Kenya's physical planning handbook of 2012. From this approach, conclusions were made.

### **3.11 Ethical consideration**

Ethical considerations are very critical when acquiring data from primary sources, some of the data provided are more private and may harm individuals and firms once published or accessed by a third party (Polonski and Waller, 2010). To avoid this harm and impinge on confidentiality a researcher must identify such potential harm and plan on how to address it during the research planning stage (Walliman, 2011) Ethics in research have an overriding implication for data collection, analysis, and research output. Due to this reason, the researchers strived to uphold research ethics concerning personal privacy, confidentiality, the anonymity of data, informed consent, and no deceit or lying in the course of research (Fleming and Zegwaard, 2018). (Fleming and Zegwaard, 2018). The study may also suffer from Conflict of interest where the researcher's interest may conflict with academic interests resulting in bias (Ibid).

To address the ethical concerns the study employed anonymity from the household questionnaires to the key informants, the researcher as well informed the respondents of the objectivity of the study upon which the target person retained the right to participate without being compelled to or deceit to get information. The researcher did not have any conflict of interest in the study and reporting of findings was factual as reviewed from the field with no information alteration.

## **Chapter Four: Study Area**

The chapter is an overview of the study area, focusing on its historical evolution, Geographical location from national to local context, demographic dynamics, climate, physiographic features, and social and physical infrastructure.

### **4.2 History of the Town**

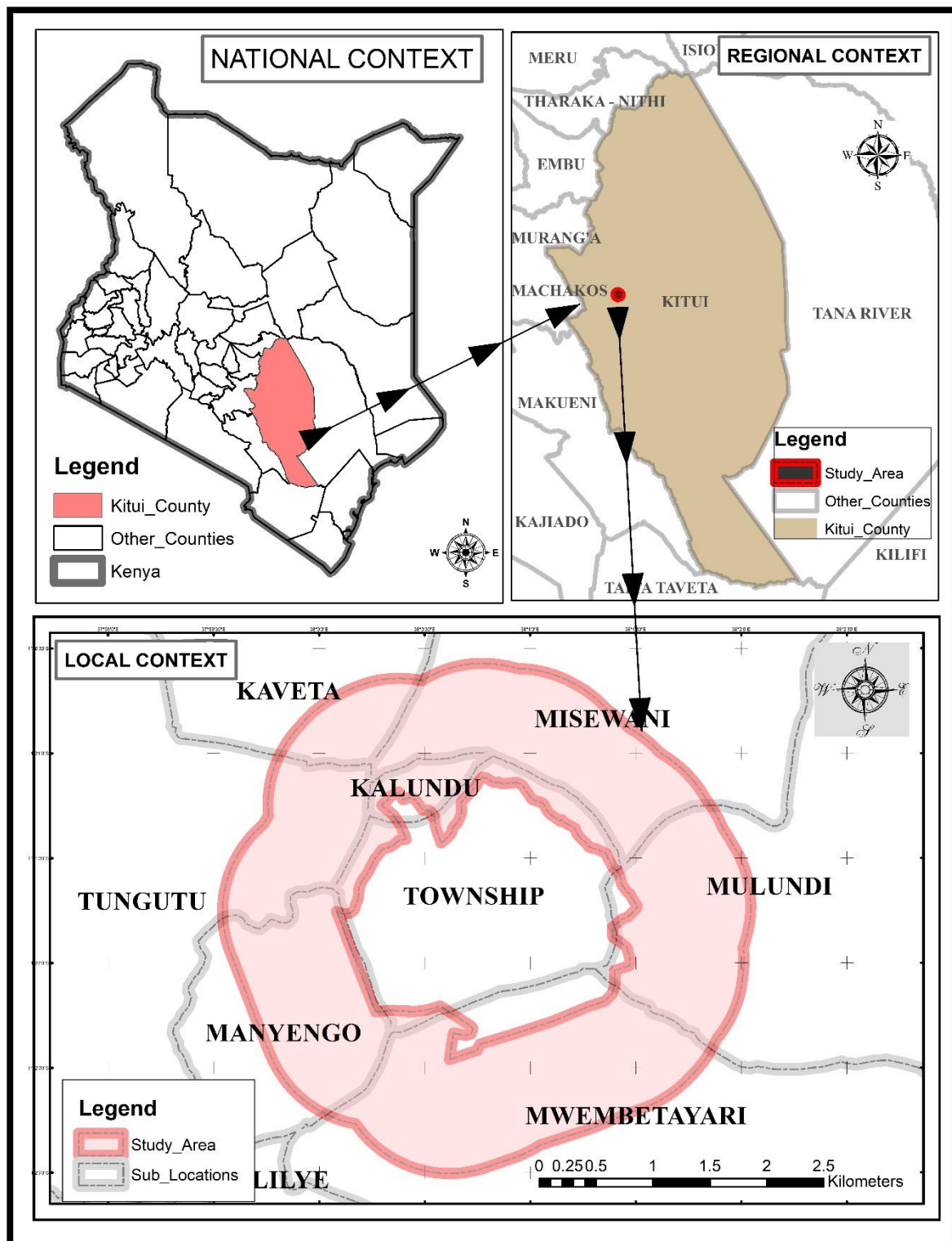
Kitui means place of iron smelting. The town is named after this primary activity taking place in the town before the colonial period. Its growth was accelerated to Arabs relocating to the currently Mjini area (MoK, 2020). The urban areas would later benefit from the colonialism approach of establishing an administrative center to govern the Locals (Ibid). In the wake of independence, the new government retained these administrative centers, with Kitui serving as the district headquarters to Kitui and Mwingi. Mwingi was later made a district. In 1989 the town was granted municipality status (MoK, 2020). The promulgation of CoK 2010 brought Kitui and Mwingi together to form the now Kitui county; this saw Kitui town regain its administrative status in the region after becoming the county headquarters. The enactment of Urban Areas and Cities Act No.13 of 2011 stripped off the town's municipality status because her population was way below the set minimum population of 250000. However, the amendment of the Act in 2019 saw the municipality's status restored on the merit of being a county headquarter.

### **4.3 Geographical Location**

Kitui town is located 180 kilometres East of Nairobi at coordinates  $1^{\circ} 22' 0''$  S and  $38^{\circ} 1' 0''$  E (MoK). The town is in Kitui county, serving as county headquarter; it is located in Kati's central sub-county and borders the following sublocations; Kaveta, Kalundu, Tungutu, Majengo, Misewani, Mwembetayari, and Mulundi. The sublocation on edge is of interest to the study since it is in these areas where urban areas have intruded the rural land. The location is further shown in Map 2.



**Map 3: Location Context of the Study Area**



Source; Author's edits, 2020

#### **4.4 Demographics Dynamics**

The town has continuously registered population growth since its independence. In the wake of independence, it had a population of 3071; the town recorded a 203% increase in population by 1989. In 1999 the town further listed a 42% population increase, 2009 it registered 44%, while in 2019, it recorded a 52% increase in population which can be attributed to devolution (CBS, 1988 and 1996; KNBS, 2010 and 2019). This population is likely to keep increasing with the current urbanization rate at 3%.

The rate of urbanization is further accelerated by the functionality of the town as a regional economic and education hub in the region, not forgetting the improved connectivity. Improved accessibility may be further accelerated by inferior hinterland economies. With these trends in population growth and the comparative advantage in the region, the phenomenon of urban sprawl is likely to accelerate, and if nothing is done, the town's urbanization will be unsustainable.

#### **4.5 Climatic and Physiographic Features**

Kitui is 1141m above sea level. Kitui's climate is tropical, with an average annual temperature of 23.4 °C (climate-data.org, 2021). Annual rainfall ranges from 500mm to 1200 mm per annum, with 40% reliability for long rains and 66% reliability for short rains. The temperatures throughout the year range from 14°C to 34°C, with the hottest period between September to October and January to February. The coldest month is July, with temperatures falling to 14°C, while the hottest is in September, with the temperature rising to 34°C (Grcheva et al., 2016). A seasonal river traverses the town with high flows of water. The Kalundu and Nzeeu Rivers are on the site and service side. The traversing of rivers in the town may explain leapfrogging of developments beyond the urban area.

The area of study has UUC2 soils which are well-drained, moderately deep to very deep, dark reddish-brown to dark yellowish-brown, friable to firm, sandy clay to clay; in many places with a topsoil of loamy sand to sandy loam Ferrallo-chromic/Orthic/ferric acrisols and luvisols; with ferralsols (Jaetzold, 2009). These soils and climatic conditions make the area ideal for farming, but this advantage over the larger hinterland is now under threat due to urbanization.

#### **4.6 Social Infrastructure**

Kitui town has various institutions including Ecde, primary, secondary, and tertiary. The town and its PUAs are served by approximately five public primary schools, three in central cities.

The home to one of the outstanding secondary in the region, Kitui high school, which has been elevated to the status of a national school, is also served by a Muslim secondary school. The town is also home to various campuses and colleges like KMTC, SEKU, Kitui teachers' college, and vocational training centers.

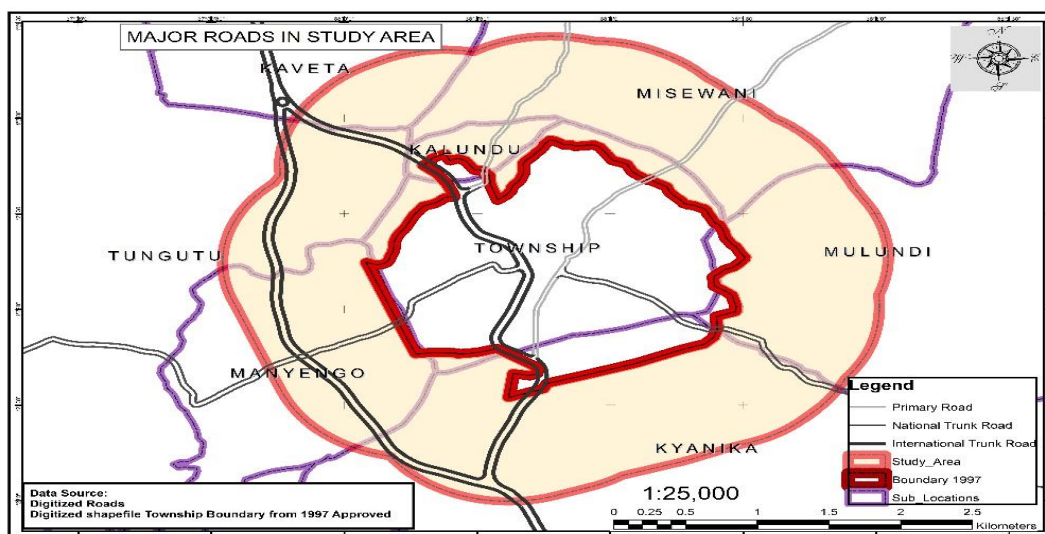
There are five primary health facilities majorly concentrated within the core one of these is Kitui Referral Hospital which serves as the primary referral within the county, Jordan hospital, and Neema are the town's best private health facilities. The lower-level health facilities are dispensaries in Kalundu and the other one in Manyengo.

The study area suffers a significant challenge in providing recreational facilities with available spaces having been grabbed and the available being located at the peripheries of the municipality; these are like the Kitui showground, which doubles as an agricultural showground and a stadium as well.

#### 4.7 Physical Infrastructure

Kitui town is well connected with the surrounding counties' headquarters as well as the capital Nairobi. Most of these roads have been upgraded, improving connectivity and the roads within the central city through an effort towards urban regeneration. Initially, the only major tarmacked roads were A9 and B7 (partially tarmacked up to Wikililye a few kilometres from Kitui municipality on your way to Kibwezi. The roads within the core, which was planned, are tarmacked but characterized by narrow roads, especially those within the Mjini estate.

**Map 4: Major Road Infrastructure**



Source; Author's Edits, 2021

The core serves as the transport hub. It has two bus parks, one in the CBD and the other one in Kunda-Kindu; the one in the CBD serves matatus that ply from Kitui and other regional centers like Machakos, Nairobi, Mombasa, Embu, Mwingi, and Matuu. The Kunda-Kindu bus terminal is not developed and is meant to serve the hinterland.

The study area is served by the Ithookwe airstrip located in PUAs of the town; the runway is weather conditions making it hard to use during heavy rains.

Kitui town is faced with a significant challenge in waste disposal, there are no adequate waste collection points, and based on the economic status of the urban population, especially in low-income estates where locals cannot afford to pay for waste disposal, illegal disposal is high. The county government cannot collect this waste.

## 5.0 Chapter Five: Findings and Discussions

### 5.1 Findings

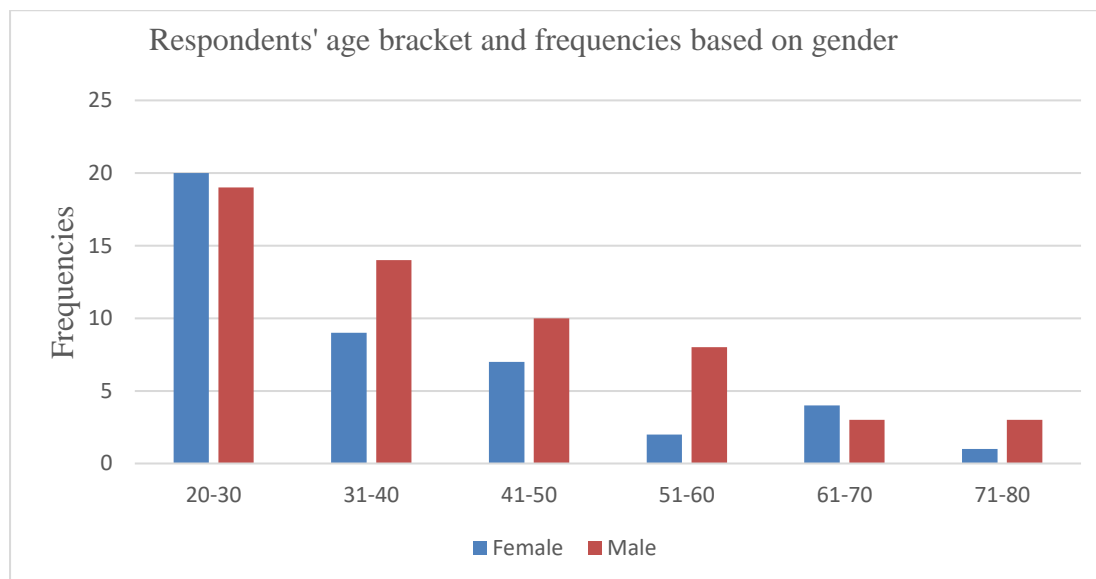
This chapter presents findings based on fieldwork carried out by the study. The information presented was acquired through the administration of household and business questionnaires, key informant interviews, field observations, and mapping. The findings are in response to the reason for households and businesses located in PUAs of Kitui town. The chapter further presents the lack of acquisition mode, and the status of access to essential services, emphasizing early childhood education, primary schools, and health facilities. The chapter presents the state of access to potable, domestic water, waste disposal, and the implication of this growth on socio-economic welfare and the environment. The chapter further reports findings on proposed management options by the key informants.

### 5.2 Demographic Information of the Respondents

Demographic information sought by this study was the age of the respondents, gender, marital status, highest level of education, and relationship to the household head. All these registered a valid response rate of 100%.

#### 5.2.1 Age and Gender

**Figure 2: Age based on grouping**



Source; Field Survey, 2021

In the household, survey males account for 57%, while females account for 43% of 100 respondents. The PUAs is dominated by age group between 20-30 years registering 39% of all

respondents, 31-40 years age bracket recording 23% while 41-50 years age bracket enumerated 17%. While age groupings of between 61-70 and 71-80 registered 7% and 4% respectively.

### 5.2.2 Distribution of Respondents based on age grouping and location

Table 8: Distribution of Sampled Population Based on Location

Age grouping	Manyengo	Mwembe Tayari	Mulundi	Misewani	Kalundu	Kaveta	Tungutu
20-30	10	14	1	7	3	2	2
31-40	2	3	6	7	1	1	3
41-50	3	7	2	2	2	1	0
51-60	2	1	1	3	0	0	3
61-70	1	1	1	1	0	2	1
71-80	0	1	1	1	0	0	1
<b>Totals</b>	<b>18</b>	<b>27</b>	<b>12</b>	<b>21</b>	<b>6</b>	<b>6</b>	<b>10</b>

Source: Field Survey, 2021

Location choices are driven by relation to place, and other place activity people locate closer to areas where they engage in much of their day-to-day activities. This table displays precisely that, for example, the distribution of age grouping of 20-30 years which forms a studying population in the study area. This population is majorly distributed in sublocations of Manyengo and Mwembetayari sublocations, with students from SEKU forming the highest percentage because the University campus is located on the edge of the town that borders the sublocation. At the same time, students from KMTC occupy much of the Mwembetayari sublocation, which is the frontier sublocation to the college.

Table 9: Category of Respondent Based on Ownership and Nativity

Age Bracket	Land Owner	Tenant	Native	Non-indigenous
20-30	4	35	3	36
31-40	17	6	13	10
41-50	14	3	6	11
51-60	9	1	6	4
61-70	7	0	5	2
71-80	4	0	4	0
<b>Totals</b>	<b>55</b>	<b>45</b>	<b>37</b>	<b>63</b>

Source: Field Survey, 2021

The nativity of the sampled population, as shown in table 6, non-locals account for 63% of the sampled population while Locals account for only 37%. The age group 20-30 years accounts

for approximately 57% of the total Non-indigenous population, but on land ownership, it scores poorly with only four households owning land.

### 5.2.3 Marital Status of Household Respondents

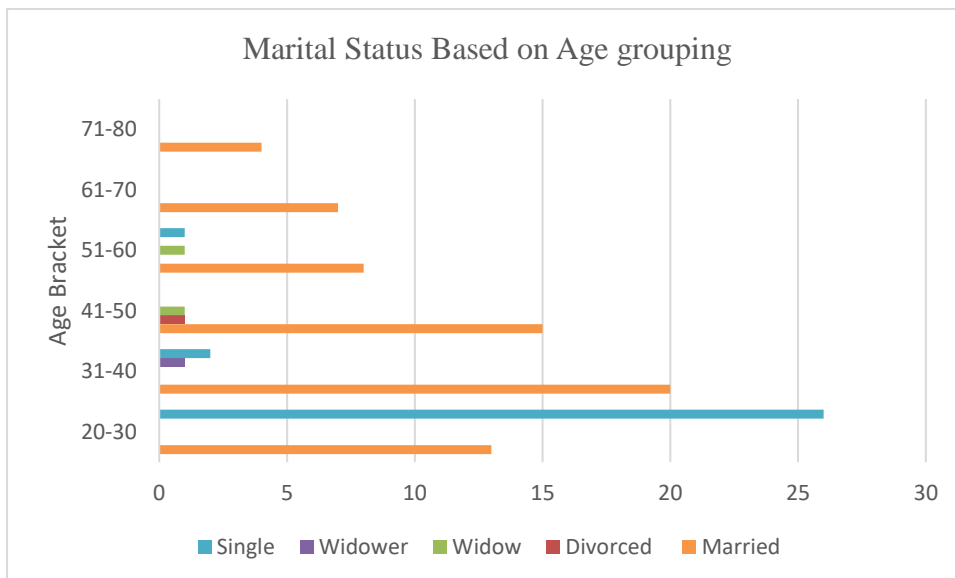
**Table 10: Marital Status of Household Respondents in the Study Area**

Age Bracket	Marital Status Frequencies				
	Married	Divorced	Widow	Widower	Single
20-30	13	0	0	0	26
31-40	20	0	0	1	2
41-50	15	1	1	0	0
51-60	8	0	1	0	1
61-70	7	0	0	0	0
71-80	4	0	0	0	0
<b>Totals</b>	<b>67</b>	<b>1</b>	<b>2</b>	<b>1</b>	<b>29</b>

Source: Field Survey, 2021

In the PUAs, 67% of the sampled household population is married, drawing 33.3% from the age bracket of 20-30 years, 86.9% from the age bracket of 31-40 years, 88.23%, 80%, 100%, 100% from the age bracket of 41-50 years, 61-70 years and 71-80 years respectively. This is further illustrated in Table 7 and figure 2.

**Figure 3: Marital Status Based on Age Grouping**

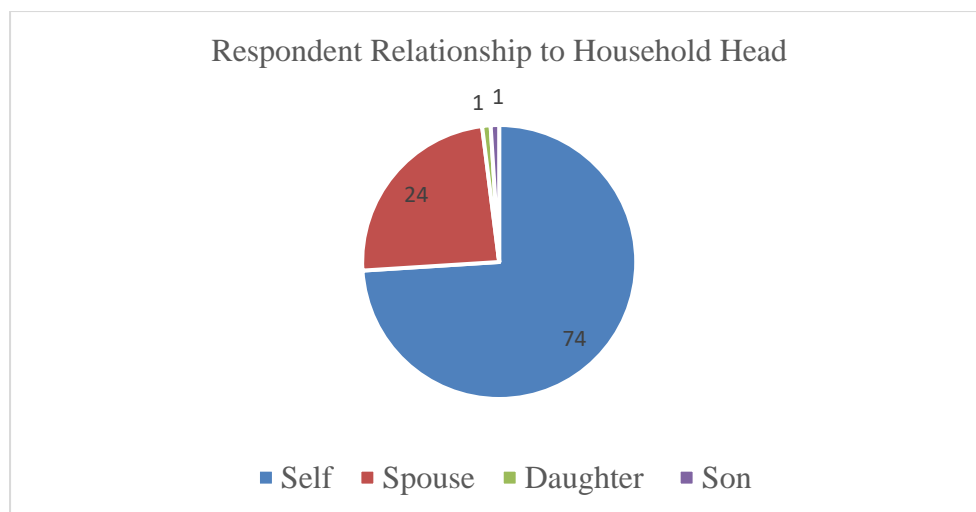


Source: Field Survey, 2021

### 5.2.4 Relation to the household head

The study targeted household heads who often happen to be men and are the key decision-makers due to cultural inclinations (Mandere et al., 2010). Where the household head could not be reached, the study opted for spouses. This was informed by the hierarchal decision-making assumption that the spouse stands in for the household head if he/she is absent or the single parent. In cases where both spouses and household heads were unavailable, the study settled for children who were over 18 years. Of the household interviewed, 74% were the household heads, 24% were the spouse while 1% daughter and 1% a son, this is further illustrated in Figure 3.

Figure 4: Respondent Relationship to the Household Head



Source: Field survey, 2021

### 5.2.5 Education Levels of the Respondents

Table 11: Highest Level of Education

Age grouping	No formal Education	Primary Level uncompleted	Primary level completed	Secondary School level uncompleted	Secondary School level completed	Post-Secondary Level Completed	Post-Secondary Level on progress
20-30	0	0	0	2	10	13	14
31-40	1	0	4	0	6	9	0
41-50	0	0	6	1	4	6	0
51-60	1	0	2	0	3	4	0



61-70	0	0	2	0	4	0	0
71-80	1	0	2	0	1	0	0
Totals	3	0	16	3	28	32	14

Source; Field survey, 2021

Population with certification above the secondary school level make the highest percentage with approximately 33% of the valid response received during the field survey followed closely by those with secondary level certification with 29%, Primary school certification at approximately 16.7%, and 3% with no formal education. The study could not ignore the contribution of the higher learning institution's location closer to the hinterland. For this reason, categorization of education level had to be done to show their impact, classified as post-secondary level on progress, which accounted for approximately 14.5% of the valid responses on education level.

#### **5.2.6 Mode of Land Acquisition**

Only 55% of the interviewed households own land, with a frequency of 55. Out of the 55, 67% was acquired through inheritance, this customary tenure is critical in releasing land for urbanization (Jayne et al., 2019), while the remaining 33% was acquired through buying. Only 58% of those who inherited land have subdivided the land with 85.7%, noting that the subdivision was for inheritance purposes while 14.3% was for selling.

While the household survey painted a picture of PUAs that have not undergone much land transfer to non-locals, conversations held with some locals gave a different picture of the same. Some of the locals were bold enough to note that people are selling off their land at an alarming rate, which has seen some becoming squatters on land that they have sold off while others have become landless moving to town as tenants

#### **5.2.7 Land Transformation**

Out of the 55 landowners, 20 of them have transformed the original land use; however, out of these 20, only 11 applied for development permission remaining nine did not seek a change of use approval, with six of them noting that their land is under freehold and did not require seeking development permission while the remaining 3 cited lack of awareness for not applying. All the land in the study area is freehold land, and all the owners have freehold title deeds.

**Table 12: Land transformation in the study area**

Changed use	Frequency	Percent
Yes	20	36%
No	35	64%
Total	55	100%

Source: Field survey, 2021

### **5.2.8 Incomes of the Locals**

#### **5.2.9 on Farm Incomes**

Farming in the area of study is only practiced by 49% of the sampled households; however, only 11 of the 49 do commercial farming, with four of the eleven doing poultry farming, three doing vegetables and fruit farming, two doing tree nursery, one doing dairy, and the other one doing Mutua farming. The reason cited for not doing commercial agriculture is small landholding sizes.

#### **Plate 1: Vegetable farming in the Study Area**

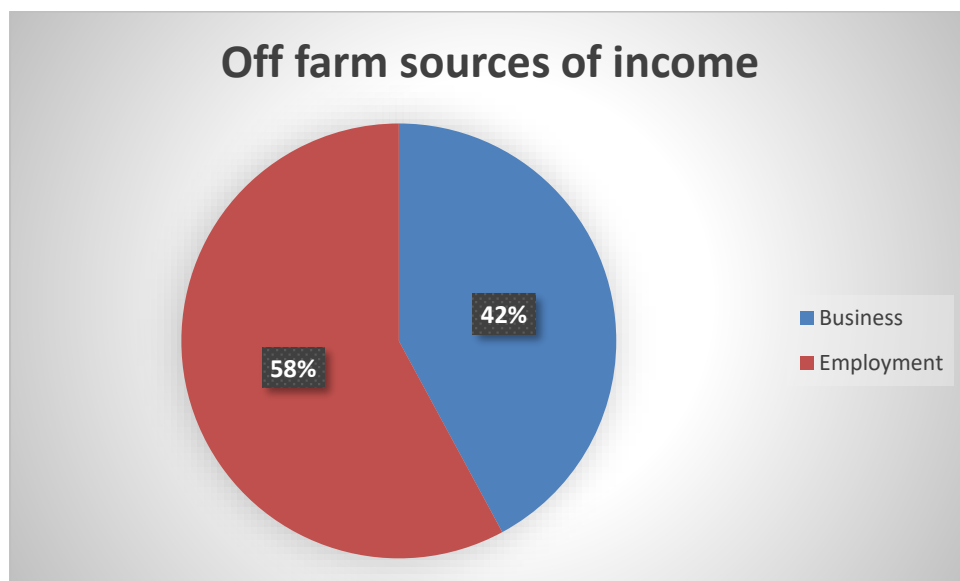


Source: Field survey

#### **5.2.10 off Farm Incomes**

The off-farm income account for 76 of the responses on incomes in the study area. Businesses accounted for 42% of the off-farm income, while employment accounted for the remaining 58%. The type of off-farm income from the businesses is listed in Table 10.

**Figure 5: Off-farm sources of income by the respondents**



Source: Field survey, 2021

**Table 13: Type of businesses practised by respondents in the Study area**

Types of Businesses	Frequency
Retail shop	9
Brick Making	4
Bar	1
Butchery	1
Land Leasing	1
Hawking	1
Bodabodas	1
Construction	1
Sand Harvesting	1
Food Kiosk	1
Cereals	1
Broker in Goat Selling	1
Green Grocery	1
Landscaping	1
Timber and Carpentry	1
Salon	1
Rentals	5
<b>Total</b>	<b>32</b>

Source: Field Survey, 2021.

Retail shop businesses account for 9 of the 32 businesses that the respondents in the study area are participating in, brick-making being the third-largest business after rental, which accounts for 5 of the 32. Other businesses practiced in PUAs are; bar, butchery, land leasing, hawking,

bodabodas, construction, sand harvesting, selling of cereals, brokering of goats for sale, Landscaping, timber, and carpentry, and salon register just one each in responses. Sand harvesting and stone crushing are shown in plates 2 and 3.

**Plate 3: Sand Harvesting in the study area**



Source: Field survey, 2021

**Plate 2: Stone crushing in the study area**



Source: Field survey, 2021

Employment accounts for the largest source of income, with 58% of the total off-farm income. Of the employed respondents, 18 of the 44 earn between 0- 25000 a month, nine earn between 25001- 40000, 5 earn between 40001-55000, one making between 55001-75000 while 11 of the 44 earn 75001-100000.

**Table 14: Monthly earnings from employment by the Respondents**

Age group	0 - 25000	25001- 40000	40001- 55000	55001- 75000	75001- 100000	Totals
20-30	12	1	3	0	0	<b>16</b>
31-40	4	1	1	0	7	<b>13</b>
41-50	2	2	1	0	3	<b>8</b>
51-60	0	1	0	1	1	<b>3</b>
61-70	0	2	0	0	0	<b>2</b>
71-80	0	2	0	0	0	<b>2</b>
<b>Totals</b>	<b>18</b>	<b>9</b>	<b>5</b>	<b>1</b>	<b>11</b>	<b>44</b>

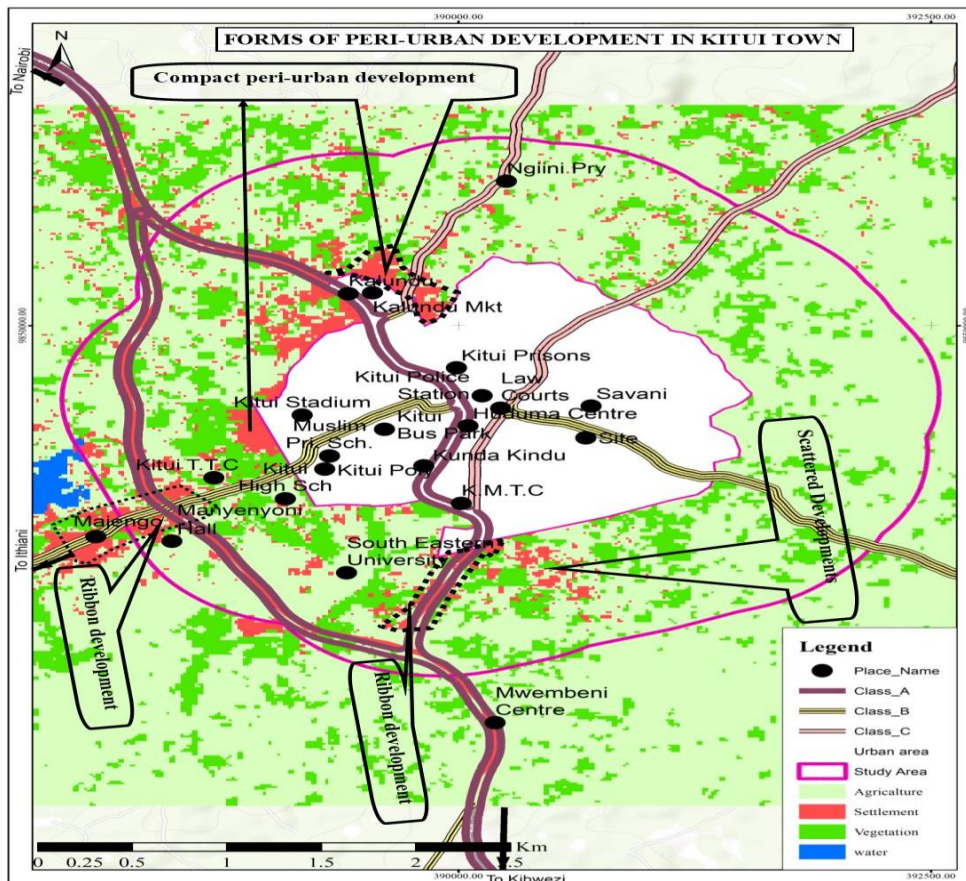
Source: Field survey, 2021

## 5.4 Nature Form and Character of Peri-urban development in Kitui Town

### 5.4.1 Nature and Form

Development doesn't take place uniformly, peri-urban development of Kitui has also experienced uneven developments. This section looks at the peri-urban development based on some sub-locations but a broad overview has been shown in map 5 for the overall area of study. In the map the study area has experienced ribbon developments, scattered developments necessitated by the independence of the actors, and then compact peri-urban developments at the edge of the town courtesy of nodes at the edge of the township.

**Map 5: Overall Forms of Peri-urban development in Kitui Periphery**



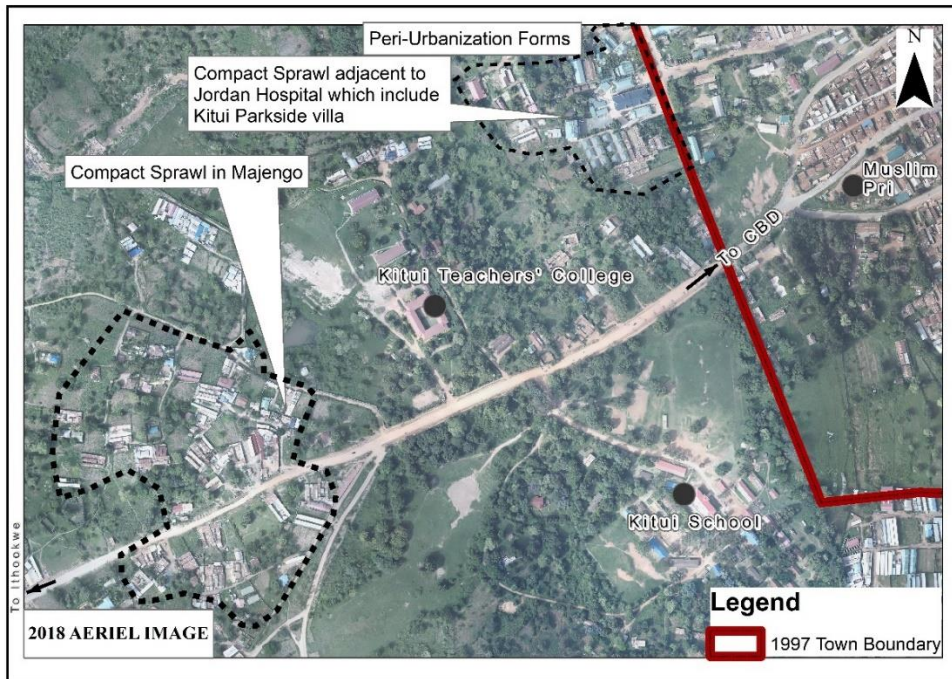
Source: Author, 2022

### Manyengo Sublocation Form of Peri-Urban Development

Manyengo sublocation serves as a dormitory sublocation for the student from SeKU and KMTTC. This has seen more compact peri-urban developments and the fact that it is very close to the town which has seen major establishments like Jordan hospital, and the Parkside villa

act as propellers of development as well as other learning institution like Kitui teachers college. Map 6 illustrates the form of compactness as an extension of the town and another compactness taking shape behind Kitui teachers' college. The area also has ribbon development along Kitui –Ithiani road as well as the rerouted A9 (Kanyonyoo-Kitui-Kibwezi Road)

**Map 6: Peri-urban development form in Manyengo**

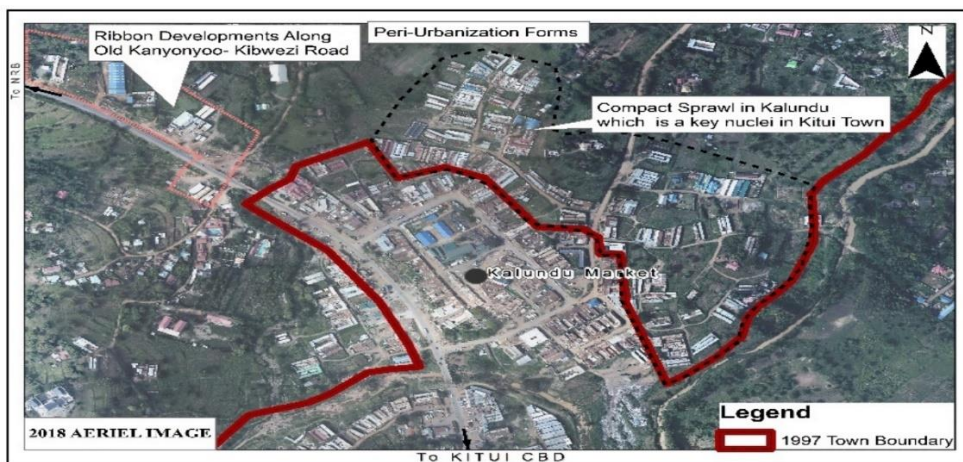


Source: Author, 2021

**Kalundu Sublocation Form of Peri-Urban Development**

Kalundu forms a part key node of the Kitui town which has seen massive investments in the sublocation. It exhibits both compact and ribbon peri-urban developments. This is further shown in map 7.

**Map 7: Peri-Urban Development Form in Kalundu Sublocation**

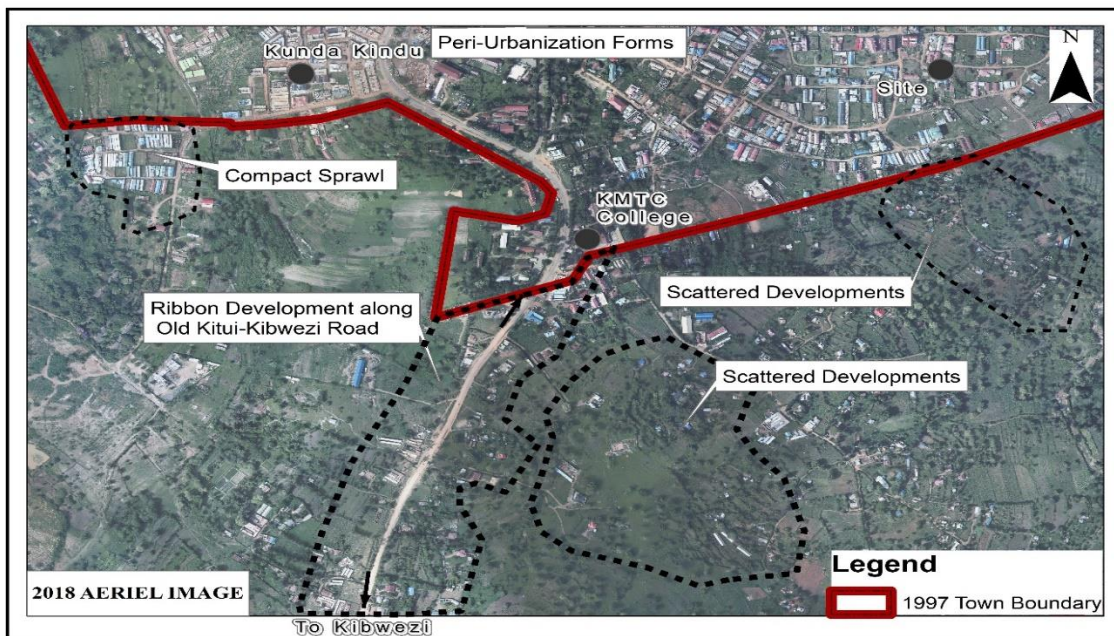


Source; Author, 2021

### Mwembetayari Sublocation Form of Peri-Urban Development

Mwembe Tayari sublocation has two major highways traversing it as well as a significant dormitory for students both from SeKU University as well as the Kenya medical training center. The sublocation has also seen the employed population buy and build homes. As shown in the map the sublocation has seen ribbon development along the A9 both the old route as well as new routing. The scattered developments especially in the location neighbouring site which was brought within the urban area through urban boundary readjustment in 1997.

**Map 8: Forms of Peri-urban development in Mwembetayari Sublocation**

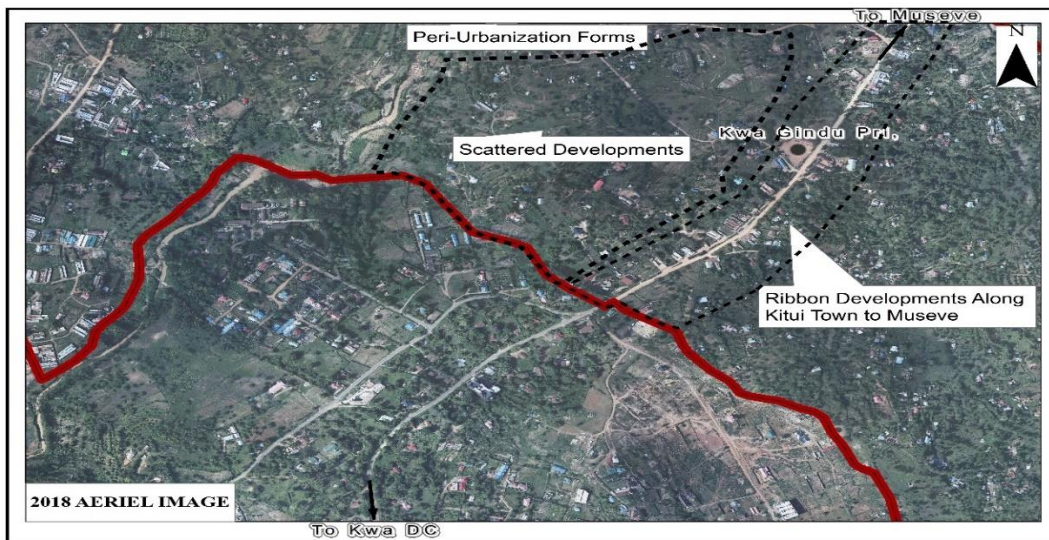


Source; Author, 2021

### Misewani Sublocation Form of Peri-Urban Development

Misewani has both the scattered peri-urban development and ribbon along the transport corridor .this form of development is further shown in map 9

**Map 9: Form Peri-urban development in Misewani Sublocation**



Source; Author, 2021

### **5.4.3 Character**

#### **Peri-urban land use change**

Peri-urban regions are known for dynamic changes in land use change, peri-urban development has seen a rise in the built-up area, Majengo area is the area that has seen peri-urban development overtime from 0.8 square kilometre in 1987 to 0.24 square kilometres in 2021. Misewani accounts for the largest built-up area with 0.33 square kilometre square from 0.036 square kilometres in 1997. Mulundi sublocation has not experienced peri-urban development yet. While Mwembetayari rate of peri-urban development is high as well with built-up area raising from 0.14 kilometre square in 2017 to 0.18 in 2021. The finding through the classification land use change analysis is further supported by findings from the household questionnaires that noted that out of 55 percent of sampled households who are land owners 36.4% have changed the use of the land from the initial use which is agriculture to residential use while 64.6% have retained the initial use.

#### **Social transformation**

The fringe also has experienced a social transformation with a heterogeneous society attracting a population from rural parts and other urban areas. The non-indigenous account for 63% of the population in the peri-urban zone with the indigenous only accounting for 37%. The non-local population from the hinterland accounts for 39.7% while 19.1% is from other regions and 17.5% is from other urban areas. Education level peri-urban region is dominated by those who have completed post-secondary education certification registering 33.3%, followed by 29.2% those who have acquired secondary level certification, 16.1 % those who have primary level certification, the category of those are progressing towards post-secondary education



certification recorded 14.6 % of the peri-urban population. The category of those with non-formal education and those who didn't manage to complete secondary certification each registering 3.1% of the population each. On economic structure of the peri-urban population, 40.9% earn between 0-25000 Ksh, 25% earning 75001-100000, 20.5% earning 25001-40000, 11.4% earning 40001-55000 and 2.3% earning 55001-75000.

### **Livelihood Transformation**

Out of this 63%, Agriculture is still practiced, but its economic viability, like other PUAs, is questionable due to smaller household landholding sizes. The fringe has also moved to non-agricultural income activities, with employment registering 58% of non-farm incomes while business ventures account for 42%. The business ventures include retailing registering 37.1%, Brick making recording 12.5%, Rental at 15.6% and, Land leasing recording 3.1% other include hawking, bodabodas, construction, sand harvesting, food vending, brokering, landscaping, salon, timber, and carpentry each recording 3.1%.

### **Land tenure and parcellation**

On land tenure, the PUA is purely under freehold, which makes it easy to transact. On land ownership, some parcels are individually owned while others are still held through customary, with such land being unable to be traded in land markets. However, while land parcellation is venture driven by a desire to sell land, from the household interview, it was noted that 85.7% was for inheritance purposes while 14.3% was for selling.

### **Management of the peri-urban region**

Management of peri-urban region has always been noted as one faced with a huge challenge due to a disjointed approach. However peri-urban zone of Kitui lies within municipality boundaries which are under review through Kenya urban classification and boundary review program. This puts the municipality management fully responsible for the management of the peri-urban. However, there are management challenges that have seen the approval of plans within the municipality by the management of adjoining sub-counties. On waste disposal, the department of environment can also not participate in any effort to ensure a cleaner environment since the responsibility full lies with municipality management.

## Other characteristics

The peri-urban region is faced with accessibility challenges due to uncoordinated development as well as development overtaking planning and infrastructure. The peri-urban region is also faced with the challenge of waste disposal from liquid to solid waste. The region also suffers from inadequacy of basic services.

### 5.3.2 Factors Motivating Peri-urban development

The study first focused on the reason for the respondents moving to the town. Of the non-locals interviewed, 38% moved to the town for employment, 11% sought jobs, 15% moved in to start businesses, 25% moved in to study, 5% due to marriage, and 6% relocation was motivated by the desire to access the bright lights of the city.

Of the discussed non-locals, 39.68% are from rural parts of Kitui County, 23.8% are from the inner Kitui town, 19.1% are from rural parts of other counties account for 19.05%, other urban areas in Kitui county account for 7.94%. In comparison, other urban areas outside the region account for 9.52% of the interviewed non-locals.

Fox (2012) and Hall (2002) explain the phenomena of rural-urban migration as being experienced in the study area and note the role of inferior rural economies as a push factor for ruralists to urban areas this is further accelerated by climate change (Fox,2012) rendering agriculture unviable. With Economic advantages held by the urban areas, so are the employment opportunities. The city's best social and physical infrastructure is another pull factor. As Fox (2012) cited, cities as the concentration of institutions of higher learning and best facilities make the ruralist relocate to enjoy this.

**Table 15:Non-indigenous population and areas of the location before locating in the PUAs**

Location before moving to PUAs	Inner Town (Kitui)	From Rural Parts of Kitui County	From Other Counties	From Another Urban Area in Kitui County	From Another Urban Area Outside the County
Frequency	15	25	12	5	6
Total in Percentage	<b>23.81%</b>	<b>39.68%</b>	<b>19.05%</b>	<b>7.94%</b>	<b>9.52%</b>

Source: Field survey, 2020

### 5.3.2 Reason for Locating in PUAs

**Table 16: Reason for Locating in Peri-urban area**

Factor	Frequency	Percentage
Cheaper Rent	36	18.2%
Near place of Work	15	7.6%
Near Town	15	7.6%
Near School	14	7.1%
Preference to freehold ownership	5	2.5%
Cheaper Land	12	6.1%
Improved Access	12	6.1%
Serene environment	29	14.6%
Increase in Household size	6	3.0%
Preference for larger spaces	16	8.1%
good security	18	9.1%
Better house designs	5	2.5%
The desire for own occupier	8	4.0%
Access to better social amenities	7	3.5%
Total	198	100.0%

As shown in Table 16, respondents cited cheaper rent as the motivation factor for moving to the fringes scoring 18.2%. The significance of cheap rents shows through the dominance of the studying group (20-30 years), where 66.67% of the 39 are fully dependants and also recorded 63% walking as a mode of transport. While 7.6% attributed their choice of location as motivated by being close to their place of work and 7.1% near their schools. The closeness to town registering 7.6% was necessary for the small-scale business people and households due to shopping. Responses of 2.5% pointed out that their drive to locate in the peri-urban area was motivated by land tenure, land in the PUAs is under freehold and therefore owners do not pay rates as well as most of the land is free from land disputes as witnessed in the urban area. Some cited the tenure also enables them to carry out developments without much policing as is the case in the urban area.

6.1 % also cited the availability of cheaper land in PUAs as a reason for moving to these areas, an argument supported by county physical planners and land surveyors. They pointed out that a lot size of 50x 100 feet was going for approximately 7-9 million in the CBD. However, the increase in the distance from the core to PUAs keeps decreasing land values, validating

Alonso's bid rent theory. Improved access scored 6.1%; this was also the reason for peri-urban development by the physical planners in charge of the municipality and County Surveyor.

14.2% cited a serene environment as a pull factor to the PUAs because to the studying population; it provided a cool environment where they could study without much distraction; the other population that had relocated from inner-city cited inner-city ills like pollution (noise, air, and solid waste) and congestion this validates the arguments fronted by scholars of flight from blight as a critical driver to PUAs.

Improved security compared to inner town recorded 20% of total responses on socially motivated location choice to the respondents. This improved security has been made possible through regular patrols by security agencies and community policing hence making the PUAs very safe.

The working group cited preference for larger spaces as motivation for moving to the PUAs, registering 8.1%. The desire for own occupier as a motivating factor to locating in the peri-urban regions recorded 4% of the total responses with an increase in household size registering 3%.

Better housing designs, as argued by Hall (2002), noting that when carrying out housing projects, should take care of expectations of generations to come or else the future generation will flee to fringes where better housing is provided this in the study area accounted for 2.5% of the total responses. The other reason was access to better social amenities recording 3.5%, one of the respondents informed the interviewer that *'I came to live here because being closer to town offers me the opportunity to enjoy access to quality basic services compared to those located further in the rural hinterland.'*

### **5.3.5 Institutional Factors Motivating Peri-urban development**

Mwangi (1994) and Ayonga (2019a) note that informality in the urban sphere is motivated by ambiguity in planning law on the management of the rural-urban divide; these sentiments are echoed by Ng'ayu (2015) by noting PUAs as a grey area in the management of development. Ambiguity in law managing PUAs and urban areas haunts the study area with land control Act 2012 and Agricultural Act cap 318, while the Agricultural Act Cap 318 defines, Agricultural land based on use the Land Control Act 2012 contradicts this by putting all land within the municipality boundaries as purely urban and should be managed as urban land therefore not within the jurisdiction of Land Control Boards. According to the County land surveyor, this

approach has driven peri-urban development in the study area since all ‘agricultural land’ can be subdivided through urban minimum lot size and get approval quickly without questioning the sustainability of these subdivisions.

The other element of irregularity is that the Urban areas and cities amendment Act of 2019 gives the municipalities the full mandate of managing areas within municipality boundaries; however, the physical planners in charge of the municipality note that their counterparts in the sub-counties overlapping with the municipality were still making approvals of developments within the municipality this overlapping role further accelerated Peri-urban development.

An obsolete development plan still guides development even; with population overgrowth and demands. The municipality is cornered by the need for sustainability and meeting demand for these growing numbers. Even with a lack of development framework, development beyond urban influence get approval. The approvals may be an attempt by the local authority to generate revenues.

### **5.3.6 Lack of Institutional Capacities**

To the political elites, planning is considered anti-development. The political perception of town and country planning makes it hard for the political class to invest in planning because they are interested in quick wins that planning may not provide. The approach explains the reluctance of the county executive to invest in planning, leaving the department of physical planning without up-to-date tools to guide development.

Even though the town has adequate personnel with three physical planners in charge of the municipality, they are faced with the challenge of logistics to enable their enforcement duties. This scenario is in agreement with the arguments of Bhatta (2010), Ahmed and Dinye (2011), and Ng’ayu (2015).

The physical planners also pointed to significant challenges posed by political interference while carrying out their duty, noting that some projects were untouchable, which had significant contributions to Peri-urban development.

### **5.3.7 Decentralization of Centres of Employments to the PUAs**

There are efforts by both County and national to decentralize employment through the big four agenda one such attempt is through the KICOTEC textile industry in Syongila and mango processing industries in parts of the Mwembetayari sub-location. The presence of institutions

of higher learning plays a significant role since most of the employees fly to these centers of employment and fly back during the evening making the town serve as a dormitory town to important centers of employment outside the town. With completion, diversion of A9, and construction of weighbridge in the peripheries, this has seen other development coming up.

### **5.3.8 Land Speculation**

The town is undergoing fast growth courtesy of investment in infrastructure; this has seen speculative buying, especially along the major corridors. The speculative buy holds the land for any urban development prompting development to leapfrog into the agricultural land. One area that has experienced speculative buy and continues to be experienced along the A9 corridor that has seen land appreciate with the construction of the road was initially cheaper costing less than 700000 Ksh for a lot size of 50x100 has now risen to over one million Kenya shillings as shown in plate 4.

**Plate 4: Sell of Land along the A9 corridor in Manyengo Sublocation**



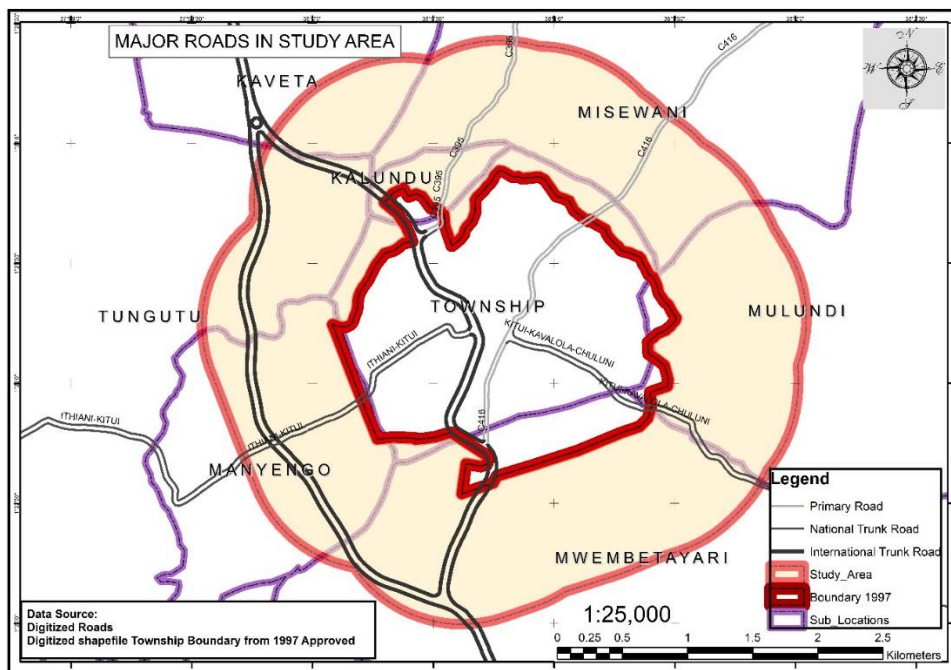
Source: Field survey, 2021

### **5.3.9 Improved Accessibility and increased individual mobility**

The town has seen a massive upgrade in infrastructure, enhancing connectivity between the town, her immediate hinterland, and the region. One of these major infrastructure projects is upgrading A9 to bitumen standards and diverting it to traverse Mwembetayari, Manyengo, and Tungutu sublocations, opening up that section to peri-urban development. The improved connectivity improves the economic position of the town, making it attractive to people from

other regions. The other significant roads upgraded to bitumen standards are the Mbusyani road connecting the inner town with parts of Manyengo, Ithookwe, and Ithiani, C395, and C416, all connecting the inner town to the Eastern part of the town. A pictorial glimpse of some of these roads is shown on plates 2, 3, and 4. It is on these corridors that much of the built-up area is. Bodabodas have further accelerated individual mobility, which is significant in driving peri-urban development; from household surveys, reliance on bodabodas accounts for 54%, with only 16% of the interviewed households owning a car.

**Map 10: Major Roads Upgraded to Bitumen Standards**



Source: Author’s construct, 2021

**Plate 5: Old Kitui-Mutomo-Kibwezi Road**



Source: Field survey, 2021

**Plate 6: New A9 (New Kibwezi-Kitui-Kanyonyo Road)**



**Plate 7: C395 (Connecting Kalundu and Eastern hinterland of the town)**



Source: Field survey, 2021

**5.3.10 Population Growth and Growth in Income Earnings**

The town has been registering population growth since independence with a population of 3071; the town recorded a 203% increase in population by 1989. In 1999 the town further listed a 42% population increase, 2009 it registered 44%, while in 2019, it recorded a 52% increase in population which is arguably attributed to devolution (CBS, 1988 and 1996; KNBS, 2010 and 2019).

The presence of institutions of higher learning has also seen an increase in population in the town; this comes with a demand for housing which the inner city is unable to meet demands the peripheries become the ideal place to do so. The devolution meant higher earnings were realized which enabled the population's capability to invest according to an interview with the county physical planner and county land surveyor.

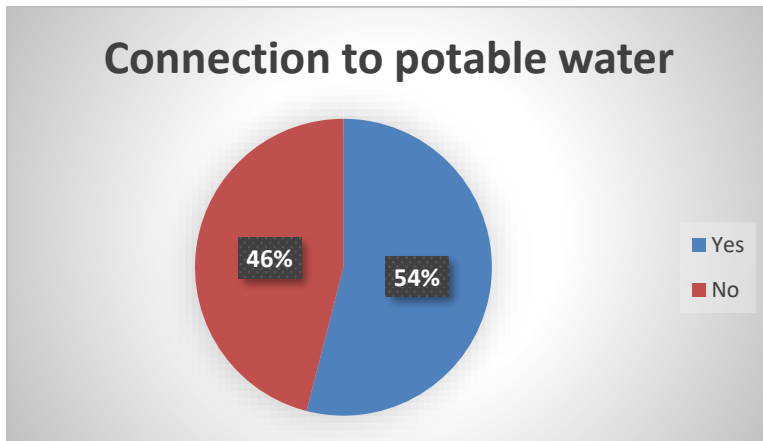
**5.4 Status of Access to Basic Services**

Essential services are critical in the running of community welfare. The study focused on access to potable and domestic water, access sewer, and access to early childhood education centers, primary schools, and health facilities. The study used the physical planning handbook of 2012 in informing it on standard distances that one should cover to access the facilities and population densities.



### 5.4.1 Access to Potable and Water for Domestic Use

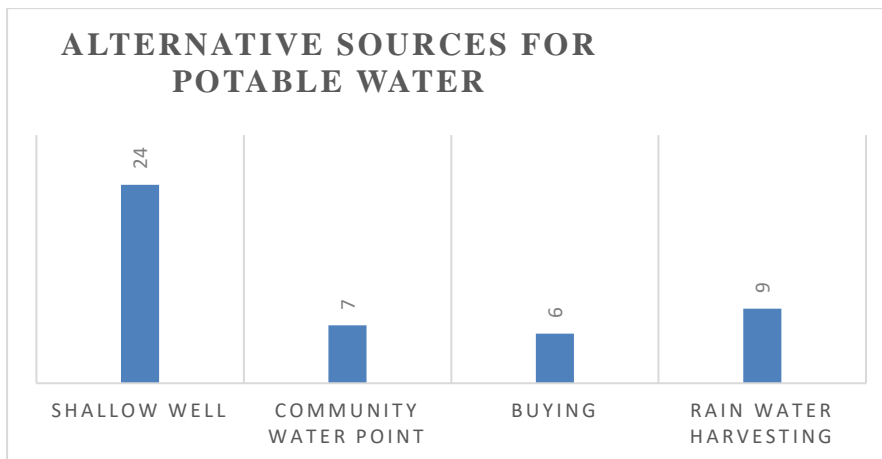
**Figure 6: Connection to Piped Municipal water**



Source: Field survey, 2021

Access to clean and potable water in the study area is at 54% of the interviewed population connected to piped water through KITWASCO. In comparison, 46% is not connected to piped water and relies on other potable water sources. These alternative sources are shown in figure 5.

**Figure 7: Alternative sources for Potable water in the study Area**



Source: Field survey, 2021

Of the 46 using alternative sources, 24 of them depend on shallow wells as the source of their potable water, 7 of the 46 rely on community water points, while 6% of the 46 have resulted buying water from refillers with 9 of the 46 resulting to rainwater harvest this common in parts of Mulundi sublocation. The shallow wells are common in the area of the study since it has a high water table.

On water sources for domestic use, shallow wells account for 98% of the 58 responses from the respondents, with only one respondent whose source of water for domestic use was a river.

**Table 17: Sources of water for domestic use**

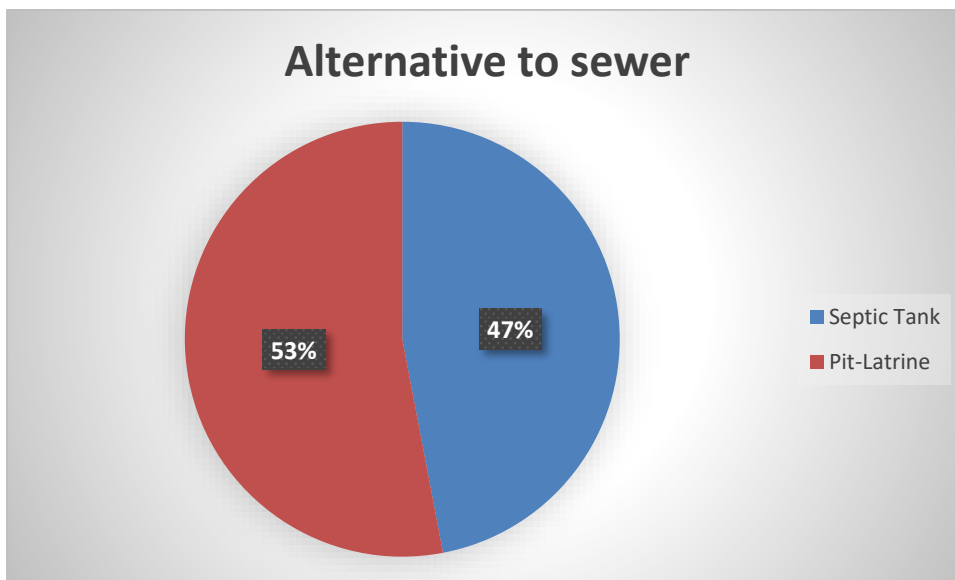
Source of water for Domestic	Frequency	Percent
Shallow Well	57	98%
River	1	2%
Total	58	100%

Source: Field survey, 2021

#### 5.4.2 Connection to the Sewer

The study area does not have any connection to a sewer; however, the infrastructure is available in parts bordering the site and service area in the Mwembetayari sublocation. Lack of sewer has made the locals result in other alter Locals like sewer and pit latrine- details as shown in figure 6. The use of pit latrines is the popular alternative scoring 53% of 100 sampled households, depicting the respondents' rurality. Septic tanks registered 47% of the sampled households. These modes have implications on groundwater quality, with the area having a very high water table.

**Figure 8: Alternative to Sewer**

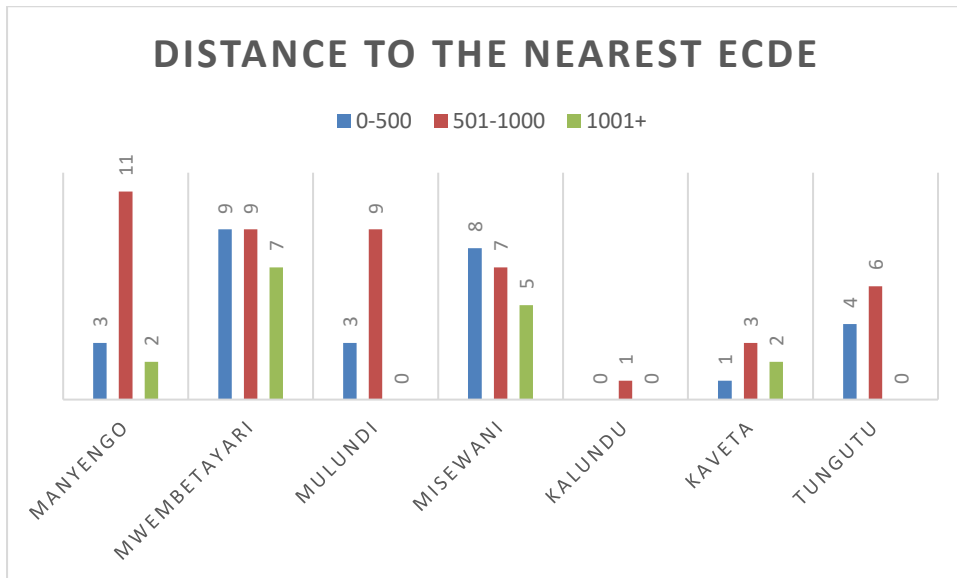


Source: Field survey, 2021.

### 5.4.3 Access to Early Childhood Centres

The physical planning handbook 2012 sets standards the children of 5-6 years whom these facilities usually target `should not travel for more than 500 meters to access. An analysis carried out from responses given during the study’s household survey showed that in the Manyengo sub-location only.

**Figure 9: Distance to the Nearest ECDE for Interviewed Household**



Source; Field survey, 2021

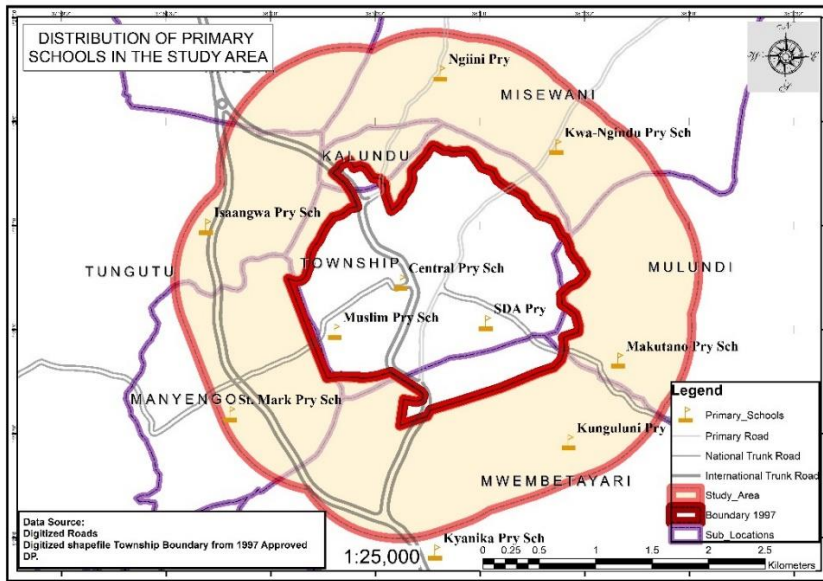
### 5.4.4 Access to Primary School

Approximately six public schools serve the area of study, but some of the inhabitants of the PUAs still take their children to schools within the central town which is 3 in number. The study adopted physical planning handbook criteria, which recommend a walking distance between 500 to 2km. Based on this evaluation approach, the Manyengo sublocation meets the standards with the respondents' children walking within a range of 0-2000km to access the nearest primary school. The primary schools within its range are St. Mark’s primary school and Muslim primary school in the central town. In the Mwembetayari sublocation, 88.5% of respondents can access schools within the recommended range, with only three walking beyond the 2km recommendation. These recommended standards are also witnessed in Mulundi Kaveta and Tungutu, while Misewani has one case where the respondent travels for over 3km to access the nearest primary school.

The distribution of the primary schools in the study area is shown in Map 6 and figure 8. However, with these standards in distances within conventional standards, some of the

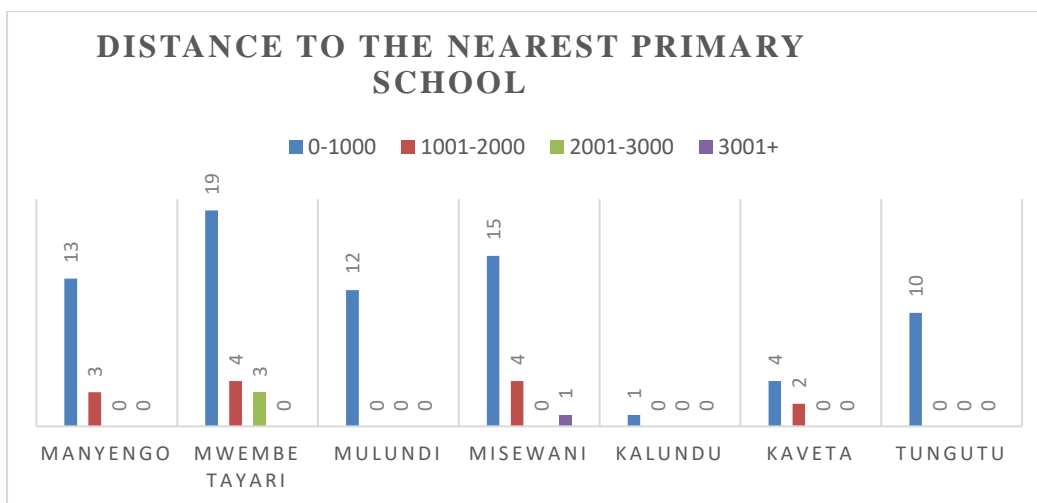
interviewed households pointed to challenges associated with access noting that these public schools are very congested, affecting the recommended teacher-pupil ratio of 1:38, which has seen mushrooming of private schools like Santa Tilahm day and boarding school in Kaseki village in Mwembetayari sublocation. The residents also pointed to poor access roads to these learning institutions as key challenges access.

**Map 11: Distribution of Primary Schools in the study area**



Source: Field survey, 2021

**Figure 10: Distance covered to the nearest Primary school**

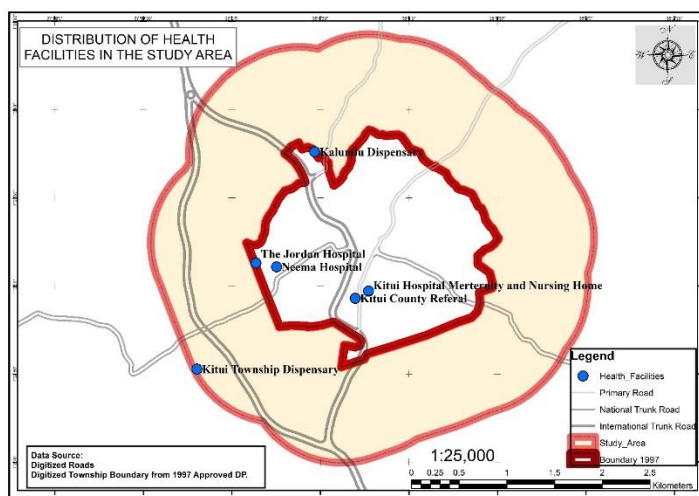


Source: Field survey, 2021

### 5.4.5 Access to Health Facilities

The study area is served by several public and private health facilities. Out of the public facilities are two dispensaries and a county referral. The study areas are also served by the private hospital, which is Jordan hospital and Neema hospital. However, the interviewed households rely highly on county referral hospitals, which also serve the whole county. Reliance on the county's referral hospital means that service provision conventional standards are compromised due to the large number of residents seeking medical attention because they have to cover long distances and delayed services accompanied by higher costs.

**Map 12: Distribution of Health Facilities in the Study Area**



Source: Field survey, 2021.

**Table 18: Distance Cover to Access nearest Health Facility**

Sublocation	0-1000	1001-2000	2001-3000	3001-4000	4001-5000
Manyengo	5	3	8	0	1
Mwembe Tayari	10	4		11	1
Mulundi	0	0	5	1	6
Misewani	0	1	15	2	1
Kalundu	4	0	0	0	0
Kaveta	2	1	3	1	0
Tungutu	4	3	3	0	0
<b>Totals</b>	<b>25</b>	<b>12</b>	<b>34</b>	<b>15</b>	<b>9</b>

Source: Field survey, 2021

### 5.4.6 Mode of Waste Disposal

The study area is faced a huge challenge in the waste disposal

Mode of Solid Waste Disposal	Frequency	Percent
------------------------------	-----------	---------

Burning	75	<b>75%</b>
Land Fill	19	<b>19%</b>
Indiscriminate Disposal	6	<b>6%</b>
Total	<b>100</b>	<b>100%</b>

### **5.5 Implications of Peri-urban development on PUAs and the Community in The PUAs**

The study investigated the effect through an open-ended question using a household questionnaire; the study further employed observation aided by photography to support arguments from both the observation and questionnaire. The study used three broader categorizations of these impacts. These categorizations are social, economic, and environmental impacts.

### **5.6 Peri-urban development implication on the environment in PUAs**

Thuo (2013) notes PUAs as zones of conflict of interests courtesy of the disjoint approach in their management, while Simon (2008) posits that urbanization and peri-urban development have diverse environmental implications on the PUAs. Simon (2008) further notes that these processes are very unsustainable, especially for the environment, by pointing out that the rural population is entirely dependent on the available natural resources for their livelihood. One of the critical concerns is the management of waste in the PUAs of Kitui town and the town and one of the critical challenges is the management of waste, both solid and liquid. The management of solid waste by the interviewed household showed that 75% of the 100 burnings of the solid waste they generate, and 19% dispose of the waste in landfills. In comparison, 6% do indiscriminate waste disposal. The findings on solid waste management agree with Thuo (2013) and Olajuyigbe (2016), who posit that the waste management strategies in PUAs are wanting. These modes are not only of crucial concern due to the emission of greenhouse gases during their burning but affect the aesthetics and breeding sites for vector-causing diseases like mosquitoes during the rainy season (Simon, 2008).

### Plate 8: Solid Waste Disposal in Study Area



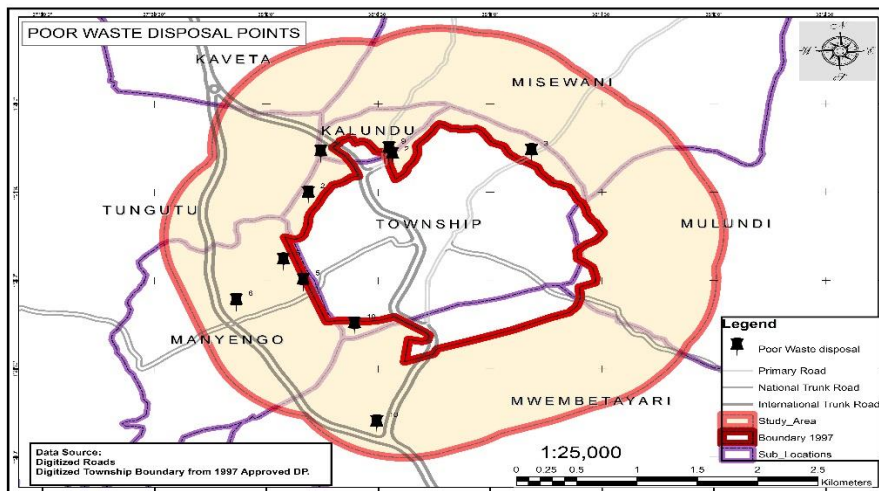
Source: Field survey, 2021.



Source: Field survey, 2021

The study also established points of poor solid waste disposal as shown in map 13. Even though generally the whole town of the embryonic city suffers from poor waste management, areas in the peri-urban areas parts of Kalundu, Manyengo, Mwembetayari, and Misewani.

### Map 13: Poor Solid Disposal Zones in the Peri-Urban Of Kitui Town



Source; Field Survey, 2021

The study has poor waste and stormwater disposal system which has compromised sanitation in the PUAs, especially in density areas as well as beyond. locals using open disposal liquid waste disposal the study area lacks a system for the disposal leaving the locals to use open ground for disposal as shown in plates 9 and 10.

### **Plate 9: Waste water disposal**



Source: Field survey, 2021.

These wastewater disposal strategies and the use of latrines in the study area where 24% of interviewed households rely on shallow wells as the source of their potable water are of concern since this may contaminate the groundwater (Simon, 2008). These findings validate Hope's (2012) argument that access to sanitation is a challenge in urban areas in Kenya. The town planner in charge of the municipality attributes these challenges to inadequate funding with the environmental department pointing to exclusion in management of the environment within the municipality since the Urban and Cities amendment Act of 2019 delegated the responsibility of managing environmental issues to the municipal management. Plate 10 shows pollution of Kalundu River from poor liquid waste disposal in peri-urban areas of Manyengo as shown in plate 9.

### **Plate 10: Disposal of Solid and liquid waste in water streams**



Source: Field survey, 2021



The peri-urban development process is characterized by the land transformation that has always seen the conversion of once agricultural land to a concrete carpet to meet urban areas' demand for housing and infrastructure (EEA, 2006; Simon, 2008; OECD, 2018). Concrete usually reduces soil permeability. One of the respondents in the Kaveta sublocation argued that the widening of the old Kanyonyoo-Kitui-Kibwezi Road has seen flooding increase. The situation is also not that different in the New A9 and other paved roads; this construction has also accelerated soil erosion through the exposure of surfaces to erosion after the construction of roads.

The respondents complained of noise pollution coming from the studying age group who usually put on loud music. Others complain of traffic-associated noise from upgrading the A9, and the old Kanyonyoo -Kitui -Kibwezi road traverses inner town and re-joins the A9 at Konani Kwa Kalundu. The respondents in parts of Manyengo and Mwembetayari sublocations have been affected by noise pollution emanating from traffic and the student population.

EEA (2006) posit that with the demand for construction material, the PUAs become the venues for extraction of these materials. Simon (2008) notes that quarrying activities take place on rivers. Kalundu River has not been exempted from sand harvesting and crushing of stones in the river for livelihood. Initially, brick making along the river was also a concern, but with a peri-urban development, the preference for bricks has gone down, but demand for building stones rose. Plates 12 and 13 show sand and stone harvesting in Kalundu River in Ngiini village.

#### **Plate 11: Stone Crushing in Kalundu River**



Source: Field Survey, 2021

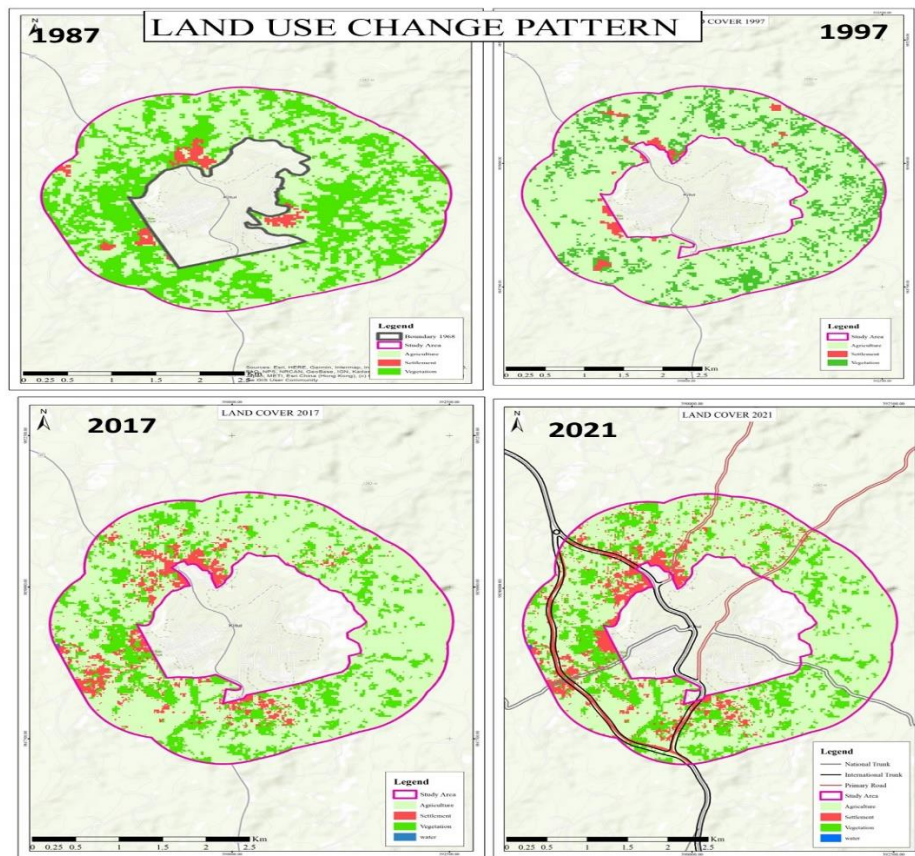
**Plate 12: Sand Harvesting in Kalundu River**



Source: Field Survey, 2021

The fringes have also undergone land-use changes; the household interview found that 20 of 55 landowners have changed land use from its original use. The difference in cover has been shown in plate 14, with the base year being 1987. From 1987 the vegetation cover has reduced significantly from 42.18 of 11.51 km<sup>2</sup> to 20.62% in 2021. At the same time, the built-up area increased from 1.56% to 10.8% in 2021. Land under agriculture has also declined from 77.5% of 11.51Km<sup>2</sup> in 1997 to 68.58% in 2021.

## Plate 13: Land Use Change Pattern



Source; Author, 2021

### 5.5.2 Peri-urban development implication on the social sphere in PUAs

Peri-urban development as a process is attributed to altering the PUAs social character from pure Locals to intrusion by non-locals. The non-indigenous population is drawn from the urbanites who come from different tribes and regions (Mandere et al., 2010; Mbuligwe, 2011; Thuo2013; Appiah et al., 2014).

The interviewed population constitutes 37% of the 100 households interviewed being Locals, while the non-locals constitute 63%. The 63% is comprised of 12 from other counties, with some coming from other counties like Embu, Kisii, Kisumu, Meru, Makueni, Nakuru, Kiambu, and Siaya. At the same time, 6 were from other urban areas and urban centres outside the county like Nairobi, and Thika while 27 were from rural parts of the county, and 15 migrated from the central town to the PUAs. The described characteristics befit the PUAs as a zone of social heterogeneity, as argued by scholars of urban sprawl. Contrary to the peri-urban regions in the west, Kitui PUAs is occupied by 35 of its interviewed inhabitants being students who are 100%

dependants. At the same time, the majority (42 in number) of their rent is 10,000Ksh. Only 16 of the 100 own a car, with 54 relying on Boda-boda while 30 Walk to school and places of work.

The social integration of the communities in PUAs has been at the centre stage of peri-urban development. As urbanization creeps into these regions, social contact is minimized (Thuo,2013; Torres, 2011; Tiwari and Goel, 2017; Bahaydar, 2013; Owusu and Chigbu, 2020). From the study's findings, the respondents noted one of the gains of peri-urban development was increasing their social network, which accounted for approximately 18% of the positive impact of peri-urban development on the social aspect of the society.

Peri-urban development has a significant influence on the rise in society's ills, one of the key concerns is an increase in the level of insecurity (Haller et al. 2017), Owusu and Chigbu (2020) posit that this is in response to an increase in the unemployment rate. Whereas the argument fronted by these authors is valid, the study found out that as the peri-urban development accelerated, the state of security kept on improving because, with an increase in densities in the PUAs, community policing, and police have intensified patrols. However, an interaction with sub-chiefs pointed to the rise in drug abuse in these peri-urban regions compared to earlier days.

Alonso's bid rent theory argues that land allocation is based on marginal utility returns, which tend to displace uncompetitive land uses. Through this process, Dieleman and Wegener (2004) say that the locals are displaced. This displacement may also be motivated by land tenure change, transforming from customary to individual, making the individual land held by the poor vulnerable (Appiah et al.,2014; Ng'ayu,2015). Due to the forces of the free market and lack of protection, the locals sell off their land, rendering them landless (Thuo,2013, Ng'ayu,2015; Owusu and Chigbu,2020). The findings have shown that a couple of individuals have been rendered landless, with an incident narrated by one of the respondents that the neighbour sold off land to get more extensive land, further in the hinterland to subdivide it and share with his children; however, upon selling, they moved to the central town where they rented and squandered all the money and didn't buy the land rendering them landless. The rise in land values has also seen a rise in conflicts with land owners selling a single piece of land to different people.

Food insecurity has been an increasing concern in substance farming, accounting for the most significant percentage of agriculture. However, the interviews noted that the farm produce wasn't enough for the local community sentiments that the county land surveyor and physical planner concur, and assistant chiefs. FAO (2011) blames land parcellation while (EEA 2006; Sun et al., 2011; Omasire et al., 2020) blame land transformation for these woes. However, looking at the agricultural methods embraced by the locals are very traditional.

**Plate 14: Access Road in Manyengo Sublocation**



Source: Field survey, 2021

**5.5.3 Peri-urban development and its implication on the economy in PUAs**

Leapfrogging of urban print has always put pressure on the available resources, one being housing. In the infancy of peri-urban development, housing is considered very affordable, but like any other commodity under the forces of the free market, as this demand keeps on swelling and supply not quickly catching up, the rental cost skyrockets. Perhaps this can be explained by location and accessibility as a function of urban land markets. The tenants in the study area note that one of the adverse impacts is the rise in the cost of living, much attributed to the increase in rent charged per month, with some noting houses they used to pay 1500Ksh per month have now gone high as 3500. The Locals appreciate the fact that land values are constantly on the increase accompanied by ever-increasing demand. Appreciation has motivated the locals to sell their land leading to landlessness and food insecurity.

The town's growth and enhanced connectivity have also triggered land hunger and speculative buying, especially in significant corridors, as noted by the County land surveyor. The locals are also afraid of being dragged into the revenue generation net by the county government by paying rates because they saw the same thing happen when the site and service area was incorporated into an urban area and were forced to pay rates.

The locals also noted that with the peri-urban development and increasing densities, businesses mushroom in the study area, with the establishment of shops accounting for 21% of opportunities provided by these densities.

Significant establishments like schools and mango juice processing factories in the PUAs have also provided employment opportunities.

However, even though they employ locals, much of their workforce is from all over the country, mainly these reflect the findings by Haller et al. (2017) and Sun et al. (2011), who opines that for skilled labour it is nearly impossible to draw workforce from the PUAs'.

## **5.6 Discussion On Key Findings**

### **5.6.1 Nature, form, and character of peri-urban development**

The composition of the peri-urban population is as follows; 23.8%, rural parts of Kitui county at 39.7% while 19.5 are from other regions and 17.5% are from other urban areas. This migration from the city center, rural areas, and other region alter the homogenous nature of rural areas into a heterogeneous society (Thuo,2013; Le,2020; Narain et al,2013; Woltjer,2014). These movements from rural to urban areas are due to push factors (Zhang and Xi, 2019), which Hall (2002) and Fox (2012) note are a result of inferior rural economies and climate change that has rendered primary production uneconomical. The movement of people puts pressure on land forcing land owners to subdivide their land to respond to the demand (Thuo, 2013; Adedire and Iweka, 2017;).However, findings of the study were that even though parcellation has taken place but all has been majorly for inheritance purposes which registered 85.7% and only 14.3% which was parcellation motivated by the desire to sell off land. This parcellation renders agricultural and other traditional land uses economically unattractive, this makes land transformation inevitable (Ng'ayu, 2015). This argument is reflected in the study area with 36.4% of land owners admitting to having transformed their lands from the original land uses. This has also impacted local livelihoods with agriculture losing economic value with only 49% of the peri-urban population practising agriculture and the rest on off-farm incomes

these findings agree with the sentiments of Wu (2008) that with peri-urban development agriculture may be the thing of the past.

### **5.6.2 Factors motivating peri-urban development**

Findings by the study pointed to cheaper rents as one of the major motivating factors for locating in the peripheries of Kitui town agrees with the arguments fronted by scholars of bid-rent theory. Joordan et al (2004) note that the utility value of land will always decrease as you move away from the city centre, through this rent for space will be always higher at the CBD. However, it is critical to note these decisions are not purely dependent on rent but considerate of commuting costs (Duranton and Puga,2013; Kleeman et al,2017; Joordan et al,2004). In Kitui town peripheries this agrees with the finds with 54% relying on bodaboda with a trip costing an average of 50ksh, 30% relying on walking as a mode of transport and only 16% relying on own car. With increased individual mobility, PUAs have become more attractive to urbanites. Further on utility value the competitive urban land uses are slowly taking over traditional land uses in the periphery in the study area, this transformation agrees with findings by Fertner et al 2016 and Brueckner (2002) by postulating that marginal returns from urban land uses are usually higher compared traditional land uses. This makes the transformation inevitable (Ng'ayu,2015). However it is also important to note that marginal utility by land uses in the periphery may not necessarily be of lower marginal return but failure by the locals to employ the best technology and intensify agriculture through investment in higher return value agri-businesses (FAO, 2007).

Seeking a serene environment was another major factor motivating urbanites to locate in the PUAs these findings agree with the sentiments of Clark and Harvey's work of 1965 on the nature and economics of urban sprawl and note that a serene environment is a pull factor for the urban population. The environment offers an opportunity for urbanites to reconnect with the village and childhood experiences in the countryside with individuals waking up to singing birds as opposed to the noise in the city. The findings also agree with arguments fronted by scholars of flight from blight theory that due to dilapidated urban infrastructure for both solid and liquid waste the PUAs offer refuge to those who want to get away from the blight.

Institutional capacities are a major driver of peri-urban development. Ahmed and Dinye (2011) note that management of urban growth is made impossible due to a lack of adequate staffing however Kitui staffing is deemed adequate. The institutional capacities are not only limited to

the human resource but financial, the study found out that the planning and management of municipality funding were not adequate making it hard to enforce as well as prepare plans to address urban growth challenges these findings agree with the findings of Bhatta (2010) and Ng'ayu (2015) that without funding the institutions in charge of urban planning have been reduced to approving authorities geared towards collecting revenues for local authorities. Bhatta (2010) and Horn (2009) further note that political interference is a factor that has weakened regulating authorities from efficiently managing urban growth. The institutions are further weakened by ambiguity in the law (Mwangi, 1994; Horn, 2009; Ayonga, 2019b), this is further acknowledged by Kenya's sessional paper number one of 2017. The study area is fully under the municipality but the land beyond the township boundary is private land held under freehold this makes it hard for the municipality to control the transaction because it is agricultural however the land board cannot regulate land management since it is also considered urban through the Urban and Cities Amendment Act of 2019. This ambiguity in law motivates peri-urban development. The law also has seen major undoing to the management of PUAs since many institutions are charged with responsibility for the management of these zones(Thuo,2013). This disjointed approach makes it hard for management to pull towards one goal hence only making peri-urban development accelerate. In the case of the study area, it was noted that even though the peri-urban area lies in the municipality it gives the municipality the sole responsibility to approve developments. However, this is not the case since the planners in charge of sub-counties adjoining the municipality are also approving planning hence resulting in uncoordinated development. this disintegrated approach is to blame for peri-urban development(Saxena and Sharma,2015).

Population growth has always been at the centre stage of urban-rural debate. The study areas have experienced rapid growth with the urban population growing from 3071 during independence to 29062 as per the KNBS Census report of 2019. The increase in the urban population in developing countries is majorly from rural-urban migration (Zhang and Xi,2019), this is reflected in the study area with 23.5% of the population in the PUAs being from the hinterland of Kitui. Urban areas act as a magnet to ruralist (Hall,2002), because of opportunities associated with an agglomeration of economies (Fox, 2012), these arguments are validated by the study through reasons cited for moving within the urban area, with 49% pointing that they moved to peri-urban areas to seek for employment,25% moving into study agreeing with sentiments of Turok and McGranahan 2013 and Hall 2002 that some migration is motivated by localization of learning institutions in the urban areas,15% moving in to start a business while



5% was due to marriage and 6% to access better amenities. This acceleration in rural-urban migration is also majorly due to push factors from rural areas (Zhang and Xi,2019). This has a huge impact on the overall urban area population which triggers demand for housing as well as urban services and infrastructure (Horn, 2009).

### **5.6.3 Implications of peri-urban development on PUAs**

The study area is faced with a challenge in waste management with poor solid waste disposal and wastewater disposal. Thuo (2013) and Olajuyigbe (2016) note this poor waste management is a result of a disjointed approach to managing PUAs, however, the study area as opposed to other PUAs is a region entirely under municipal management. Simon (2008) notes with this poor management in waste disposal has resulted in peri-urban areas as zone invested with vectors -disease-causing infested areas. These wastewater disposal strategies and the use of latrines in the study area where 24% of interviewed households rely on shallow wells as the source of their potable water are of concern since this may contaminate the groundwater (Simon,2008). These findings validate Hope's (2012) argument that access to sanitation is a challenge in urban areas in Kenya. The town planner in charge of the municipality attributes these challenges to inadequate funding.

The study area is facing environmental degradation, especially in the health of rivers. EEA (2006) posit that with the demand for construction material, the PUAs become the venues for extraction of these materials. Simon (2008) notes that quarrying activities take place on rivers. Kalundu River has not been exempted from sand harvesting and crushing of stones in the river for livelihood.

## **6.0 Chapter Six: Summary of Findings, Conclusion, and Recommendations**

### **6.1. Summary**

The literature points to PUAs as regions faced with management challenges due to the disjointed approach employed to manage them. This is further attributed to lacunae in policy and legal frameworks in defining and providing sustainability paths. Kitui PUAs are within the municipality boundaries, which eliminates the question of their challenge in their management. However, ambiguity in planning laws has aided in the challenge in management because they are neither rural nor urban. Agricultural land can't be managed as urban land. The land tenure being the freehold land has promoted independence in decision making for the occupants with urban print taking compact mode (edge city), ribbon development courtesy of transport corridors, and scattered developments. The study also established that whereas peri-urban development in the western world was driven by affluence, the Kitui one is an escape from expenses associated with the urban area. The peri-urban regions are faced with poor waste management, an increase in disputes arising from the sale of land, and a decline in the viability of agriculture.

#### **6.1.2 Factors Responsible for Peri-urban development**

the serenity of the environment in PUAs was the highest-ranked pull factor, good security being the second-highest pull factor, Preference for larger spaces, desire for own occupier, and access to better social amenities for the rural population seeking bright lights. While the increase in household size and better housing designs registered as the lowest social motivators.

The economic motivators from the household survey were cheaper rent ranked as the primary motivator. Near the place of work, school and town ranked second because the cost of access to these places was more affordable with walking and bodabodas being the most used means. The PUAs have also offered land ownership as locations of cheaper land, while improved accessibility through the development of major corridors has also accelerated peri-urban development. Other factors include a lack of tools to direct development, and a lack of funding to ensure enforcement. Land speculation, as well as political interference, have also played a part in accelerating peri-urban development. The population growth and increase in per capita income associated with the introduction of second-tier governments have triggered preferences. Agricultural land management as an urban land has made it easy to subdivide and deliver land for peri-urban development. The location of centres of employment in PUAs has also accelerated the phenomenon.

### **6.1.3 Implications of Peri-urban development on PUAs**

Peri-urban development has been viewed as a blessing and curse to the communities in PUAs. The study established that the phenomenon has led to a rise in living costs with a rent increase. The demand for land for urban development is increasing, triggering appreciation in land values and rendering agriculture economically unviable for locals to cope with economic transformation. The study established that food insecurity and landlessness are increasing in the social spheres. Still, this phenomenon has seen security improve and locals create new social networks. However, the environment has been a significant casualty of this overgrowth with poor waste management, lost vegetation cover, and disturbance of ESAs.

## **6.2 Conclusion**

### **6.2.1 Nature, form, and character of peri-urban development**

The peri-urban area of Kitui just like other peri-urban has undergone tremendous land use changes and parcellation that have rendered agriculture economically unviable, this has in turn led to livelihood reconstruction. It is also important to note peri-urban development rate is very high as evidently shown by land use change analysis between 2017 and 2021. This puts the locals very vulnerable so is the state of the environment. These processes make it a zone of the dynamic process as pointed out in the literature on how a typical peri-urban region transforms. The region is also characterized by poor waste management just like other peri-urban regions. The forms region has three distinct forms; the ribbon development which has been motivated by infrastructure investments, the scattered which the literature argues as development motivated by each actor in the peri-urban region acting alone, and the lack of coordinated land management. There is also compact development resulting from nodes at the edge of the urban area.

### **6.2.2 Factors responsible for Peri-urban development**

Land use planning seeks to ensure future needs are projected to avoid tragedies. However, the leadership of both local authorities and national governments seems not to embrace this tool in providing sustainable urbanization. This lack of political goodwill has seen little or no resources geared towards town and countryside planning efforts. This has also led to urban areas using obsolete plans to direct development. Even in the wake of significant happenings like devolutions, the county headquarters made no efforts to prepare plans that would enable them to absorb the anticipated population growth and the needs of societal demands accompanying the new centres of employment. The growing population and changing

preferences have seen housing being met beyond urban boundaries. If no effort will be made to plan peri-urban development will keep moving further into the hinterland.

The establishment of institutions of higher learning closer to urban fringes has motivated peri-urban development since the PUAs serve as an affordable dormitory to the schooling population as well as as a zone with a serene environment that enables them to study with minimum disturbance. This has also motivated developers to develop these fringes further to meet housing demands. The cheaper housing has also seen low-income earners move to the PUAs.

Accessibility and individual mobility is a critical function in land pricing and will always motivate urbanites to move to the PUAs; this confirms arguments fronted by proponents of bid rent theory that the further you move from the central city, the lower the land pricing and rents. The land pricing in the town reduces as you move away from the town where 50x100 goes for 7-9 million Ksh, while in the peripheries, it reduces to as low as 700-500 thousand Ksh. The investment in these major road infrastructure developments has played a critical role in peri-urban development. However, despite various policies noting the impact, the national government has not embraced corridor planning to ensure coordinated developments.

The ambiguity in law remains a driver since the agricultural land is being managed as urban land. The elite political view that urbanization is pro-development is endangering the sustainability of urbanization so is the interference with the technocrats' enforcements and ignoring citizen participation in decision making. There is a need for the authorities to harmonize laws and regulations to manage the fringes effectively.

Flight from bright on its own is a weak push factor to the urbanites in the town, economic factors dominated as both push factors from the town while at the same time acting as pull factors to the fringes. These finds are a reflection of drivers of peri-urban development in primary towns as pointed out in the studies by Mwangi in 1994, Musyoka in 2004, Ayonga in 2019, Thuo in 2013, and Ng'ayu in 2015.

### **6.2.3 Implication of Peri-urban development on PUAs**

Peri-urban development is slowly preying on the Locals, with land management approaches that are not in tandem with principles of land as outlined by CoK 2010, especially on vulnerable groups. The rate of landlessness and displacement is likely to accelerate, especially in a town

that has witnessed major investment in road infrastructure. Agricultural economic viability in the study area remains questionable, the traditional approaches are making the situation worse.

the development has been detrimental to the environmental wellbeing with disturbance of ecologically sensitive areas and poor waste management practises which is a reflection of peri-urban areas.

### **6.3 Recommendations**

The study recommendations are based on the objectives outlined by the study.

#### **6.3.1 Nature, form, and character Peri-urban development**

Bhatta (2010) posits that peri-urban development forms as a consequence of the independence of decision-making of actors in the peri-urban region. These peri-urban development forms may be ignored but it is critical to note with uncoordinated peri-urban development challenges in the delivery of basic services and infrastructure arise. To address the challenge associated with varying forms of peri-urban development, urban and countryside planning is critical, this can be achieved through the preparation of municipality plans as well as county spatial plans. Developing a zoning plan used with western concepts like transfer of development rights would also help in a coordinated peri-urban development that is not very stringent to urban expansion. The regional approach in land management should as well be adopted this will ensure there is a common goal by all the players that will ensure farm preservation as well as encourage compactness in density distribution.

#### **6.3.2 Factors motivating peri-urban development**

Failure to plan has always led to challenges in urban demands Kitui Municipality should prepare an integrated plan that will see future demand for land towards urban development and projected urban boundaries demarcated. The land use planning effort should be keen on revising the municipality to leave it for management as agricultural land or formalize peri-urban agriculture and farm support programs to ensure the viability of the venture. The plan efforts should ensure the zoning of agricultural zones.

Housing remains a significant driver of peri-urban development; this challenge is unavoidable in urban areas operating on obsolete development plans. Since efforts toward public housing have failed, land use planning would be critical in ensuring developments are coordinated. Even if the demand for land for housing exceeds the supply, the local authorities can embrace the transfer of development rights in specific areas for densification. The national government

and county government as well as municipality management should revise land policies to ensure a coordinated development in peri-urban areas. This could be done through a private partnership between developers and the locals who own land and are unable to develop, however, this should be done through authorities to ensure locals are not exploited. Further on affordable housing provision government should embrace infills and urban densification with better housing designs that will retain generations in the central city for a longer period. The authorities in charge of the urban area should also explore the registration of new entrants in the city which will enable them to plan effectively.

Compliance with the laws and policies set in the management of land should form a mandatory framework in sharing revenue to motivate the preparation of urban areas and county spatial plans that will ensure both the urban areas and countryside are planned, ensuring a defined use for each zone as well as having a management framework.

Traditional methods in agriculture have rendered it economically unviable; there is a need for peri-urban communities to engage in intensive farming, especially on vegetables and other less space consumptive agricultural ventures like poultry, and dairy farming. This will enable them to exploit the urbanites' market provided for these commodities, thereby increasing marginal utility and reducing land conversions. Further, to ensure agriculture's viability, there is a need to have land consolidation along the fringes; this will enable a vast chunk of land to be left for commercial agriculture and compete against urban land use. However, such an initiative may be resisted by locals; the local authority can hold the land temporarily for them by signing renewable agreements while paying the original owners dividends based on the productivity of the land leased.

The new infrastructure installation should also be accompanied by corridor planning; this will ensure that ribbon developments are taken care of and control speculative buys, which tend to accelerate peri-urban development.

The local authority can adopt a site and service approach; however, this should be accompanied by an urban service provision boundary to discourage more peri-urban development. For the population on the fringes who cannot access the basic service, the local authority should employ a site and service approach in ensuring access.

On land management laws and regulations there is a need for PUAs to be recognized as special zones that require a special management approach that may vary from different regions to protect the vulnerable and the environment.

### **6.3.3 Impact of peri-urban developments on peri-urban regions**

One of the key concerns in peri-urban regions is the management of waste, the problem can be addressed through the recycling and reuse approaches, for example poorly disposed wastewater can be used in improving aesthetics through the planting of flowers or trees and watering them using the wastewater. On the solid waste, sorting the organic and inorganic waste, the organic waste can be collected to a specific point, and upon accumulation, it can be used as organic fertilizer. On the inorganic, the local authority can invest in building a recycling plant thereby widening their revenue generation base.

With low marginal returns from agriculture, there is a need to have land consolidation along the fringes; this will enable a vast chunk of land to be left for commercial agriculture and compete against urban land use. However, such an initiative may be resisted by locals; the local authority can hold the land temporarily for them by signing renewable agreements while paying the original owners dividends based on the productivity of the land leased.

### **6.3 Areas for Future Research**

The area on urban growth containment and peri-urban region management borrows much from the western world. The adoption of Western world concepts is very ignorant of African settings, especially the land ownership challenge that has made it impossible to intervene in the direction of land even when laws and regulations are unambiguous on acquisitions. The study would forge a new way toward sustainable peri-urban development.

Peri-urban agriculture is a new concept in the global south studies should be carried out to ascertain minimum lot sizes that will ensure the economic viability of the venture.

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## **Appendices**

### **Appendix 1: Questionnaire for Household**

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

#### **Section I: Questionnaire identification and tracking**

(1) Questionnaire No..... (2) Name of the sub location..... village.....  
(3) Date of Interview..... (4) Contact of the Interviewer.....

#### **Section II: Respondent information**

(5) Gender of the respondent ..... (a) Male (b) female (6) Age of the respondent..... yrs.

(7) Marital status (a) Married (b) Divorced (c) Widow (d) Widower (e) Single

(8) Relationship of the Respondent to Household Head... (a) Self (b) spouse (c) Other, specify.....

(9) Highest level of education attained by Household Head.....

(10) Category of respondent (a) Land owner (b) Tenant

**Section III drivers for Peri-urban development**

(11) (A) where did you live before moving to this place?

(A) Inner Town (Kitui) (B) From Rural parts of Kitui county, specify.....

(c) From any other place, specify .....

(11) (B) what was the reason of moving to this town?

(a) Employment (b) Job seeking (c) start a business (d) study (e) any other reason, specify.....

(12) Why did you choose this area and not in the town centre? List as many reasons as possible

.....  
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.....  
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.....

**Mode of land acquisition (Only applicable if the respondent is the owner of land or property)**

13. How did you acquire the land?

(a) Inheritance (b) Allocation by local authority (c) Buying (d) Just moved in and occupied this land because it was not occupied.

(d) Other, Specify.....

(14) What was the size of the lot when you acquired it?

(15) (a) Have you ever further subdivided the land (a) Yes (b) No

(15) (B) if yes why?

- a) Inheritance purpose
- b) Selling purpose
- c) Any other specify.....

(16. A) has the land changed its initial use (a) Yes (b) No

(16. b) if yes to 17 (a) did you apply for change of use? (a) Yes (b) No

(16.c) if No to 17 b what is the reason for not applying?

.....

17. (A) Do you have land ownership document to the property/ land (a) Yes (b) No

17. (B) if yes to 18 (a) which documents

- a) Freehold Title deed
  - b) Letter of allotment
  - c) Leasehold Title
  - d) Other, specify.....
- ...

**HOUSEHOLD INCOME AND EXPENDITURE**

18. What are Sources of your income?

Source of Income		Amount generated in a year (approximate)
On-farm	Farming activity. Specify.....	
Off -farm	Employment	
	Business(specify)	



	Rental income	
--	---------------	--

**19. What is your Household Expenditure on?**

Expenses	Amount
Rent (Monthly)	

**Access to basic infrastructure (Physical and social)**

20. Is the premise served by sewer? (a) Yes (b) No

20 (b) If No, what are you using?

- a) Septic tank
- b) Pit-latrine
- c) Any other specify.....

21(a) is the premise served by water? (a) Yes (b) No

21 (b) If No, where do you get your

- I. Drinking water from.....
- II. Water for domestic use from.....

22. How do you dispose solid waste?

- a) Regular collection by Municipality
- b) Burning
- c) Landfill
- d) Any other specify.....

23. What mode of transport do use to go to your place of work?

Destination	Mode used	Tick (appropriately and multiple where applicable)	Cost
Place of work (Specify).....	Bode -Bode		
	Own Car		
	Motorbike		
	Mutate		
	Bicycle		
	Walking		

**24. Access to social amenities and facilities, how long do you travel to access the listed facilities and the challenge faced in access?**

Amenities	Distance	Challenge in access
ECDE		
Primary School		
Health facility		
Playing field		

25. What are disadvantages of the town growing into your area? List many reasons

.....  
.....  
.....  
.....  
.....

26. What are some of advantages of being closer to the town? List many reasons as possible

.....  
.....  
.....  
.....  
.....

**THANK YOU FOR YOUR TIME**

**Appendix 2: Key Informant Guide for the County Land Surveyor**

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

**Date of Interview.....**

Urbanization presents an opportunity and curse in management of land especially on the edges of urban areas. How is the situation in peri-urban regions of Kitui town? How is the management of the peri-urban zone coordinated?

.....  
.....

How is land being delivery for urban development? Are there area where people have squatted within the peri-urban?

.....  
.....

How is the subdivision and processing of titling being done?

.....  
.....

How is this having implication on land uses especially agriculture?

.....  
.....

What is motivating peri-urban areas development?

.....

Land pricing in relation to the CBD?

.....  
.....

Land sizes in relation to CBD, are there subdivisions and what is motivating these subdivisions

.....

Any dispute resulting from this overgrowth?

.....

How are you addressing the overgrowth of the town?

**Appendix 3: Physical Planner in Charge of the Town**

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

**Name of Respondent.....Date of Interview.....**

1. What is guiding development Kitui Municipality?

.....  
.....  
.....

2. Does the municipality have urban growth boundary to contain urban growth?

.....  
.....

3. The town is experiencing a lot of Peri-urban development and urban sprawl, what could be the factors motivating this growth?

.....  
.....

4. What's your take on this form of urban growth?

5. How is the county government addressing the challenge of vulnerability of agricultural land use to competitive urban land uses?

.....  
.....

6. What challenges are you facing in carrying out development control?

.....  
.....

7. What's the state of service provision, infrastructure and distribution amenities in these peri-urban regions?

.....  
.....

8. Which challenges are you facing in service, infrastructure, and amenities provision in these areas?

.....  
.....

9. In your opinion how do you think we can address the challenge of Peri-urban development?

.....  
.....

10. Kitui county is keen on implementation of big four agenda

Where are the industries being located?

.....  
.....

Location of Affordable housing projects?

.....  
.....  
.....

**Appendix 4: Officer in Department of Environment**

UNIVERSITY OF NAIROBI DEPARTMENT OF URBAN AND REGIONAL PLANNING

Key Informant Interview Guide for Officer in the Department Of Environment

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

**Name of Respondent.....Date of Interview.....**

1. Kitui town is rapidly advancing into agricultural land. what do you think are the factor responsible for this growth

.....  
.....  
.....

2. What is your take on this form of growth

.....  
.....  
.....

3. What are some of the environmental challenges

.....  
.....  
.....  
.....

4. How are you addressing these challenges

.....  
.....

5. What ways do you think we can mitigate this form of growth

.....  
.....

Thank you for your time

**Appendix 5: Key Informant Schedule for Deputy Municipal Manager**

1. What is guiding development Kitui Municipality?

.....

2. Does the municipality have urban growth boundary to contain urban growth?

.....

3. The town is experiencing a lot of Peri-urban development and urban sprawl, what could be the factors motivating this growth?

.....

4. What's your take on this form of urban growth?

.....

5. How is the municipality addressing the challenge of vulnerability of agricultural land use to competitive urban land uses?

.....

6. What challenges are you facing in carrying out development control?

.....

7. What’s the state of service provision, infrastructure and distribution amenities in these peri-urban regions?

.....

8. Which challenges are you facing in service, infrastructure, and amenities provision in these areas?

.....

9. In your opinion how do you think we can address the challenge of Peri-urban development?

.....

10. Kitui county is keen on implementation of big four agenda

(I)Where are the industries being located?

.....

(II)Location of Affordable housing projects?

**Appendix 6: Key informant for the officer in infrastructure department**

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

**Name of Respondent.....Date of Interview.....**

1. What is your take on rapid growth peri-urban development in Kitui town?

.....

2. What do you think has motivated this form of growth?

.....

3. How has this impacted on connectivity in peri-urban development zones in Kitui town

.....

4. What are the challenges in connectivity posed by this form of growth?

.....

5. How are you planning/addressing to address these problems?

.....

6. What do you think can be done to manage urban growth into the peri-urban region?

.....

**Appendix 7: Observation Checklist**

House topologies

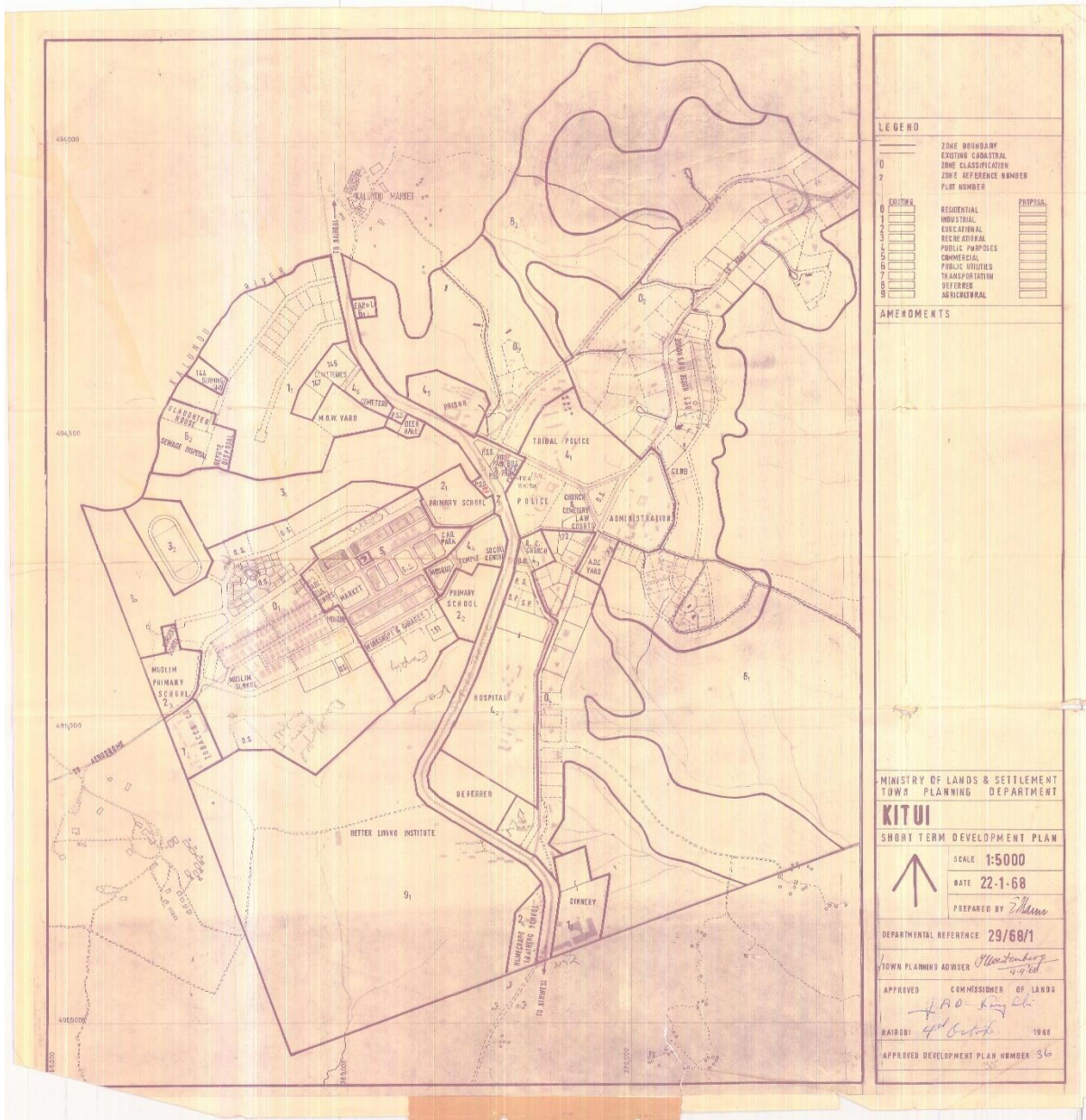
State of waste management

Economic activities within the study area

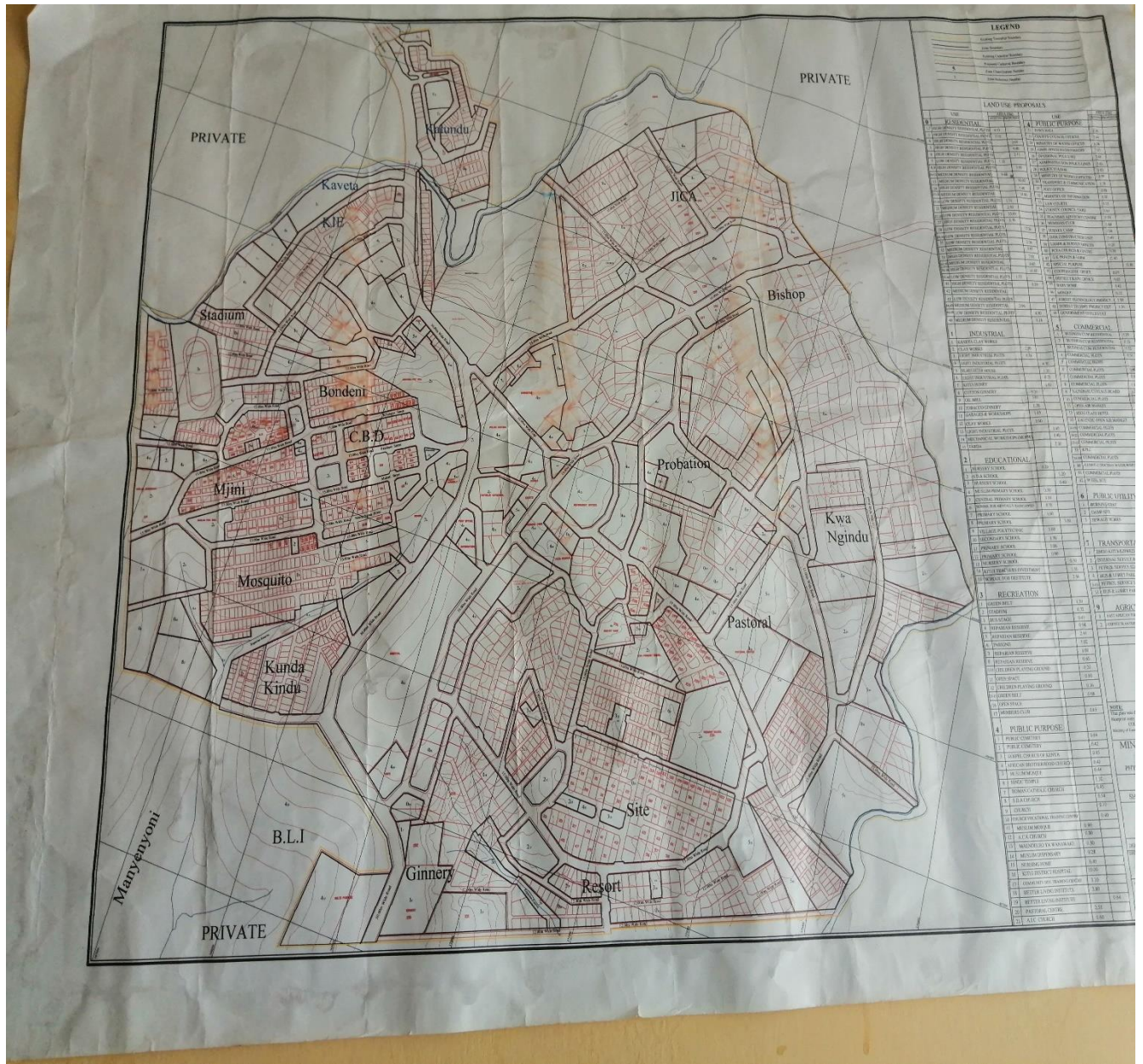
State of road infrastructure and accessibility



# Appendix 8: Kitui Township Development Plan of 1968

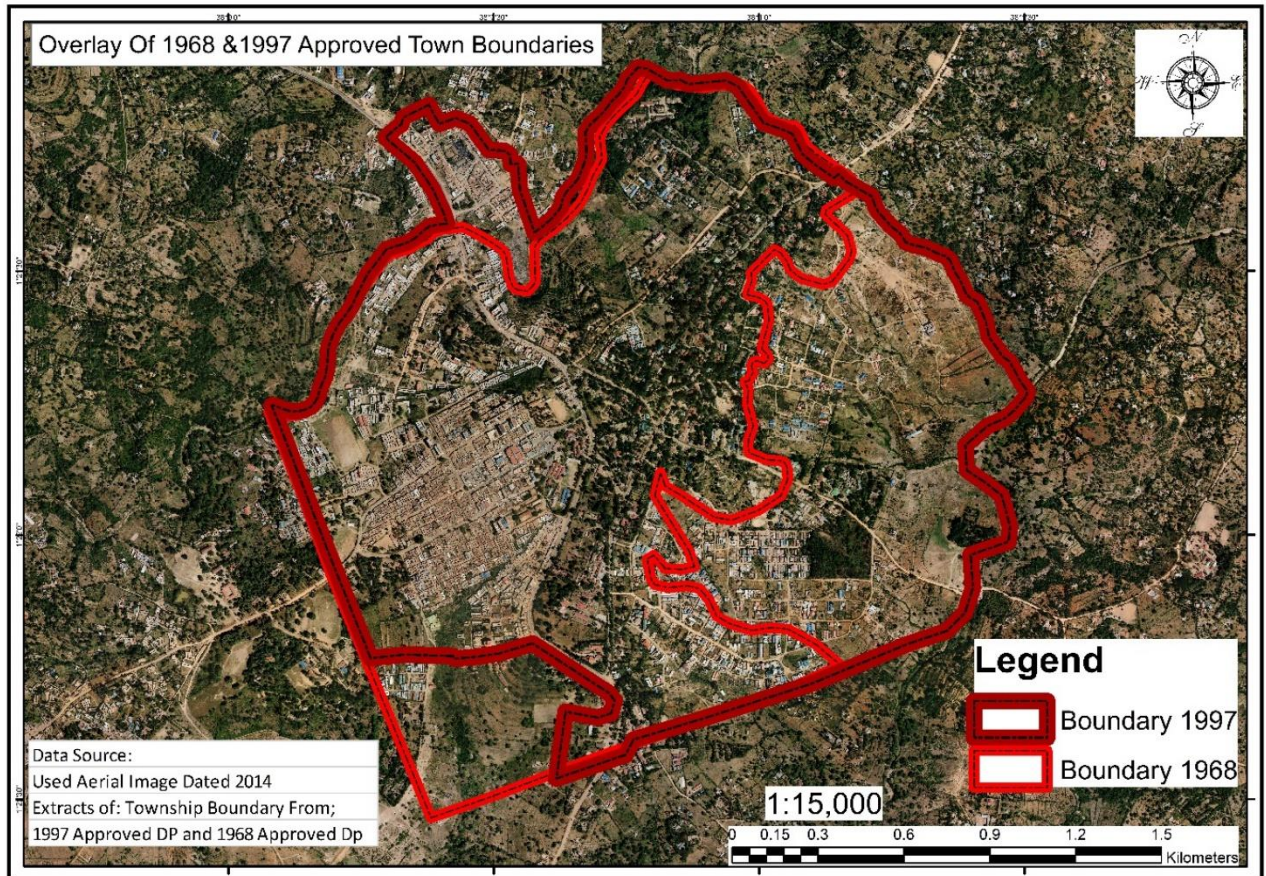


**Appendix 9: Approved Kitui Town Development Plan of 1997**



Source: CGoK Department of Physical Planning

## Appendix 10: Overlay of 1968 and 1997 Town Boundaries from Approved DPs



Source: Author, 2021

**Appendix 11: Research Permit**

  
**REPUBLIC OF KENYA**

  
**NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY & INNOVATION**

RefNo: **346101** Date of Issue: **22/October/2022**

**RESEARCH LICENSE**



**This is to Certify that Mr., George Mbaluka of University of Nairobi, has been licensed to conduct research as per the provision of the Science, Technology and Innovation Act, 2013 (Rev.2014) in Kitui on the topic: ASSESSING DRIVERS AND EFFECTS OF PERI-URBAN DEVELOPMENT IN SECONDARY TOWNS: A CASE STUDY OF KITUI TOWN IN KITUI COUNTY, KENYA. for the period ending : 22/October/2023.**

License No: **NACOSTI/P/22/21176**

  
**Director General**  
**NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY & INNOVATION**

**346101**  
 Applicant Identification Number

**Verification QR Code**  


**NOTE: This is a computer generated License. To verify the authenticity of this document, Scan the QR Code using QR scanner application.**

**See overleaf for conditions**

## Appendix 12: Authorization Letter



**UNIVERSITY OF NAIROBI**  
**Department of Urban and Regional Planning**  
ADD Building, State House Road, Opposite YMCA  
P.O. BOX 30197, 00100 GPO Nairobi, KENYA  
E-Mail: [dupr@uonbi.ac.ke](mailto:dupr@uonbi.ac.ke) TEL: +254-20 491 3526

July 13, 2021

**TO WHOM IT MAY CONCERN**

**RE: GEORGÉ MBALUKA – B63/12651/2018**

This is to confirm that the above named is a Master of Arts (Planning) student in the Department of Urban & Regional Planning, University of Nairobi.

As part of the training, students are required to acquire experience in planning research through data collection and analysis in the field of Urban and Regional Planning.

We wish to request you to allow him to collect data from your institution/households for his Masters Project titled ***“Understanding drivers and effects of peri-urbanization in secondary towns, Case of Kitui Town”***.

Any assistance accorded to him will be highly appreciated.

**Dr. Fridah W. Mugo**  
**CHAIR - DEPARTMENT OF URBAN & REGIONAL PLANNING**



FM/m