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Land value capture for preservation of green landscapes: Case of peri-urban Kumasi, Ghana.

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Summary

Ghana is experiencing high urbanization rate with over 56% urban population. Due to high urban population, there is increased demand for land for urban development which has resulted in uncontrolled expansion of urban areas.

Kumasi, the fastest growing city in Ghana is rapidly expanding to its peri-urban areas. These peri-urban areas are undergoing land use changes which have resulted in loss of green landscapes and increase in land values. Legislation provided capture of increments in land values due to land use changes through betterment charge which is unique within African context.

The objectives of this research were to explain the extent by which local governments capture increments in land values due to land use change through betterment charge to finance preservation of green landscapes in peri-urban Kumasi, and to investigate if betterment charge is known by actors, if the instrument is operationalized and if it is used to capture increments in land values arising from changes in land use.

To achieve these objectives, the main research question "to what extent do local governments capture increments in land values due to land use change through betterment charge, to finance the preservation of green landscapes in peri-urban Kumasi?" was asked. A theoretical review of key concepts like peri-urbanization, land use change, land value change, land value capture, and preservation of green landscapes was done, and conceptual developed and operationalized.

A case study strategy was used to answer the research questions. Kwabre East and Asokore Mampong municipalities were chosen due to differences in land size and level of greenery. Primary, secondary, and primary-secondary data sources were used to collect data. Methods used to collect data include Semi-structured interviews, content analysis, and photo documentation. Purposive, quota sampling, and snowball sampling were used to select key actors relevant to the research. primary data was collected through face-to face and online interviews.

The findings indicate that land use changes result to increase in land values in peri-urban Kumasi. Also, betterment charge due to land use change has not been operationalized, and not implemented resulting in loss of revenues. On the other hand, land use plans and zoning regulations are ineffective in preserving green landscapes due to inadequate financing of enforcement of zoning regulations

Recommendations were made regarding capture of land values due to land use change and on enhancing effectiveness of land use plans and zoning regulations in preserving green landscapes.

Keywords

Local governments, Land value capture, betterment charge, Peri-urban Kumasi, and green landscape preservation

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Dedication

This work has been dedicated to my late Dad Walter Kaumba; Minwa Hellen; my husband Nicholas; and Childeren; Marrian and Leila

Abbreviations

BIRD	Buearurea of Integrated Rural Development
DACF	District Assemblies Common Fund
IGF	Internally generated Funds
IHS	Institute for Housing and Urban Development Studies
KMA	Kumasi Metropolitan Assembly
KNUST	Kwame Nkrumah University of Science and Technology
MMDAs	Metropolitan, Municipal and District Assemblies
PBL	Netherlands Environmental Assessment Agency
UDS	University for Development Studies
USA	United States of America
USGS	United States Geological Surveys

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Chapter 1: Introduction

1.1 Background

Ghana's urban population is much higher than Africa continent's average. In 2018, 16.5 Million Ghanaians (56.1%) lived in urban areas compared to 42.5% continental average in the same year. The country's urban population is projected to increase to about 73% in 2050(United Nations. Department of Economic and Social Affairs. Population Division, 2018). The increase in urban population exerts pressure on urban land and creates demand for more land for urban development.

High demand for urban land leads to high land prices within city boundaries. Therefore, creating a counter demand for cheaper land for residential and other urban uses (commercial, industrial and residential) in the peripheries of cities. Hence urban development expand to the peripheries ans people look for cheaper lands(Appiah; Bugri, et al., 2014, Abass; Adanu, et al., 2018). As population and firms move to the peripheries, peri-urban areas are the preferred locations due to their proximity to cities(Kuusaana and Eledi, 2015). Peri-urban areas also referred to as urban fridge are transition zones between urban and rural areas, subject to continuous changes in land use, economic activities, and culture. Due to the constant change in land uses, these areas represent a mix of both rural and urban character and blurring of urban-rural dichotomy(Varkey and Manasi, 2019, Amoateng; Cobbinah, et al., 2013).

Uncontrolled expansion of urban development and the associated change in land use transform the landscapes and result in loss of green landscapes as built-up areas replace unbuilt-up land(Nechyba and Walsh, 2004, Glaeser and Kahn, 2004). This leads to loss of livelihoods for farmers, land degradation, and loss of ecological services provided by nature and agricultural lands (Ayambire; Amponsah, et al., 2019).

Further, land use changes in the peri-urban area are associated with increase in land values(Amoateng; Cobbinah, et al., 2013, Cobbinah; Gaisie, et al., 2020). Demand for land for urban use creates competition for land for various uses. The competition triggers monetization of land and creates active land markets and real estate sector(Sharif, 2014, Varkey and Manasi, 2019). Varkey and Manasi (2019), illustrate that each land use type attracts different value. Hence increase in land values. The increase in land values due to land use change is among the unearned increments to landholders which should be shared with society through land value capture(Alterman, 2012).

Land value capture concept is based on the ideology that land value increments are derived from both landholders' investments; general societal conditions such as population and economic growth; public investments in infrastructure and services; public actions and decisions on land use by the government based on powers of the government to regulate land use (Fainstein, 2012, Ingram and Hong, 2012a). The general idea is that value increments as a result of land owner's action should be retained by the owner and any other benefit not resulting from pure individual's input on land, should be shared by the state for redistribution to the public(Ingram and Hong, 2012b, German and Bernstein, 2018). To enable the public share in benefits of increment in land values, governments are empowered and obliged to tap part or whole of the increase in land values to finance infrastructure and services(UN-Habitat, 1976, Alterman, 2012, Ingram and Hong, 2012a), mitigate impacts of changes in the use of land or implement public policies aimed at achieving equity(Suzuki; Murakami, et al., 2015).

Studies on land use change mainly focus on the impact of land use change on agriculture and environment, and determinants of land use change(Kombe, 2005, Kuusaana and Eledi, 2015, Abass; Adanu, et al., 2018, Ayambire; Amponsah, et al., 2019). Even though these studies recognize that land use change result to increase in land values, there has been little research on tapping the increased values due to land use change to provide revenues to be used by local governments to address externalities of land use change. Additionally, there are numerous studies on land value capture to finance grey infrastructure especially transport and housing. However, there has been little attempt to study how land value capture can be used to preserve green landscapes, especially in Africa. This research fills this gap by explaining the extent by which local governments use betterment charge to capture increments in land values due to land use change to finance preservation of green landscapes. In addition, the research investigates if betterment charge which is meant to capture the increase in land values due to changes in land use are known by the various actors, if it is operationalized and if it is implemented in practice.

1.2 Problem Statement

Kumasi metropolitan area is the fastest-growing urban metropolis in Ghana. The metropolis had a growth rate of 5.2% between 2000-2010. This was more than double the national growth rate of 2.4% during the same period(Abass; Adanu, et al., 2018). The increased population growth is characterized by uncontrolled peri-urbanization. This has resulted to heavy, severe, unprecedented environmental impact such as pollution, land degradation and loss of ecosystem services (Yeboah and Asibey, 2019) as a result of loss of green landscapes through conversion of non-built -up land to urban use(built-up land) (Divine; Gabriel, et al., 2018, Ashiagbor; Amoako; Asabere, et al., 2019b).

The uncontrolled urban expansion taking place in peri-urban Kumasi and the continuous loss of green landscapes is contrary to the Sustainable Development Goals(SDGs) to which Ghana Committed. To steer the realization of the Sustainable Development Goals, urban development must be controlled and managed to prevent loss of green landscapes through effective implementation of land use plans and enforcement of zoning regulations(Cobbinah; Gaisie, et al., 2020). However, even though local governments intend to preserve green landscape through land use plans and zoning regulations(Cobbinah and Amoako, 2012, Mensah, 2014, Cobbinah; Gaisie, et al., 2020), little or no financial investment is put in monitoring of land use plans and enforcement of zoning regulations due to inadequate financial capacity(Abass; Afriyie, et al., 2018). It is paramount that for land use plans and zoning regulations to be effective in preserving green landscapes, adequate financing of monitoring of land use plans and enforcement of zoning regulations is required(Naab; Dinye, et al., 2013). Therefore, there is need to enhance financial capacity of local governments to fund preservation of green landscapes. Among mechanisms that can be used is to capture increments in land values arising from land use change.

Peri-urban Kumasi has experienced massive increase in land values due to changes in land use(Justice and Kevin, 2010, Abass; Afriyie, et al., 2013). Higher land prices offered for urban uses motivates the chiefs to sell land to private investors and developers (Appiah; Abalo, et al., 2019). The new leaseholders have ability to pay higher prices, result in further increase in land values. Such increases in land values should be recouped by local governments by the use of land value capture instruments to fund preservation of green landscapes.

Betterment charge outlined in the Local Governance Act,2016 and Land use and Spatial Planning Act,2016 is a unique land value capture instrument that explicitly aims at capturing land value increments arising from changes in land use within an African context. The provision of betterment charge in legislation to capture increase in land values due to land use change is unique within African context because most of the developments in Africa are informal and are mostly not registered with local governments. Moreover, betterment charges have always been associated with government investment in physical infrastructure and only landholders whose land is directly impacted by the infrastructure pay betterment.

It is critical to look into how local governments in Ghana are using the rare opportunities to generate own-source revenues from the increase in land values due to land use changes in the peri-urban areas to fund green landscape preservation especially monitoring of land use plans and enforcement of zoning regulations. Thus the focus of this research is to explain the extent by which local governments capture the increments in land values due to land use change to finance green landscape preservation and investigate if the betterment charges are known by various actors both within and without government, if the instrument is operationalized and if it is used in practice to capture increments in values that arise from the changes in land use.

1.2.1 Research objectives

- To explain the extent by which local governments capture increments in land values due to land use change through betterment charge to finance preservation of green landscapes in peri-urban Kumasi.

- To investigate if betterment charge is known by actors, if the instrument is operationalized and if it is used to capture increments in land values arising from changes in land use.

1.2.2 Main research question

To what extent do local governments capture increase in land values due to land use change through betterment charge, to finance preservation of green landscapes in peri-urban Kumasi?

1.2.3 Sub-questions

1. **How has land use changed in peri-urban Kumasi with the past decade?**

   To answer the main research question, it is important to examine the actual changes in the landscape due to land use change.

2. **How have land values changed in peri-urban Kumasi within the past decade?**

   To understand if and how local governments are capturing increment in land values due to land-use change, firstly, it is necessary to measure the changes in land values to see if it warrants capturing since value capture can only take place when there are increases in value.

3. **Are increments in land values due to land use change captured in peri-urban Kumasi?**

   To answer the main question, it is important to understand if betterment charge is known, operationalized, and levied when use of land is changed.

4. **How are captured increments in land values used, to preserve green landscape peri-urban Kumasi?**

   This question helps in answering the main question by determining how revenues from value captures are used and if the revenues are used for preservation of green landscapes or not.

5. **How has betterment charge due to land-use change enabled local governments to preserve green landscapes?**

   To answer the main question, it is important to know if betterment charge is contributing in preservation of green landscapes

1.3 Significance of the study

Preservation of green landscape is important to ensure continuity of the ecological services such as acting as carbon sink and protection of biodiversity, promoting food security, and protection of livelihoods (Divine; Gabriel, et al., 2018). To protect these landscapes from uncontrolled peri-urbanization, local governments must enhance their financial capacity to monitor land development and enforce zoning regulations. This research, therefore, sheds light on the priorities of local government in green landscape preservation and willingness to invest captured increment in values to achieving it. It also shows how the increase in land values due to land use change can contribute to own-source revenues by capturing land values or loss of revenues due non-implementation of value capture through the use of betterment charge. Also, it shows whether land-use plans provide for green landscape protection and the level of enforcement of such plans and zoning regulations to realize the intention of protecting green landscapes. Therefore, the information from this research can be used to formulate strategies for financing future green growth in peri-urban Kumasi.

Academically, studies on value capture mainly focus on financing physical infrastructures such as roads and housing with little efforts on capturing values for financing preservation of green landscapes. This research, therefore, fills the gap in use of land-based revenues to finance green landscape preservation by focusing on financing of land use plans and zoning regulations which are the main mechanisms applied in Africa to control urban growth and protect green landscapes from conversion to other uses. It contributes to the existing academic literature on the relationship between land value capture and green landscape preservation in Africa.

This research is also part of the Netherlands Environmental Assessment Agency(PBL) project that focuses on exploring strategies and scenarios for inclusive green growth in the Kumasi peri-urban landscape in Ghana. It contributes to the project by indicating how urban expansion has contributed to changes in green landscapes in peri-urban Kumasi within the past decade. It also shows how land use changes have resulted in increments in land values and how the increments in land values due to land use change can be used to preserve green landscapes by investing revenues from land in funding activities aimed at preserving green landscapes to achieve inclusive green growth in peri-urban areas.

Chapter 2: Theory/ Literature review

2.1. Introduction

This chapter provides a review of theoretical literature of the concepts used in this research including peri-urbanization, land value capture, land value capture instruments, land use change, and impact on land values and preservation of green landscapes. To examine the spatial location of land uses from economic perspectives, economic theories on location of land use on space were also reviewed to understand economic perspective of land use changes. Additionally, theory of single-tax on land is discussed as an anchor of land value capture for benefit of society.

2.2. Urban expansion and peri-urbanization

Peri-urban and peri-urbanization are used interchangeably in literature. However, there is no consensus on the definition of what constitutes a peri-urban area. For peri-urbanization, scholars agree that it refers to the process of converting or transforming areas beyond an urban boundary into urban character in terms of land use, lifestyle, economic activity, and socio-cultural aspects as a result of urban expansion or influence from the city(Rauws and de Roo, 2011, Tian; Ge, et al., 2017).

Authors like Harman(2011) and Ravetz; Fertner, et al., et al.,(2013) view peri-urbanization with a spatial lens. According to this group of writers, peri-urban and peri-urbanization is concerned with the spatial transformations that take place beyond the city boundary. Such transformations are attributed to dynamics within the main city such as population growth(Cobbinah and Amoako, 2012) and urban land value increases(Brueckner, 2000) which leads to lateral urban expansion and changes the spatial configuration of the area beyond the urban boundary characterized by uncontrolled low-density developments(Acheampong; Agyemang, et al., 2016). Spatially, peri-urban areas are defined as zones between the city and the rural hinterland which are subject to continuous changes in land uses and reflect a mix of both urban and rural land uses due to urban expansion. On the other hand, peri-urbanization is defined as the process by which mixed land uses occurs outside the city boundary(Hudalah; Winarso, et al., 2007).

Other writers such as Rauws and de Roo(2011) and Varkey and Manasi (2019) describe peri-urbanization as a comprehensive transformation of both the physical, social and economic landscapes of regions beyond the urban boundaries as a result of urban-rural linkages. According to this group of authors, the interdependent interactions between the city and its rural hinterland for resources and services(Sebego and Gwebu, 2013) result in the city influencing both the physical and non-physical aspects of its rural hinterland. As a result, the urban-rural dichotomy is blurred(Lambin; Geist, et al., 2003) and a dynamic continuum of spatial changes, lifestyle, economic and cultural changes emerge beyond the city boundary(Rauws and de Roo, 2011).

Despite the disagreement on the scope of the transformations, there seems to be consensus that peri-urban areas are lands between the city and its rural hinterland which are continuously undergoing land use changes(Amoateng; Cobbinah, et al., 2013, Debolini; vallete, et al., 2015). It is also agreed that the outcome of peri-urbanization is the change in land use in peri-urban areas(Kombe, 2005, Appiah; Bugri, et al., 2014, Ayambire; Amponsah, et al., 2019, Cobbinah; Gaisie, et al., 2020). In this study, peri-urbanization will be discussed based on its spatial aspects as built-up areas occur beyond Kumasi city boundaries over the past decade evident by changes in land use.

2.3. Land use Change

Land uses are the activities for which particular land are utilized(Kimengsi; Nguh, et al., 2017). Land use change is either the conversion of land from one use to another or modification of the use of land over a given period. Land use conversion illustrates the total change from one category of land use type to another while land use modification represents change in the characteristic of land use without change in classification(Lambin; Geist, et al., 2003). Land use change in peri-urban areas have been measured by several researchers in terms of conversion of land from one category of use to another by use of remote sensing data to give patterns of land use over time(Abass; Afriyie, et al., 2018, Abass; Adanu, et al., 2018, Toure; Stow, et al., 2018).

Land use change in terms of land conversion includes conversion of non-urban land use (agricultural land) beyond the urban boundary, into to urban land use (residential, industrial, or commercial) due to urban expansion and conversion of natural areas to agricultural land (Browder; Bohland, et al., 1995, Glaeser and Kahn, 2004, Kombe, 2005, Ravetz; Fertner, et al., 2013, Debolini; vallete, et al., 2015, Varkey and Manasi, 2019). Lambin; Geist, et al., (2003) adds that it also includes conversion of peri-land into infrastructure and urban amenities. Additionally, it involves conversion of natural areas such as woodlands(Ode and Fry, 2006); forest land (Divine; Gabriel, et al., 2018) and wetlands (Kimengsi; Nguh, et al., 2017) to agricultural or urban use.

From the above literature, there are two dimensions of land use conversion: conversion of agricultural land to urban use and conversion of natural areas (forests, woodlands, wetlands) to agricultural use or urban use (residential, commercial, or industrial use). Therefore, this research defines land use change as the conversion of none-built-up land (agricultural land, forests, wetlands, woodlands, open spaces(non-built-up land) to built-up land (residential, commercial, industrial, infrastructure)(Lambin; Geist, et al., 2003, Glaeser and Kahn, 2004, Kombe, 2005, Ode and Fry, 2006, Divine; Gabriel, et al., 2018, Kimengsi; Nguh, et al., 2017).

The degree of change/rate of land use change can be measured by depicting the average amount of change over a period, which indicates a constant speed of change or the annual rate of change which indicates the percentage rate of change per annum(Puyravaud, 2003). The percentage annual rate of change is preferred since it does not assume land use change to be constant over the years and has been used to measure land use changes in Africa with the help of GIS(Acheampong; Agyemang, et al., 2016, Owar; Legesse, et al., 2017). The above literature shows that land use change is quantifiable quantitatively. However, to understand the dynamics of change, drivers of change are important parameters.

2.3.1 Drivers of Peri-urban land use

Factors driving peri-urban land use change discussed in literature include transport, population growth, and economic growth. Zasada; Fertner, et al.,(2011), Ravetz; Fertner et al.,(2013) and Aalbers and Pauleit(2013) argue that transportation and income growth contributed to conversion of peri-urban land into urban use especially in Europe and America. These authors observed that improvement in transport networks and increased incomes enhanced accessibility and reduced commuting costs. As a result, conversion of agricultural land and green areas to residential use dominated the peri-urban areas. However, Brueckner(2000) argues that land value is the underlying driver of land use changes as a result of higher land prices within cities which forces urban land uses to move to the periphery in search of cheaper land. Factors such as transport and increased income levels only play a facilitative role by enhancing accessibility and ability to pay increased commuting costs respectively.

In developing countries in Asia and Africa with rapidly growing cities, population growth is the major cause for peri-urban land use change(Hudalah; Winarso, et al., 2007, Justice and Kevin, 2010). Literature show that in some parts of Asia, the change in peri-urban land use is planned and occurs as a result of formal government policies to redistribute population by decentralizing employment area (Hudalah; Winarso, et al., 2007, Vitriana, 2017). These policies have resulted in huge increase in land values in peri-urban areas of countries like China, India, and Indonesia. Consequently, governments have monetized land to generate revenue through land leasing, a process which as further intensified conversion of land to urban use(Shatkin, 2016). On the other hand, peri-urban land use change in Africa is organic and does not comply with the provision of land use plans and planning regulations(Kombe, 2005, Debolini; vallete, et al., 2015, Kimengsi; Nguh, et al., 2017). Organic development is attributed to inadequate financial capacity of the local governments to monitor and enforce planning regulations(Kombe, 2005).

Studies in peri-urban areas in Africa indicate that urban population growth (both natural and rural-urban migration), high demand for land, willingness of customary land custodians to sell land and increased land prices are the main drivers of peri-urban land use change(Doan and Oduro, 2012, Appiah; Bugri, et al., 2014). Kombe (2005), concluded that conversion of agricultural land in peri-urban areas of Dar-es-salaam city, Tanzania, is characterized by informal land developments resulting from buyout of communal land from traditional leaders. The traditional leaders are enticed by higher land values associated with urban development to sell communal land. Kuusaana and Eledi (2015), supported these arguments in a study of Tamele metropolis in Ghana. Similarly, Sebego and Gwebu (2013) also agreed with the arguments in a study of peri-urban areas of Gabrone city, Botswana. Similar conclusions have been demonstrated by studies focusing on land use change in peri-urban Kumasi(Amoateng; Cobbinah, et al., 2013, Acheampong; Agyemang, et al., 2016).

All the above factors translate to demand for urban land. Land use change occurs when urbanization dynamics create demand for more land. The demand coupled with the ability to pay especially among the middle-income group result in expansion of residential use and other urban uses to the periphery(Justice and Kevin, 2010). It is shown that economic perspective of land and land use is a major driver of land use change. These arguments are derived from several economic theories dating as early as the 18th century.

2.4 Economic theories of spatial location of land use and land values

The spatial distribution of land uses is explained by several economic theories based on competition. However, the research will only refer to three of these theories since they form the basis for the other models/theories. Among these theories are:

Von Thunen's Agricultural Location Theory

This theory was developed in 1826 by Von Thunen. According to this theory, savings on transport costs are determinant of value of rent payable to the landholder. Agricultural land uses compete for land based on the location. Land close to the city is put into use and earns rent unlike land further from the city(O'Kelly and Bryan, 1996). It assumed land to be of the same quality/fertility. The main contribution of this theory is the focus on location as a determinant of land values. Based, on this theory, Peet(1969), argues that agricultural use expands to other zones further away from the city if there is increased demand for agricultural produce; resulting in higher produce price and increased land rent. The high land rent necessitates expansion of agriculture to other zones as farmers compete for land to produce the crop.

Ricardo's Agricultural Land Rent Theory

Ricardo developed agricultural land rent in 1951. The theory argues that the fertility of land determines rent payable to the landholder. Fertile land has higher productivity, therefore produces surplus products that are sold and paid to the landlord as rent(Barnes, 1984). The difference in soil fertility formed the basis for competing for land. The main contribution of this theory is that it highlighted productivity of land as a determinant of land value.

Alonso's Bid-rent theory

The theory was developed by William Alonso in 1964. According to the theory, all lands uses (both urban and agricultural) compete for land in a free market by offering a bid-price depending on the size of land required for each use, transport cost and the return on investments and other benefits expected to accrue to the investor or land user. The highest and best use offers the highest price and out-bids the other uses thereby being allocated the land Alonso(1964). Therefore, land use change can only occur when new use offers a better return than existing use. This theory brought into perspective the dimension of land size, type of use, and expected return as a determinant of the location of land uses and land value. However, the Bid-rent theory has been criticized by many authors for assuming a free land market where all buyers have equal access to information. Also, it is criticized for ignoring the non-material value of land and effects of land use zoning and land use regulations on land values(Koomen and Buurman, 2002, Turvey, 2017). Critic on effects of land use zoning and land use regulations led to the formulation of models indicating that zoning can either increase or decrease land values and therefore, a change in land use zoning influences land prices(Ohls; Weisberg, et al., 1974).

Despite the criticism, empirical studies confirm the arguments put forward by Alonso concerning land use change. For instance, Browder; Bohland, et al.,(1995) in studying the spatial expansion of cities in Asia and Latin America, concluded that urban expansion and associated land use change takes place when the land values within the city exceed those at the fridge. Individuals and businesses move to the fridge to take advantage of lower land prices. Further, Brueckner argues that location of land uses in space is controlled by "economist's invisible hand" Brueckner(2000 pg., 162). He points out that in a free market if urban uses can out-bid agriculture or open spaces, it indicates that the land would make a higher economic return when put under urban use.

The theoretical discussion above demonstrate that land use change can only occur when there is a better economic value that will accrue to the landholder or investor when land is put to a different use other than the existing use. It also demonstrates that each land use attracts different prices in a competitive land market(Varkey and Manasi, 2019). Therefore, as land use change occurs, the value of land consequently increases. In addition, empirical studies support the preposition of these theories and highlight the link between land use change and increase in land values.

2.4.1 Linkage between land use change and Land values

The transformation of the peri-urban areas from purely rural settlement to a mosaic of urban and rural settlement due to land use changes result in a huge and constant increase in the economic value of land and create massive difference in the value of agricultural and urban land use (Vitriana, 2017). This has been confirmed by studies in peri-urban areas of developing countries in Asia and Africa. Debolini; vallete, et al.,(2015), assessed the land value changes in peri-urban areas of Meknes City, Morocco, and reported that real estate developments paid six times higher

than the value of agricultural land of equal size. Similarly, Varkey and Manasi,(2019) studied land values in peri-urban areas of Bengaluru Metropolitan**,** India, and concluded that change in land use constantly increased land prices, activated land market, and real estate development. Moreover, Sharif,(2014) in studying the relationship between land use change and land price in Savar municipality, a satellite town of Dhaka metropolitan area, concluded that there is a direct correlation between land use change and increase in land price.

Vitriana(2017) studied land value increases due to land use change in Bandung – Cimahi Peri-urban Region, Indonesia, and its contribution to government revenues. She demonstrated that land values had increased significantly as a result of land use change. Further, she observed that the government was losing revenues from land since the increased values were not contributing to an increase in local government revenues. She concluded that to preserve the environment, the government must generate revenues from increased land values and use those revenues to mitigate the negative environmental impacts of land use change by ensuring strict adherence to rules on regulation of land use in peri-urban areas.

Naab; Dinye, et al.,(2013) reported that land use change in peri-urban Tamale, Ghana had resulted in increments in land values more than 1000% within ten years(2002-2012). For example, they observed that the value of 0.25 acres of land had increased from between 30-80 GH¢ in 2002 to 500-6000 GH¢ in 2012. Moreover, several studies in Ghana have acknowledged that Land use changes resulted in increase in land values in peri-urban areas of cities in Ghana such as Accra, Tamale and Kumasi(Cobbinah and Amoako, 2012, Amoateng; Cobbinah, et al., 2013, Abass; Afriyie, et al., 2013, Appiah; Abalo, et al., 2019, Ashiagbor; Amoako; Asabere, et al., 2019a, Cobbinah; Gaisie, et al., 2020, Abass; Afriyie, et al., 2018).

The Literature above indicates that land use change significantly increases land values. The increased land values associated with land use change are among the increments in land values that are supposed to be subjected to land value capture as a way of sharing such benefits with the public(UN-Habitat, 1976).

2.5. Land Value Capture

The concept of land value capture refers to mobilization of all or part of increase in land values which accrue to landholders due to public infrastructure investments, economic growth, population growth and state decisions on regulation of land use to finance infrastructure and services(UN-Habitat, 1976, Alterman, 2012, Ingram and Hong, 2012a, Philip, 2012, Walters, 2013), mitigate impacts of changes in the use of land, or implement public policies aimed at achieving equity(Suzuki; Murakami, et al., 2015).

The concept originated in 1879 from the idea of a single tax on land by Henry George (Michael A. MacDowell, 1977, Robert, 2004). George argued that public authorities should capture full increment in land values that accrue to landholders as a way of distributing wealth to society. He was of the view that land value increases are created by the community and therefore are unearned and undeserved benefits to landholders(Backhaus, 1997). However, adoption of value capture by many countries took place after the UN-Habitat Vancouver declaration that states that "*The unearned increment resulting from the rise in land values resulting from change in use of land, from public investment or decision, or due to the general growth of the community must be subject to appropriate recapture by public bodies (the community)"* UN-Habitat (1976, pg. 30).

The idea of taxing land as a way of distributing wealth created by society has since been supported by several authors like Alexander(2009) who argue that landholders have a social obligation to share surplus produced by land with society. This ideology of distributing wealth led to academic debate about full value capture and partial value capture. Writers who opposed full value capture criticized the idea of a single tax on land as having a possibility of resulting in zero capital gain on land(Ingram and Hong, 2012a).

Ingram and Hong(2012a) add that land values are determined by factors such as public investments, changes in land use, population growth, economic growth, private investments, and productivity of land. In their opinion, value capture should delineate who contributed to increment in land values to ensure that fairness and that values increments due to private investments and original productivity of land must remain with landholders hence only partial capture of value is deemed fair. However, for ease of estimation of values, they suggest that value capture should not be focused on which actors generated the increase in values since the aim is not to apportion increase in value to each contributing factor, but to estimates change in values that occur within a definite period due to public investments, government decision or change in land use(Ingram and Hong, 2012a).

Another critic of George is Fainstein (2012) who argues that land value increments can also result from actions of individual landholders and not only public actions and societal conditions. She views full value capture as an injustice to the landholder and proposes partial capture of land value increments to ensure that only unearned increments are shared with society. Ingram and Hong(2012a) agree with Fainstein(2012)on partial value capture on the ground that private investments also result in land value increase and that any attempt to capture a 100% increment in value may discourage investments in the land. However, Smolka and Furtado(2002)argue that land values increases generally originate from the community since there is little that a landowner can do to increase value except by investing in buildings.

Further, Smolka(2013)argue that even in circumstances where land value increments may be attributed to the action of individual landowners, the general societal conditions such as demand for land and locational site amenities which have nothing to do with efforts of the landholder, play a critical role in generating value increase. However, Smolka (2013) agrees with Fainstein(2012) on the proposal for partial value capture but disagrees with the argument that value increments can purely be generated by individual landholders.

Despite these debates, many countries adopted value capture policies and formulated laws outlining instruments to be used to capture the increase in land values arising from public investments or actions associated with regulations of land use, However, these laws were never implemented as expected. According to Smolka and Furtado(2002), Some of the challenges that resulted to non-implementation of the laws include contradictions in the provisions of the laws, difficulties in interpreting and understanding the legal context of value capture instruments, limited awareness of the provisions of laws on value capture instruments by both state actors and other stakeholders. Apart from the challenges associated with law, implementation of value capture also faces perceptional drawbacks such as arguments that local governments lack human resources and technical capacity to implement the instruments, debates about double taxation, and higher collection cost with minimum return(Biitir, 2019).

Land value capture has gained popularity in recent years in developing countries. It is being accepted by policymakers as a key alternative source of revenue to traditional taxation especially

in regions with rapid urban growth like Africa. Urban expansions of cities in such regions create massive increase in land values due to high land demand and changes in land use(Peterson, 2009, Paulais, 2012). Smolka(2013) adds that fiscal decentralization and the need to generate own-source revenues to finance infrastructural services are among the reasons which have led to the popularity of value capture among local governments.

To generate revenues through land value capture, land value estimations can either be based on the market value of land at the time of valuation reflected by the price the land would attract in a free market during the time it was valued or the market value of land at the time of sale indicated as selling price of land in a free market condition(Pagourtzi; Assimakopoulos, et al., 2003, Ma and Swinton, 2012). After value estimation, several instruments may be used to capture increments in land values. some of the instruments are discussed in section 2.5.1.

2.5.1. Types of land value capture instruments

Alterman(2012) categorized land value capture instruments into three types: Macro, direct, and indirect. Macro instruments include nationalization of land ownership, land banking, long-term public land leasing, and land readjustment. Land readjustment is not widely used and termed as sleeping beauty while the usage of the other three has decline.

Direct Instruments

Direct instruments are in the form of mandatory legally binding obligations for landowners to contribute part or whole of the increase in value to the government in form of tax as a way of redistributing wealth. They are not meant to mitigate impacts of any project or provide services that directly benefit the contributors. They categorized into two: 1) Instruments that capture general increase in land values due to economic growth or trend in society and not linked to any government action such as capital tax, land transfer fee, and annual property tax. 2) Instruments that capture increase in land values due to government investment in infrastructure (infrastructure-based- betterment) or due to planning decisions on development regulations (development-rights based-betterment)(Alterman, 2012).

Betterment charge

Betterment charges are one-time assessment tax aimed at capturing increase in land values arising from investment in public infrastructure or government actions regarding regulation of land use(Alterman, 2012). Fensham and Gleeson(2003) clarify that investment in infrastructure and granting of development permission result to increase in intrinsic land values by allowing land uses to access positive urban externalities such as amenities, services, supplies and markets which create economic surplus independent of the landholders' on-site investments.

Writers like Fensham and Gleeson(2003) and Walters(2013) emphasize that in practice, land value capture by use of betterment differs from development charge. They argue that development charge is aimed at recovering the cost of infrastructure development from landholders who directly benefit from such infrastructure or to defray the impact of particular developments on a given public infrastructure. On the other hand, betterment charge is aimed at recouping an apparent increase in land values due to economic surplus accruing to a private landholder due to development in infrastructure or land use decisions by the government.

a) Infrastructure-based betterment charge

Infrastructure-based betterment is the most common value capture instrument which has existed since the early 19th century in Britain and was later adopted in British colonies. However, its implementation was never successful due to lack of political goodwill and unpopularity among landholders and difficulty in defining the causal relationship between land value increase and infrastructure development and also arriving at the market value of land (Alterman, 2012, Philip, 2012).

In recent years, infrastructure betterment charges have become more popular and are being used to finance infrastructure development both in developed and developing countries(UN-Habitat, 2016). As a result, many empirical studies have focused on financing infrastructure through betterment. For instance, Marthur and Smith(2013) in studying revenues generated by joint inter-municipal transport developments in the USA, concluded that capturing the increase in land values associated with transit developments provides reliable revenues to transit agencies. Additionally, Betterment charges on Transit Oriented Development have been used in China Pearl River Delta to finance Inter-city passenger rail investment(Li; Luan, et al., 2013). Several studies have also been undertaken to assess the applicability of this type of betterment charge in Africa(Paulais, 2012, Turok, 2016).

b) Development-right-based betterment charge

Development right-based betterment is chargeable on increment in land values due to change in land use regulations, granting development permission, or decision on change of land use(Philip, 2012, Alterman, 2012). Similar to infrastructure-based betterment, development right-based betterment charge was provided for in British planning law and exported to British colonies like Ghana. It was also provided in Poland and Denmark(Walters, 2013) planning laws. In Poland, conversion of agricultural land to urban use attracted a betterment charge of 60% of increment in value while in Poland it was charged at 30-50%.

In contrast to infrastructure-based betterment which is more effective in cities or countries with public land management models, development-right based betterment charge is understood to be the most appropriate for use under private land ownership(Fainstein, 2012, Alterman, 2012). Fainstein (2012) argues that the policy alternatives to full value capture on privately owned land should aim at leveraging powers of local governments concerning regulation of land use. She gives an example of a linkage fee of $7.18 per square foot charged on commercial development over 50,000 square feet by the Boston Redevelopment Authority as a condition for approval.

Despite the potential of development based-betterment charge to generate substantive financial revenues for local governments, this type of betterment has mainly been transformed into indirect value capture instruments such as exactions and developer obligations especially in Europe and America(Philip, 2012). Alterman(2012) point out that among fourteen countries she studied within OECD, only Israel has a successful operational fiscal direct betterment charges enshrined in planning law with all the other countries utilizing indirect instruments such as exactions. This transformation is attributed to difficulties in the implementation of development-right based betterment. These difficulties include non-acceptance among landholders because it is mostly viewed as additional tax on land, and challenges in determining the time-frame within which land use decision results to an actual increase in value(Alterman, 2012, Philip, 2012, Walters, 2013).

However, Smolka and David(2000) point out that development-rights value capture can include a combination of both fiscal and in-kind contributions. Under these circumstances, planning authorities have the freedom to negotiate with developers to either pay a charge/fee or provide certain public goods such as roads, hospitals, schools among others.

Alterman(2012) highlights that the success of development-right-based betterment charge in Israel is largely linked to its design. This includes clarity; plot-based appraisal; a uniform rate of 50% increase in value due to planning decision is applied through the country; it is compulsory and high enough to cater for administration costs; has criteria for social exemptions; revenues are fully retained by municipalities and can be used for any purpose decided by the municipality this has made municipalities dedicated to its success, and not politicized either at the national or local level. The legal grounds betterment charge includes approval of detailed local planning or rezoning, approval of variation in the use of an area or a single plot, commencement of new use or approval of a subdivision scheme. She added that charges apply to both public and privately leased land. the law also clarifies occasion for payment to be upon sale of property or application for development permission.

2.5.2 Land value capture in Ghana

Ghana was chosen for this research because Ghana has a rapid urban population growth higher than the continental average(United Nations. Department of Economic and Social Affairs. Population Division, 2018). This means that it experiences more pressure from urban development due to increased demand for land for urban use. Hence prevalence of loss of green landscapes due to change of land use. Further, land value capture in Ghana stands out because Ghana has expressly legislated on capture of increments in land values arising from land use through betterment charge unlike many countries in Africa. Due to the high urbanization rate and changes in green landscapes, and legal provisions to capture land value increments arising from land use change, Ghana is ideal for studying land value capture for financing preservation of green landscapes. Also, the above reasons provided the best fit for the research to contribute to the overall objective of the PBL project about inclusive green growth.

Constitution of Ghana, 1992 establishes a framework for fiscal decentralization including assignment of revenue generation to the local governments also known as Metropolitan, Municipal, and District Assemblies(MMDAs). Among the source of revenues assigned to MMDAs include revenues from land (Owusu-Mensah, 2015). Therefore, Land value capture is legally recognized under different laws that enable both the central and local governments to generate revenue from land. However, this research focuses on value capture by local governments because local governments have the responsibility to regulate land use.

The instruments used to capture increments in land values that generate revenues to local governments include Stool land revenues(The Constitution, 1996(Article 267)), development charge, property tax, and betterment charges(Local Governance Act , 2016). Stool land revenues include revenues from land rents and royalties from lease of customary lands. These revenues are collected and shared among different beneficiaries by the national government through the Office of Administrator of Stool Lands(OASL)(The Constitution, 1996). Among the beneficiaries are the local governments and therefore, ground rents which form part of stool land revenues are considered as land value capture instrument which generates revenue to local governments even though it is not administered by local governments(Ayitio, 2019).

Development charges are collected by the Assemblies upon issuance of development permits. The charges are meant for infrastructure or service provision and an Assembly cannot levy development charge if it will not (or has not) provide the services(Local Governance Act , 2016,(sections 92 and 209)). Property rates are chargeable on improvements on the land. the valuation method used indicates that the rateable value is the replacement cost of the buildings/structures after the deduction of the amount it would cost at the time of valuation to restore the premises to a condition in which they would be when new(Local Governance Act , 2016(sections 145-146)). Biitir(2019) adds that valuation method used in Ghana to determine the rateable values does not include increase in land values, and that the benefit principle of taxation is applied.

Betterment charge

Land Use and Spatial Planning Act,2016, and the Local Governance Act, 2016 provide for recovery of a percentage increase in land values arising from investment in infrastructure, sale of land, provision of a plan, decision, or action of the planning authority. The percentage payable is to be determined by the Valuation Division of the National Land Commission(Local Governance Act , 2016,(section 102), Land Use and Spatial Planning Act, 2016, (section 111)). Given the foregoing, both infrastructure based-betterment and the development-right-based betterment charges are recognized by law. The development rights-based betterment charges are levied if land values increase is caused by the provision of a land use plan, the decision of planning authority(local government) concerning the change of use of land, or an action such as rezoning of an area. This research, therefore, focused on the development- right-based betterment charge because it entails capturing value increase associated with the regulation of land use.

2.6 Preservation of green landscapes

Peri-urban green landscapes consist of non-built-up land including agricultural land, and natural areas such as forests, woodlands, wetlands and any open spaces which are unpaved (Koomen; Dekkers, et al., 2008, Abass; Afriyie, et al., 2018, Cobbinah; Gaisie, et al., 2020). Agricultural lands are categorized as green landscapes due to the ecological services they offer such as reduction of adverse environmental impacts, promotion of efficient resource use, and providing access to green areas(Ayambire; Amponsah, et al., 2019).

Preservation of green landscapes is the protection of the agricultural land and natural areas from conversion to urban use. It aims at managing or containing urban growth to slow down land-conversion to urban use(Bengston; Fletcher, et al., 2004, Ayambire; Amponsah, et al., 2019). Literature also indicates that in peri-urban context, special attention should be paid to agricultural land since they are under more threat from urban development due to high demand for land and resultant increase in land values, unlike natural areas which are mostly protected by national laws and their lands vested in government agencies (Lee; Ahern, et al., 2015, Ayambire; Amponsah, et al., 2019, Naab; Dinye, et al., 2013).

Koomen, Dekkers, et al.,(2008) and Ayambire et al.,(2019) highlight that, preservation of green landscapes should take into account land ownership structures and the policy regime of the local context since these influence decision making and the effectiveness of mechanisms applied to protect the green landscapes. This is very critical in the Ashanti region where most land is held under customary tenure and is held in trust for the community by chiefs (Akrofi and Whittal, 2011, Abass; Afriyie, et al., 2018).

The chiefs have the responsibility to deliver land through leasehold arrangements to individuals outside the community or corporations. Also, the chiefs have the power to dictate the use of land. This has been argued to result in informal land transactions and land use practices which contradict the formal land use plans and zoning regulations(Barry and Danso, 2014, Kleemann; Inkoom, et al., 2017). Ayambire et al.,(2019), Amaoko and Adom-Asamoah(2017) and Abass; Afriyie, et al.,(2018) add that the massive influence of traditional chiefs has resulted to disparity between provisions of land use plans and actual development. They also argue that due to commoditization of land and high land values associated with urban use, the chiefs do not allow zoning of land for agricultural use.

2.6.1 Mechanisms for preserving green landscapes

Mechanisms for preserving green landscapes are classified into three main categories namely; Public land ownership and management, incentives, and regulations. Public land ownership is mainly used to preserve protected areas such as forests and wildlife habitats (Bengston; Fletcher, et al., 2004) while incentives are mainly used in developed countries(Pruetz, 2003). On the other hand, It is the most common mechanism and is used in developed and developing countries(Bengston; Fletcher, et al., 2004). Preservation of green landscapes through regulations entails control of land uses through the planning mandate of local governments to prepare and implements land use plans to direct development. Further, studies in Africa and Ghana have shown that land use planning and zoning are the mechanisms used to direct and control urban developments(Kombe, 2005, Naab; Dinye, et al., 2013, Abass; Afriyie, et al., 2018). This research, therefore, focuses on land use planning and zoning regulations as the mechanisms for preserving green landscapes applicable in Ghana.

2.6.2 Land use planning and zoning regulations

Land use planning is the tool by which governments, intervene in the land-market to correct market failure like loss of green landscapes(Alexander, R., 2014). Land use plans and zoning regulations play a crucial role in preventing and mitigating the negative impacts of uncontrolled urban expansion in the peri-urban areas. To be effective in preserving these landscapes, land use plans must incorporate green landscape preservation requirements in the national, regional, and local land use plans (Bengston; Fletcher, et al., 2004, Naab; Dinye, et al., 2013). Besides, lower level plans must be guided by and take into consideration the provisions of the higher-level plans. In preparing land use plans, zoning is the main tool used to designate land uses in space. Some of the criteria applied include large-lot zoning which discourages sub-division of land into smaller sizes; cluster zoning which provides for the development of housing in clusters and releases other lands for agricultural use, and sub-division exactions which require that environmentally sensitive areas must be set aside in sub-division scheme plans(Bengston; Fletcher, et al., 2004).

Effectiveness of planning and zoning in preserving green landscapes is highlighted in literature for example, transformation of forest area from conditions of deforestation to reforestation in China, Vietnam and Bhutan(Lambin; Meyfroidt, et al., 2014). Local governments have the responsibility of ensuring that developments adhere to the provisions of the plan which are presented mainly by zonal regulations. To achieve this, local governments mainly rely on land and building permitting(Naab; Dinye, et al., 2013). Development authorization through permitting further need to be enforced to avoid any variation from permitted use.

The success of planning and zoning regulations require strong enforcement and monitoring by the local governments(Peerzado; Magsi, et al., 2019, Bonye; Yiridomoh, et al., 2020). Empirical studies undertake by Koomen, Dekkers, et al.,(2008) assessed the effectiveness of planning and Zoning in preserving agricultural land and natural areas in the Netherlands. They concluded that planning and zoning are generally successful due to the strong capacity of municipalities to monitor and enforce development control. Equally, Fertner; Jørgensen, et al.,(2016) in their assessment of tools used to manage urban growth in metropolitan regions in Europe and USA, concluded that planning and zoning instruments are widely used but require effective enforcement by the local governments. To enforce provisions of land use plans and zoning regulations, local governments use several instruments which include sanctions/fines, surveillance, and compliance orders (Lambin; Meyfroidt, et al., 2014, Ellickson, 1973).

Bromley,(1990), Koomen et al.,(2008), Kleemann et al.,(2017) and Abass; Appiah, et al.,(2019) add that public awareness of the plans and regulations, public acceptance of the regulations and financial capacity to enforce plans and regulations are also key in determining the success of planning and zoning in preserving green.

The above theoretical review is summarized by the theory map and conceptual framework below.

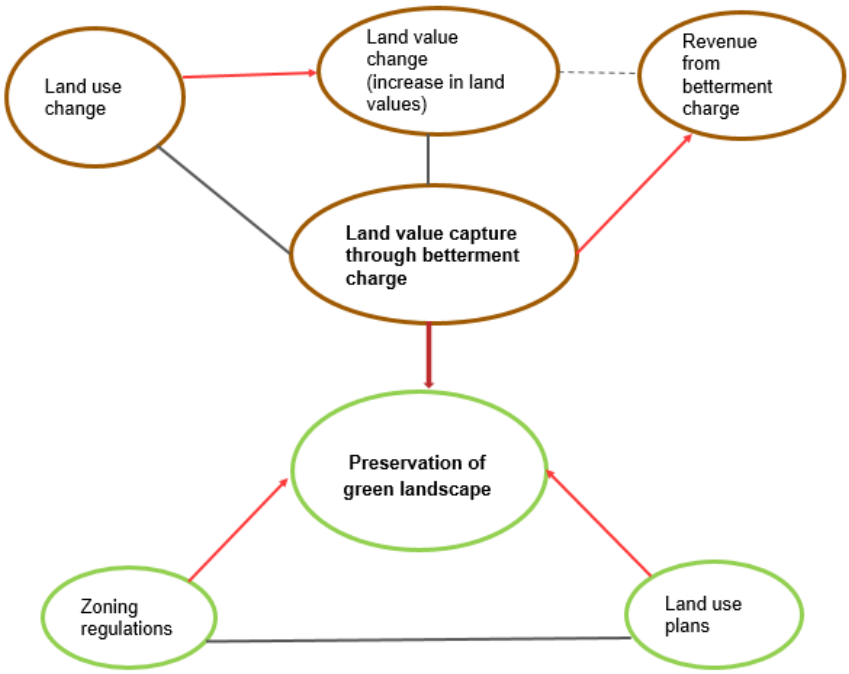
2.7 Theory map and Conceptual framework

2.7.1. Theory Map

The theoretical review has shown that land use change either through zoning or change in use of particular land parcels triggers competition for land among the various land uses as demand for land increases. Since each land use type attracts a different price in the land market, the use of one parcel and its price affects the price of other parcels within its vicinity. Thereby, changing the values of land within an area. The effect can either be a decline or an increase in land values. within ***a peri-urban*** context**,** the competition for land is between urban land uses and non-urban land use such as agriculture, open spaces, natural areas like forests, woodlands, and wetlands. Urban land uses offer higher prices due to higher economic returns associated with urban land use. Therefore, a ***change in land use*** from non-urban use to urban use result to ***increase in land values.*** the increase in land values due to land use change are unearned increments that should be shared with society by use of ***land value capture*** instruments.

The instrument provided in law to be used by local governments in Ghana to capture land value increments due to land use change is ***betterment charge.*** By applying this instrument, the local governments generate own-source ***revenues from betterment charges.*** The revenues from betterment charges are then used to finance ***preservation of green landscapes***. The mechanisms used in Ghanan to preserve green landscapes are regulatory mechanisms which include use of the powers of local governments to regulate land use through land use planning. It involves preparation, implementation, monitoring, and enforcement of ***land use plans*** and ***zoning regulations*** outlined in the plans**.** For land use plans and zoning regulations to be effective in preserving green landscapes, adequate finance is required to monitor the plans and enforce zoning regulations. Therefore, revenues from betterment charges are important in enhancing the financial capacity of local government to fund monitoring of land use plans and enforcement of zoning regulations.

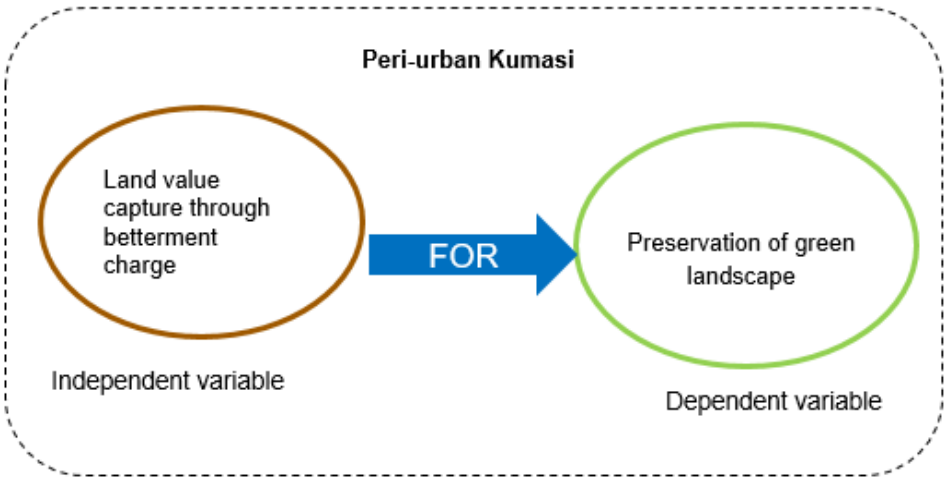
Figure 1: Theory Map



7.1.2. Conceptual framework

The conceptual framework illustrates the relationship of the concepts discussed in the theoretical review above. ***Land value capture through use of betterment charge(independent Variable)*** is applied by local governments to recoup part of the increments in land values accruing to landholders due to land use changes in peri-urban Kumasi. The recouped values provide revenues that are used by local governments to finance the ***preservation of green landscapes(dependent Variable)*** by monitoring land use plans and enforcing zoning regulations outlined in the land use plans.

Figure 2: Conceptual framework



Chapter 3: Research design, methods, and limitations

3.0 Introduction

This chapter describes the research strategy and method that were used to undertake the study to meet the study objectives and answer the research questions. It describes the overall research strategy, methods that were used for data collection, and analysis. It also outlines steps taken to ensure reliability and validity of the research, operationalization of concepts into variables and indicators, challenges faced in undertaking the research, and limitations of the research.

This research is part of the PBL project and several steps were taken in general to enhance reliability and validity of the research. The research was supported by a team of 3 experienced researchers from PBL and 2 IHS_PBL project coordinators(academics) with expertise in land value capture and land use planning which are relevant to this research topic. The team from PBL and IHS provided input to the research at different stages. Several consultative meetings were held between the PBL team, IHS-PBL project coordinators and researchers participating in the PBL project to discuss research topic, research strategy, data collection, data analysis and also provided feedback on the draft research proposal and preliminary research findings. During the meetings, the researcher presented the progress of the research and valuable input provided by PBL team, IHS coordinators, and fellow researchers. Apart from enhancing the reliability and validity of the research, the feedbacks from PBL researchers was important in ensuring that the research is in line with the objective of the PBL project and contributes to the overall project objective of exploring strategies and scenarios for inclusive green growth in the Kumasi peri-urban landscape.

The research also benefitted from input of PBL project team in Ghana. the Ghana team was made up academics (Professor and Doctor) from Bureau of Integrated Rural Development(BIRD) of the Kwame Nkruma University of Science and Technology(KNUST) with 25 years' experience in academic research and consultancy on land use dynamics in peri-urban areas in Ghana and beyond, and a lecturer form from the real estate department of the University for Development Studies (UDS), Ghana who also researches land value capture. This was of particular help to the research he made valuable local experience input in the research, a shortfall that the researcher had anticipated due to lack of local knowledge of land management in Ghana. Through the support of PBL, face-to-face interviews were possible despite the corona pandemic which made it impossible for the researcher to travel to Ghana for data collection. 3 research assistants from BIRD, Ghana, with experience in academic research collected part of data for the researcher. The research assistants were supervised by the 3 academics from Ghana.

The research assistants were also well conversant with the local language which was important in translating the questions to local language, conducting interviews in local language when necessary, and translating interviews undertaken in local language to English and transcribing responses from such interviews. This could have been a challenge to the researcher if no assistance was offered. The team from Ghana(academics) provided input on the research instruments and booked appointments for both faces-to-face interviews and some of the online interviews which were conducted by the researcher. They also actively participated in the data collection. Apart from supervising the research assistants, the academics also joined the research assistants in the field and collected part of the data. Specific details on reliability and validity will be discussed in section 3.1.3.

3.1. Description of the research design and methods

This section outlines a repetition of the research question, the overall research strategy, data collection methods, data sources and data types, and data analysis techniques.

3.1.1. Research questions

Research questions from the provisional research questions remain unchanged but have been repeated and justified.

Main research question

To what extent do local governments capture increase in land values due to land use change through betterment charge, to finance preservation of green landscapes in peri-urban Kumasi?

Sub-questions

1. **How has land use changed in peri-Urban Kumasi within the past decade?**

To answer this question, primary data from interviews, primary secondary data, and secondary data (published articles) were used. Primary secondary data (Spatial Data-Landsat 7 and 8 Images) for 2009 and 2019 were downloaded from United States Geological Survey (USGS) website and Arc *GIS was used to do supervised image classification to generate land use maps while secondary data from published articles were used to get the formula for quantifying land use changes and to triangulate the results. Primary data through interviews were used to obtain qualitative data on the rate of land use change.*

2. **How have land values changed in peri-urban Kumasi within the past decade?**

To answer this question, both primary and second data were used. Primary data collection through interviews was used to obtain data on land values for 2009 and 2019 and quantify the changes in land values, while secondary data (published Articles) were used to triangulate the results.

3. **Are increments in land values due to land use change captured in peri-urban Kumasi?**

To answer this question, both primary and second data were used. Primary data collection through interviews was used to obtain data on implementation of betterment charge due to land use use. Secondary data from published articles and legislation, and primary secondary data from unpublished government reports were also used to triangulate the data.

4. **How are captured increments in land values used, to preserve green landscapes?**

To answer this question, both primary and second data were used. Primary data collection through interviews was used to obtain data on whether there are revenues generated from increments on land values due to land use change, if yes, the estimated and actual revenues and how that revenue is used, annual funding for enforcement of land use and zoning regulations while primary secondary data from government financial reports and secondary data from published articles were also used to triangulate the data.

5. **How has betterment charge due to land-use change enabled local governments to preserve green landscapes?**

To answer this question, both primary and second data were used. Primary data collection through interviews was used to obtain data on the implementation of betterment charge, revenues from betterment charge, expenditure of revenues from betterment charge, and funding of enforcement activities. Primary

secondary data from unpublished government reports and published articles were used to triangulate the data to determine whether betterment charge is contributing to preservation of green landscapes or not.

3.1.2. Research objective, strategy, and methodology

a) Research objectives and strategy

The objectives of the study are to explain the extent by which local governments capture increment in land values through betterment charge due to land use change to finance preservation of green landscapes in peri-urban Kumasi, and to investigate if betterment charge is known by actors, if the instrument is operationalized and if it is used to capture increments in land values arising from changes in land use. The research is explanatory; therefore, a heterogeneous multiple case study strategy was used to achieve the objectives outlined above.

A case study strategy examines a real-life situation within its context by selecting one or more cases to represent the subject of study to allow for in-depth analysis instead of breadth(van Thiel, 2014). Yin (2018) adds that a case study is suitable for a study in which the researcher has no control over the events and aims to explain an existing real-life phenomenon with solid manifestation by selecting a few subjects. A case study strategy was most suitable for this research because first, the researcher has no control over the subjects of study. Second, among the many peri-urban areas in Ghana, Kumasi was selected. To ensure feasibility of the study, two municipalities (*Kwabre East and Asokore Mampong, see map 1 in chapter 4*) in Peri-urban Kumasi were selected among the many local governments to measure the extent by which local governments use a single value capture instrument (betterment charge).
Third, land use changes and land value increments are real-life phenomena manifested in peri-urban areas. Fourth, the study aims to get an in-depth understanding of the use of betterment charges to preserve green landscapes and not breath. Moreover, according to Yin (2014), a case study collects data from different sources to allow for triangulation. This research required collection of data by use of several methods such as spatial analysis, interviews, content analysis, and photo documentation for triangulation.

The type of case study approach used is heterogeneous multiple case study because two municipalities of different sizes (small and big in terms of land area) with different level of greenery were purposively selected to get an understanding of whether there are differences in the use of betterment charge in capturing land value increments, and use of the revenues from betterment charge in preserving green landscapes(van Thiel, 2014). Multiple case study was also chosen to enhance the replicability of findings(Yin, 2014).

b) Data collection methods

The research used a mix of secondary and primary data sources to collect both qualitative and quantitative data due to the nature of the data required to answer the research questions(Yin, 2014). In a case study research, several data collection methods can be used such as interviews, questionnaires, content analysis, and observation(van Thiel, 2014). To ensure data triangulation, this research collected primary data through photo documentation and semi-structured interviews (face to face and online). The interviewees included local government officers in Kwabre East and Asokore Mampong Municipalities, regional land valuers from the valuation division of the Land Commission working in Kwabre East and Asokore Mampong municipalities, customary chiefs in Kwabre East, family heads, residents, academics and real estate agents in both Kwabre East and

Asokore Mampong municipalities (*see table 2 below).* In addition, Photographs were taken to document depletion of green landscapes through land use changes.

Primary secondary data was collected from unpublished government reports on Kwabre East and Asokore Mampong. Spatial data (Landsat images- 2009 and 2019) for Kwabre East and Asokore Mampong municipalities was collected from the Website of USGS, Google Maps were also used to define the boundaries of the municipalities on the Landsat Images. Primary secondary data was also obtained from PBL including data on population, spatial data which were used to triangulate the data. Secondary data was collected from published journals, the Constitution of Ghana, and legislation through content analysis. Examples of secondary data sources are shown in table 1 below.

Table 1:Primary secondary data and secondary data sources

Data category	Type of data	Description	Data source
Primary secondary	Spatial data	Landsat images for Kwabre East and Asokore Mampong Municipalities(2009 and 2019)	United States Geological Surveys(USGS) website Google maps
	Revenues	District Assemblies Common Fund(DACF) transfers to Kwabre East and Asokore Mampong (2013-2018)	DACF website
		Internally Generated Funds for Kwabre East and Asokore Mampong (2013-2018)	-Kwabre East composite budget 2019-2022 -Medium term plans for Kwabre East and Asokore Mampong 2017-2019 -Composite budget for Asokore Mampong 2015 -A report by Anokye and Ashong,2018 on promotion of economic growth and youth employment in the Asokore Mampong municipal assembly -Kwabre East development Plan 2010-2013
	Population statistics	2010 population Data and 2019 projections for Kwabre East and Asokore Mampong	Ghana Statistical Services website PBL
	Municipal profiles	Land size, location	-Medium term plans for Kwabre East and Asokore Mampong
	Land use plans and Zoning regulations	Zoning guidelines and planning standards for preservation of green landscapes	Zoning guidelines and planning standards 2011 downloaded from website of Land use and Spatial Planning Authority
		Awareness of land use plans	Planning manual,2011 downloaded from website of Land use and Spatial Planning Authority
			Program implementation reports for Kwabre East and Asokore Mampong 2014, 2015 and 2016 2018 and 2019
Secondary data	Betterment charge and preservation of green landscapes	Betterment charge, land use plans and zoning regulations	-Constitution of Ghana, -Land Use and Spatial Planning Act, 2016 -Local Governance Act, 2016 -Published Journals

c) Sampling and sample size selection

i. Sampling

Due to the nature of the research question, this research relies mainly on key-informants. Therefore, non-probability sampling method was used. To select the respondents, purposive sampling, quota sampling, and snowball sampling were used(van Thiel, 2014). Government officers and academics were selected through purposive sampling due to the nature of their work, expertise, and knowledge which are specifically relevant to this research.

Real estate agents, chiefs, family heads, and residents were selected through snowball sampling by use of respondent networks (van Thiel, 2014). Snowball sampling was used to select real estate agents because it was difficult to find real estate agents working in the selected municipalities. The

real estate agents were selected to participate in the research due to their involvement in land transactions Snowball sampling was used to select chiefs because most chiefs do not reside within the communities, therefore snowball was used to identify chiefs who were available during data collection. Chiefs participated in the research because of their role as custodians of customary land and key decision makers on land use and land transactions(Akrofi and Whittal, 2011). Family heads and residents were also selected through snowball sampling because of the Corona pandemic which made it difficult to find respondents willing to participate in an interview. Family heads were involved in the research because of decision making roles on issues concerning the land within the African family context and therefore they engage with the chiefs on decisions concerning community land(Barry and Danso, 2014).

Quota-sampling of residents based on gender(2 males and 2 females in each case study area) was done and then snowball sampling was used to select residents who had lived in the study area for more than 10 years(van Thiel, 2014). It was important to interview the residents to corroborate information provided by the other respondents especially on public awareness, accessibility to land use plans, adherence to land use plans, and enforcement of betterment charge and land use plans among others.

ii. Sample size

The sample size was designed taking into consideration practical issues such as time for data collection, availability of respondents due to Corona pandemic, and access to respondents(van Thiel, 2014). Therefore, to be able to collect the data within the allocated time, a total of 27 respondents were interviewed as indicated in table 2 below.

There is no minimum number of respondents in a case study(van Thiel, 2014), 27 respondents were considered adequate to ensure reliability. Data saturation is considered to be reached by interviewing 12 respondents(Guest; Bunce, et al., 2006). The researcher intended to interview a total of 4 chiefs (2 from each municipality), however, chiefs from Asokore Mampong could not be reached during data collection period. Therefore, the questions which were to be answered by the chiefs in Asokore Mampong were answered by the family heads. The unavailability of chiefs may affect the findings of the research negatively especially findings on land values since chiefs are key actors in land transactions and therefore hold key information on trends of land values in their communities. In Addition, one officer had worked in Asokore Mampong for less than 2 years, therefore 1 more officer was interviewed to check the data provided by the relatively new officer. Table 2 shows the actual number of respondents interviewed.

Table 2:Interview sample size

Sampling method	Type of respondent	Office	Number	Type of data
Purposive	Local Government	Physical planning department	2	Land use change, Change in land value, Use of betterment charge, Land use plans, Zoning regulations
		Finance department	2	Use of betterment charge
		Public works	2	Land use change, Use of betterment charge, Land use plans, Zoning regulations
		Municipal planning officer	1	Land use change, Use of betterment charge, Land use plans, Zoning regulations
	National Government	Valuation Division of National Land Commission	2	Land use plans, Change in land values, Use of betterment charge
	Land use change academic	KNUST	1	Land use change, Land use plans, Zoning regulations
	Real estate academia	KNUST	1	Land use change, Land use plans, Zoning regulations, Use of betterment charge

Snowball	Real estate agents		2	Land use change, Land use plans, Zoning regulations, Use of betterment charge
	Chiefs		2	Land use change, Land use plans, Zoning regulations, Use of betterment charge
	Family heads		4	Land use change, Land use plans, Zoning regulations, Use of betterment charge
Quota and snowball	Residents		8	-Land use change, Use of betterment Charge-Public awareness of betterment charge -Land use plans and zoning regulations
	Total		**27**	

d) Data analysis

Data analysis entails data management, actual analysis, and presentation(van Thiel, 2014). The study adopted qualitative, quantitative, and spatial analysis methods. Qualitative data from interviews were transcribed by the researcher and research assistants and data saved as a backup for ease of retrieval and counter checking and correction of any errors that may occur during coding(van Thiel, 2014). With the help of Atlas ti. Software, a coding scheme was created based on the variables, sub-variables, and indicators derived from the operationalization table *(see annex 2).* The transcribed data was then coded both deductively and inductively. Using co-occurrence tables and queries, the researcher made inferences on the relations among variables and patterns within the data to determine meaningful relevant interconnections between variables. Besides, the researcher made inferences on the information with the help of the conceptual framework and information from the literature(Yin, 2018).

Spatial analysis was undertaken to illustrate spatial change in land use over the past ten years. Landsat remote sensing images for 2009(Landsat 7) and 2019 (Landsat 8) were downloaded from United States Geological Survey (USGS) website as standard products. The images had a spatial resolution of 30 m. The images were classified using supervised maximum likelihood algorithm in ArcGIS online software to generate land use maps. The land uses were categorized into built-up and non-built-up areas for each municipality (*see maps 2-5*). The non-built land consists of all the green landscapes (agricultural land, woodlands, forest, wetlands, and open spaces) while the built-up land represents developed land (urban use). Land use changes (conversions of land from non-built-up to built-up) was measured by comparing 2009 and 2019 land use maps(Lambin; Geist, et al., 2003) and calculating the rate of change based on data from the attribute table.

Quantitative data on land values, revenues (Internally generated Funds and DACF), and spatial data from the attribute tables (pixel counts) were analyzed using Excel. The data were entered into an excel sheet and descriptive statistical analysis was done to generate percentages, average, and ratio (van Thiel, 2014). The information generated includes percentages of built-up and non-built-up areas of the two municipalities in 2009 and 2019, land area in Km^2 of each type of use in 2009 and 2019, rate of land use change for each municipality, average land values for each land use type(residential, commercial, industrial and agriculture) for 2009 and 2019, percentage rate of change of land values for each land use type and IGF and DACF trends for the two municipalities(Heyvaert; Heyvaert, et al., 2013, van Thiel, 2014).

The results of the analysis are presented by the use of maps, tables, graphs, charts, and explanatory texts including quotations from the interviews(van Thiel, 2014).

3.1.3. Reliability and validity

Reliability and validity of a case study are important in determining integrity of the research (van Thiel, 2014). To enhance the reliability and validity of the research, the following steps were undertaken:

Reliability

Reliability is concerned with how consistent and accurate the variables are measured(van Thiel, 2014). Accuracy of measurements is impacted by research instruments used and the capacity of the interviewer in terms of background knowledge and communication skills(van Thiel, 2014). To ensure accurate measurement of the variables, semi-structured interview guides with a mix of close-ended and open-ended questions were used. The close-ended questions ensured that the responses include appropriate answers which are linked to indicators generated from literature and also an additional answer option of 'others with explanation' was included to ensure that any other relevant information that is not in the answer options outlined in the interview guide would be included and explained. Moreover, open-ended questions allowed for probing to get further information where necessary. The structure of the interview guide was also made very clear by grouping questions into categories of sections based on sub-variables.

The researcher also discussed the interview guide with fellow researchers who were working on the PBL project to ensure the questions and the design of the interview guides were easy to understand and that compound questions were avoided. Data collection was partly undertaken by research assistants who may have limited background knowledge about the research topic. Thus may not have been able to adequately probe the respondents or misinterpret the questions (Yin, 2018). To minimize the possibility of misinterpretation of questions and to ensure proper probing of respondents, the researcher held briefing sessions with research assistants to explain the questions and address the challenges that arose during data collection. However, due to logistic challenges of time to travel to the field, the briefings were not held as frequently as had been planned.

The research assistants translated the questions into local language to enable interviews to be held in the local dialect where necessary. Responses from these interviews were translated into English and transcribed by the research assistants. To ensure accuracy, the transcribed data was checked by the three academics who understand the local dialect and are part of the Ghana team in the PBL project. Interviews are also prone to interviewer-bias which can affect the objectivity of the interview(van Thiel, 2014). To address this, the researcher used interview guides with both structured and open-ended questions to minimize the risk of biased questions and enhance sufficient data collection.

Accuracy of measurement of land value increments arising from land use change was achieved by asking specific questions to the respondents to state reasons for changes in land values. The responses showed that the increments in land values were linked to land use change.

Consistency aims to achieve repeatability of the research so that if a similar study is undertaken under the same conditions, similar findings can be arrived at (Yin, 2014). To ensure consistency, a database was created in which all the data collected was stored for ease of reference during analysis and the codes assigned to variables also indicated. The researcher also kept memos to help track the steps and decisions made during coding and analysis. Secondly, all steps undertaken were documented for ease of reference and to ensure the research is systematic (van Thiel, 2014).

Internal validity

Internal validity was enhanced through triangulation by using different data collection methods and data sources(van Thiel, 2014, Yin, 2018). Primary secondary data and secondary data were through content analysis (*see table 1*). Spatial data were collected from the USGS website (Landsat7 and Landsat 8 images) of Kwabre East and Asokore Mampong municipalities for 2009 and 2019 Google maps were used to get data on the boundaries of the municipalities. Primary data was collected through semi-structured interviews (online and face-face) with government officers, customary chiefs, family heads, residents, academics, and real estate agents (see *table 2*). The interviews were aimed at the head of departments. However, where the head of the department was not available, middle-level staff were interviewed. This reduced respondent bias as a mix of senior and middle-level officers were interviewed. Photo documentation in the field was also done to support data on green landscape loss through land use change.

Different data sources include soft copy digital images, laws and policy documents, reviewed journals, and a total of 27 interview respondents. The respondents included 9 government officers working in Kwabre East and Asokore Mampong Municipalities and 2 regional officers of the Land Commission working in Kwabre East and Asokore Mampong Municipalities, 2 real estate agents working in Kwabre East and Asokore Mampong Municipalities, 2 Chiefs in Kwabre East, 4 family heads in Kwabre East and Asokore Mampong Municipalities, 8 residents of Kwabre East and Asokore Mampong Municipalities and 2 academics with research experience and expertise in land use change and real-estate in peri-urban Kumasi. The academics had not undertaken research in Kwabre East and Asokore Mampong Municipalities but had undertaken research in other peri-urban Districts in Kumasi and Ghana in general, therefore, they gave valuable information on the research topic.

The researcher also ensured consistency and accuracy of measurements by deriving the variables and indicators from literature and ensuring that indicators for measuring independent and dependent variables are exclusive to avoid mix-up in measurements during data collection and analysis(Yin, 2014). Further, data analysis was done based on findings of each indicator, a combination of findings per indicate to summarize the findings per sub-variables and linkages of variables of the study.

3.2 Operationalization: variables, sub-variables, and indicators

Based on the literature review and conceptual framework, the concepts are operationalized into variables and indicators to allow for measurements. First, the concepts are defined based on literature as follows:

3.2.1 Definition of concepts

Land value capture

Land value capture is used to mean the power of local governments to recoup part of increase in land values due to change in the use of land to provide public service(Alterman, 2012, Walters, 2013).

Land value

Land value is the price of a given size of land for a particular use would fetch in a free market at the time of valuation or the selling price of a particular size of bare land between a willing buyer and willing seller at a given time in a free market, where the parties act knowledgeably, prudently and without compulsion after taking into account the highest and best use of the land(Alonso, 1964, Pagourtzi; Assimakopoulos, et al., 2003, Verheye, 2004).

Land use change

Land use change is defined as the conversion of non-urban land use (agricultural land, open spaces, and natural areas) outside the boundary of the main city, into to urban land use (residential, industrial, or commercial)(Browder; Bohland, et al., 1995, Lambin; Geist, et al., 2003, Divine; Gabriel, et al., 2018, Varkey and Manasi, 2019).

Green landscapes

Green landscapes refer to agricultural land, natural areas such as forests, woodlands and wetlands, and any other unpaved land(Koomen; Dekkers, et al., 2008, Cobbinah; Gaisie, et al., 2020).

Preservation of green landscapes

Preservation of green landscapes is the protection of agricultural land, open spaces, and natural areas from uncontrolled urban development through use of mechanisms that direct urban growth(Koomen; Dekkers, et al., 2008, Ayambire; Amponsah, et al., 2019).

Table 3:Operationalization

Concept	Variables	Sub-Variable	Indicator	Data Collection Method	Data source
Land value capture	Betterment charge	Land use change	Types of land use 2009 -Non-built (Agriculture, forest, woodland, wetland, open spaces) -Built area (urban use)	Primary and secondary data: -Interviews -Spatial analysis -Content analysis.	-Interview physical planners, land valuers, real estate agents, public works officer, public works officer, residents, academics from KNUST -Spatial data from USGS and Google maps -Published journals, unpublished reports
			Types of land use in 2019: -Non-built (Agriculture, forest, woodland, wetland, open spaces) -Built area (urban use)	Primary and secondary data: -interviews -Content analysis.	-Interview physical planners, land valuers, real estate agents, public works officer, public works officer, residents, academics from KNUST -Spatial data from USGS and Google maps -Published journals, unpublished reports
			Rate of land use change	Primary and secondary data -Spatial analysis -content analysis	-Spatial data from USGS and Google maps - Take photographs in study area -Published journals, Unpublished reports
		Land value changes	Land prices in 2009 by land use type (agriculture, residential, commercial, industrial)	Primary and secondary data: -interviews -Content analysis.	-Interview land valuers, physical planners, real estate agents, chiefs, family heads, municipal planner - land values from valuation rolls -Academic journals
			Land prices in 2019 by land use type ((agriculture, residential, commercial, industrial)	Primary and secondary data: -interviews -Content analysis.	Interview land valuers, physical planners, real estate agents, chiefs, family heads and municipal planner - land values from valuation rolls -Academic journals
		Revenues from betterment charge	Applicability of the use of betterment charge	Primary and secondary data: -interviews -Content analysis.	-Interview physical planners, finance officers, academics land valuers, chiefs and family heads -Laws and by-laws -Academic journal
			Level of Public awareness of payment of betterment charge	Primary and secondary data: -Interviews -content analysis	-Interview physical planners, works officers, finance officer, real estate agents, chiefs, family heads and Residents -published journals, -unpublished Government reports
			Rate of betterment charge levy per land use	Primary and secondary data: -interviews -Content analysis.	-Interview physical planners, interview public works officers, finance officers, land valuers and real estate agents -Records of betterment charge payment from finance office -laws and by-laws
			Estimated annual revenue from betterment charge between 2009-2019	Primary and secondary data: -interviews -Content analysis.	-interview finance officers and physical planners -Local government budget estimates from revenue department
			Actual revenue collected per annum from betterment charge between 2009-2019	Primary and secondary data: -interviews -Content analysis.	- Interview finance officers -Local government revenue collection records from revenue/finance department
			Collection rate of betterment charge	Primary and secondary data: -interviews -Content analysis.	-Interview finance officers -Local government revenue collection records from revenue/finance department

			Criteria for levying betterment charge	Primary and secondary data: -interviews -Content analysis.	-Interview land valuers, physical planners, public works officers, finance officers, real estate agents, chiefs and family heads -Records of payments of betterment charge from revenue/finance office -Laws and by-laws
			Mechanisms for enforcing payment of betterment charge	Primary and secondary data: -interviews	-Interview physical planners, public works officers, finance officer, real estate agents, chiefs, Residents and family heads -Laws and by-laws
			Use of betterment charge revenues	Primary and secondary data: -Interviews -content analysis	-Interview physical planners, public works officers, finance officer, real estate agents, chiefs and family heads -Government financial reports
Green landscapes	Preservation of Green landscapes	Mechanisms used: -Land use plans	Presence of land use plans in peri-urban areas	Primary and secondary data: -interviews -content analysis	-Interview physical planners, public works officers, municipal planning officer, land valuers, chiefs and family heads, residents real estate agent and academics -land use plans, laws and journals
			Public awareness of land use plans in peri-urban areas	Primary and secondary data: -interviews -content analysis	-Interview physical planners, public works officers, municipal planning officer, land valuers, chiefs and family heads, residents real estate agent and academics -government reports, laws and journals
			Public access to peri-urban land use plans	Primary and secondary data: -Interviews -Content analysis	-Interview physical planners, public works officers, municipal planning officer, land valuers, chiefs and family heads, residents real estate agent and academics -government reports, laws and journals
			Level of adherence to peri-urban land use plans	Primary and secondary data: -interviews -content analysis	-Interview physical planners, public works officers, municipal planning officer, land valuers, chiefs and family heads, residents real estate agent and academics -government reports, laws and journals
		-Zoning regulations	Presence of green preservation regulations in peri-urban areas	Primary and secondary data: -interviews -Content analysis	-Interview physical planners, public works officers, municipal planning officer, land valuers, chiefs and family heads, residents real estate agent and academics -government reports, laws and journals
			Level of public awareness of green preservation regulations in peri-urban area	Primary and secondary data: -interviews -Content analysis	-Interview physical planners, public works officers, municipal planning officer, land valuers, chiefs and family heads, residents real estate agent and academics -Government reports, laws and journals
			Level of acceptance of green preservation regulations in peri-urban areas	Primary data: -interviews	-Interview physical planners, public works officers, municipal planning officer, land valuers, chiefs and family heads, residents real estate agent and academics -government reports, laws and journals
			Enforcement mechanisms of zoning regulations in peri-urban area	Primary and secondary data: -interviews -Content analysis	-Interview physical planners, public works officers, municipal planning officer, land valuers, chiefs and family heads, residents real estate agent and academics -Government reports, laws and journals
			Annual expenditure on enforcement of zoning regulations	Primary and secondary data: -interviews -Content analysis	-Interview physical planners, public works officers, municipal planning officer and finance officers -Government financial reports

3.3 Challenges and limitations

3.3.1 Challenges

Unavailability of respondents, for example, chiefs in Asokore Mampong could not be reached during the entire data collection period. to respond to this, questions that were to be addressed by the chiefs were directed to family heads. Data collection was done during rainy season which worsened traffic congestion. Hence the research assistants would depart very early for field and get to Kumasi very late at night. This made it impossible to hold daily briefing seasons. Therefore, only 4 briefings were held during data collection, in addition to one that was held before the start of data collection. Some targeted government officers were unavailable due to work commitments outside their duty stations. To address the gap, middle-level officers working in the targeted departments were interviewed. Also, some respondents refused to be recorded but consented to be interviewed, and use of the information for purpose of this research. To address this challenge, research assistants took notes during interviews.

Corona pandemic also made data collection through interviews to be very difficult due to delays in securing appointments with respondents, the unwillingness of family heads and residents to agree to be interviewed, also complying with social distancing requirements made some audio recordings to be less audible. To address the unwillingness of respondents to be interviewed, snowball sampling was used. To enhance the audibility of the recordings, Express Scribe Transcription software was used to regulate the speed of speech during data transcription. Corona Pandemic also made it impossible for the researcher to travel to Ghana for data collection. Therefore, research assistants and online interviews were used to collect primary data. Online interviews could sometimes be interrupted by poor internet connections. To partially address the challenge, the researcher resorted to audio calls instead of video calls.

3.3.2 Limitation

The limitations of this research are grouped into two: Limitations of data and scope of the research.

Limitation of data

The researcher did not obtain secondary data requested from the government offices. These include data on land values as per valuation rolls in both municipalities and data about monetary expenditure on enforcement of zoning regulations. Therefore, the researcher relied on data provided by interview respondents. Another limitation is that chiefs in Asokore Mampong were not available to be interviewed. Due to their role in land transactions, lack of data from the chiefs on land values may have negatively impacted research findings concerning land values in Asokore Mampong. The other limitation is that the study required respondents to answer questions on land values and land use in 2009, this depends on the memory of respondents, and also the duration of either work or residency in the two municipalities. Therefore, it is difficult to fully ascertain the accuracy of the data. The Landsat image 7 which was used for 2009 spatial data was not clear and had scan line errors. This made it challenging to classify the land uses in some parts of the images.

Limitation in terms of scope

Scope of the research is limited to variables indicated in the operationalization table. The study focuses on capture of increment in land values due to land use change through betterment charge. Therefore, capture of increment in land values due to infrastructure development is not included. Additionally, the study is also limited to planning and zoning regulations as mechanisms for preserving green landscapes. Spatially, the study was undertaken in Kwabre East and Asokore Mampong Municipalities in Kumasi peri-urban area.

Chapter 4: Presentation of Data and Analysis

This chapter presents the research findings based on data collected through the methods described in Chapter 3. It begins with a brief description of the study area, characteristics of the interview respondents, and finally presentation of findings following the sequence of the variables with their corresponding sub-variables and indicators as shown in the operationalization table in chapter 3. To answer the main and sub-research questions, interview responses were coded using Atlas.ti and findings are presented using frequency tables. The findings from primary data are verified by secondary data for similarities and variations. The discussions follow the format of the conceptual framework.

4.1 Description of the case

The study aims at explaining the extent by which local governments capture increment in land values due to land use change through betterment charge to finance preservation of green landscapes in Peri-urban Kumasi. It also investigates if betterment charge is known by various actors, if the instrument is operationalized and if it is used to capture increments in land values arising from changes in land use. Kumasi City is the capital of Ashanti region. It is strategically located within the intersection of major routes connecting northern and southern Ghana. Thus it attracts a lot of population with spillover effects to the neighboring districts and municipalities within its peri-urban areas which also form the greater Kumasi Sub-region. The study was undertaken in two of the Municipalities within the Greater Kumasi Sub-region: Kwabre East and Asokore Mampong.

The cases differ in geographical size with Asokore Mampong covering a smaller area of 23.91Km^2 compared to Kwabre East which covers 148km^2. Even though Asokore Mampong has a smaller land area, it has a bigger population size than Kwabre East(Ghana Statistical services, 2020). Further, google maps showed that Asokore Mampong has less greenery than Kwabre East. The two case study areas are similar because both were elevated to municipal status in 2017. Also, they are experiencing pressure for urban development from Kumasi city due to their proximity to the city(Republic of Ghana, 2010, Asokore Mampong Municipal Assembly, 2020). Both municipalities are also located within the first ring of Kumasi Peri-urban area as per the PBL project focus districts*(see figure 3 below)* or what is called the urban fridge in the literature(Sebego and Gwebu, 2013). These factors made the two municipalities ideal for a comparative analysis to examine how the local governments use betterment charge to capture increase in land values due to land use change and how betterment charge is used to preserve green landscapes.

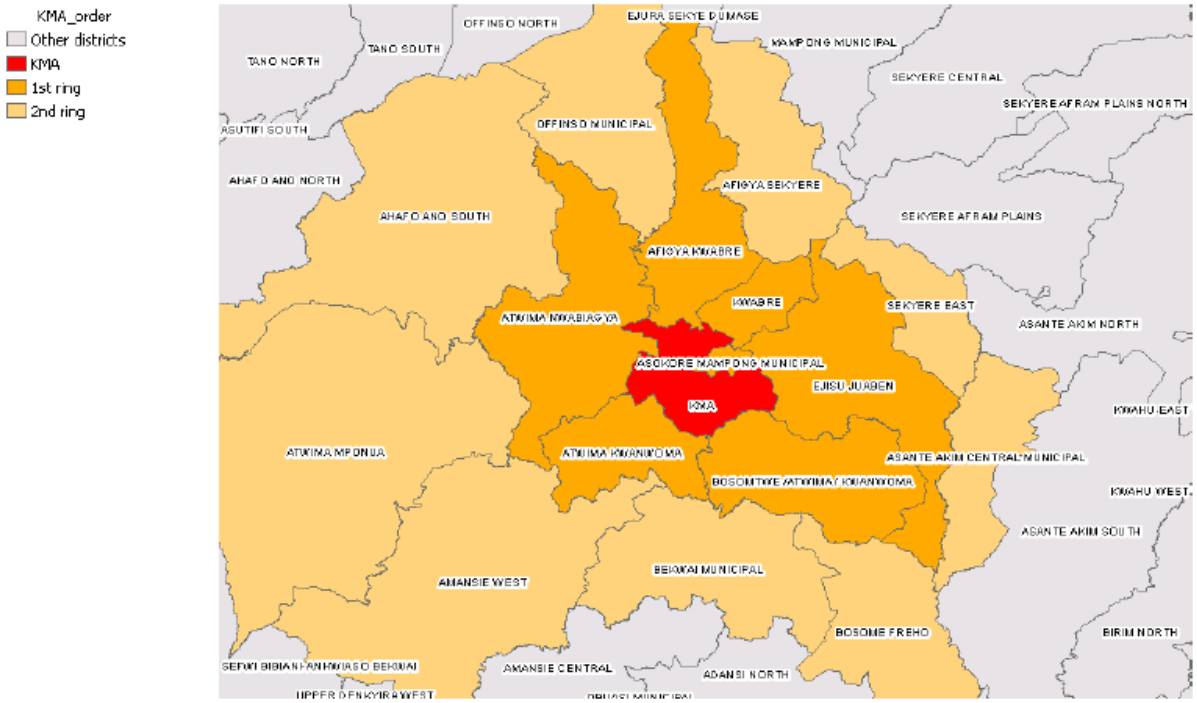
4.1.1 Kwabre East Municipality

Kwabre East Municipal was part of the former Kwabre District. In 2008, Kwabre district was divided into two districts: Afigya Kwabre and Kwabre East. Kwabre East was elevated to municipal status in November 2017 via LI 2265. It has a total land area of 148 square kilometers (Republic of Ghana, 2019). It borders Sekyere South District to the North; Kumasi Metropolitan Area to the South; Ejisu Municipal to the South-east; Atwima Nwabiagya Municipal to the West and Offinso Municipal to the North-west. Mamponteng, its capital, is approximately 14.5 kilometers from Kumasi. Its population was 115,556 in 2010 and was projected to increase to 139,983 in 2019(Ghana Statistical services, 2020).

4.1.2: Asokore Mampong Municipality

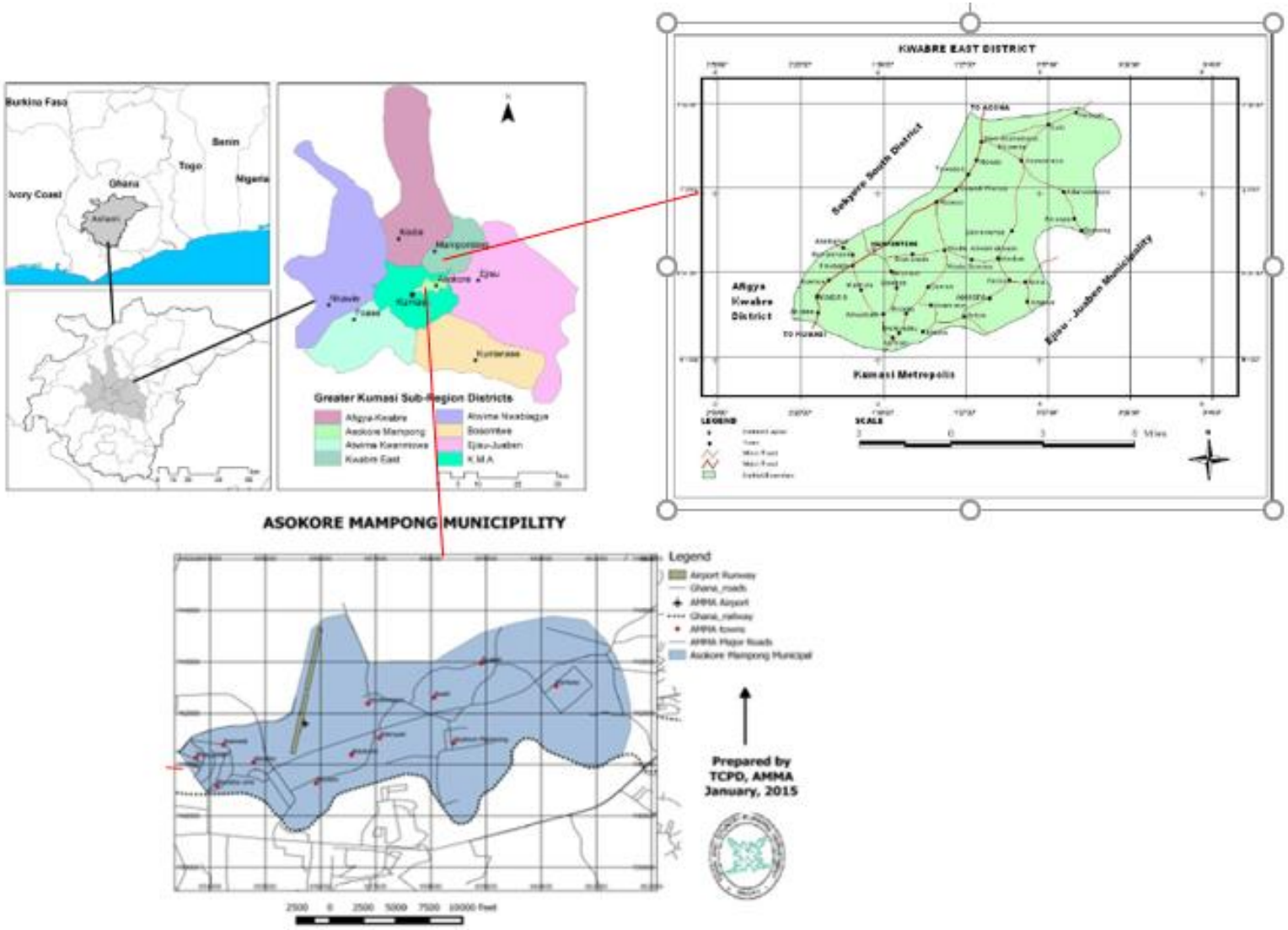
Asokore Mampong Municipal Assembly was carved out of the Kumasi Metropolitan Assembly (KMA) in December 2017 by a Legislative Instrument (L.I.) 2294 due to the growing population of the Kumasi Metropolis. It borders Kumasi Metropolitan Assembly (KMA) to the East, South, and West, Kwabre East District to the North-west and Ejisu- Juabeng Municipal Assembly to the North-east. It covers a total of 23.91 square kilometers. Asokore Mampong its capital is approximately 12km from Kumasi city(Asokore Mampong Municipal Assembly, 2020). It had a population of 304,815 in 2010 which was projected to increase to 369,264 in 2019(Ghana Statistical services, 2020).

Figure 3: PBL project focus districts



Source: PBL,2020

Map 1:Location of the study area



Source: Acheampong; Agyemang, et al., 2016, Kwabre East district Assembly,2010 and Asokore Mampong Municipal Assembly (n.d)

To realize objectives of this study, a total of 27 respondents were interviewed, section 4.2 highlights the characteristics of these respondents.

4.2 Characteristics of Respondents

Purposive, snowball, and quota sampling methods were used to select respondents within and outside the government as described in chapter 3. A total of 13 respondents were interviewed in Kwabre East while in Asokore Mampong 12 respondents were interviewed. In addition, 2 academic experts with knowledge in the research topic were also interviewed. Frequency analysis on characteristics of respondents in each municipality is shown in figures 4 and 5 below. Figure 4 indicates that in Kwabre East, both government officers and residents each represent 31% of respondents, customary authorities, and family heads each represents 15%, and real estate agent 8%. The chiefs included in the study had been chiefs for more than 10 years in Kwabre East hence had proper insights on the research topic.

Figure 5 shows that in Asokore Mampong, government officials represent 42% of respondents, residents 33%, family heads 17%, and real estate agent 8%. In Asokore Mampong, one additional government officer was interviewed to gather further information since a key respondent had only worked in the municipality for less than two years. However, no customary authority was interviewed because the research assistants were unable to find any of the chiefs during the entire data collection period.

Figure 4:Respondent categories Kwabre East

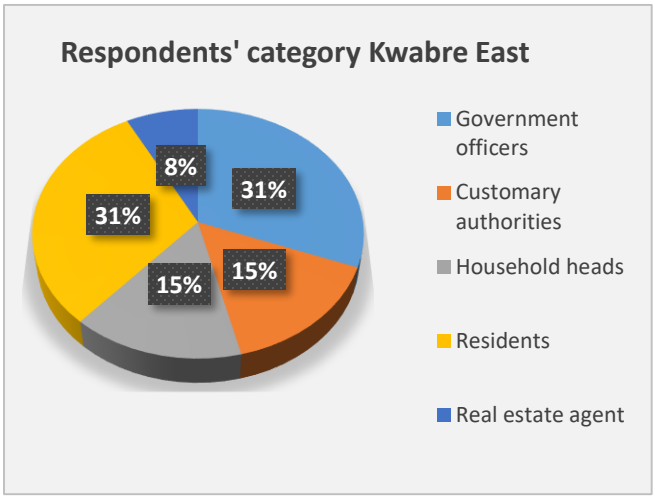
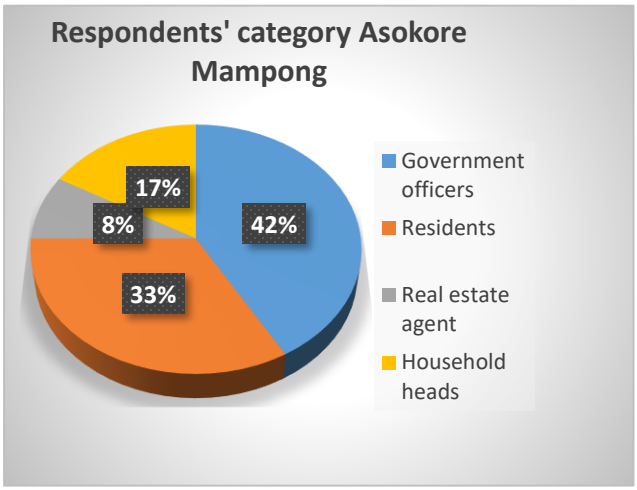


Figure 5: Respondent category Asoke Mampong



To reduce respondents' bias and enhance validity, the government officers interviewed in both municipalities include both middle-level and senior-level officers. Moreover, in both locations, the family heads interviewed were indigenes of the communities. To get the general opinion of the residents and to help triangulate the information from the authorities and decision-makers, 2 males and 2 females were interviewed in each municipality. These residents had lived in the study areas for more than 10 years. Further, the real estate agents interviewed are directors of formal real estate firm with 12 and 13 years of practice in real estate. For residents, 10 years was considered as the minimum number of residency since the study aims to analyze land use and value change within the past decade.

Two academics with expertise in real estate and land use change were also interviewed. The academicians have researched on land use change and real estate in peri-urban areas for over 25

years. However, they had not undertaken research specific to the two municipalities of focus in this research, their input based on knowledge of peri-urban land use change and real estate was crucial in cross-checking the data collected from the municipalities. Details on characteristics of the respondents can be found in annex 3. The interview findings were triangulated with information from literature, primary secondary data spatial information. The findings are presented in section 4.3 and subsequent sections.

4.3 Land Value capture through betterment charge

To measure the variable of land value capture through betterment charge, three sub-variables (land use change, land value change, and revenues from betterment charge were measured using the indicators in the operationalization table. The findings per indicator, a summary of the finding per sub-variable, and the overall finding on the variable are presented in this section. For purposes of confidentiality, the respondents are coded with letter R1-R27 (*see annex 4*).

4.3.1 Land use change

To understand the extent of urban expansion and the associated land use change for better growth management aimed at preserving green landscapes, the research quantified land use changes over the past decade. The indicators used include types of land use in 2009, types of land use in 2019, rate of land use change. In addition to the Spatial Analysis, qualitative data was collected through semi-structured interviews to get the opinion of respondents on how land use has changed within the past decade. The information was corroborated by secondary data and literature.

a) Types of land use in 2009, types of land use in 2019, and rate of land use change

As described in section 3.1.2 (d) on data analysis, spatial change in land use over the ten years was quantified using land use maps for 2009 and 2019 generated through supervised image classification. The land uses were categorized into built up and non-built up for each municipality (*see maps 2-5*). The non-built land consists of all the green landscapes (agricultural land, woodlands, forest, wetlands, and open spaces) while the built-up area represents developed land (urban use).

To quantify land use types, percentage of land areas for each land use type in 2009 and 2019 was calculated for each municipality.

The results of the spatial analysis are shown in table 4.

Table 4:Land use changes 2009-2019

Municipality	**Area km²**	**2009**				**2019**				**Annual change Km²**		**Annual rate of Change**(%)	
		Non-built up(%)	Area km²	Built-up(%)	Area km²	Non-built up(%)	Area km²	Built-up(%)	Area km²	Non-Built-up	Built-up	Non-Built-up	Built-up
Kwabre East	148	73	108.04	27	39.96	51	75.48	49	72.52	-3.26	3.26	-1.56	2.59
Asokore Mampong	23.91	56	13.39	44	10.52	26	6.22	74	17.69	-7.17	7.17	-3.33	2.26

Spatial analysis for 2009 and 2019 showed that there was conversion of green landscapes to urban use within the past decade. However, the annual rate of change is higher in Kwabre East ((2.59%) than Asokore Mampong (2.26%). Results from interviews with a total of 23 respondents in Kwabre east and Asokore Mampong also indicated that land is mainly converted to residential use due to

the high demand for residential land occasioned by increase in population. The findings were cross-checked with two academics, secondary data, and literature.

Table 4 above and figures 6 and 7 below show that in Kwabre East, non-built land reduced from 108.04 km^2(73%) in 2009 to 75.48 km^2 (51%) in 2019. On the other hand, built-up area increased from 39.96 km^2 (27%) to 72.52Km^2(49%) during the same period. This represents an average rate of change of 3.26 km^2 per year of non-built land (green landscapes) to build-up area (urban use). It shows that in Kwabre East non-built up area reduced at a rate of negative (-)1.56% every year while the built-up area increased by 2.59% annually.

Figure 6: Land Use types 2009 and 2019

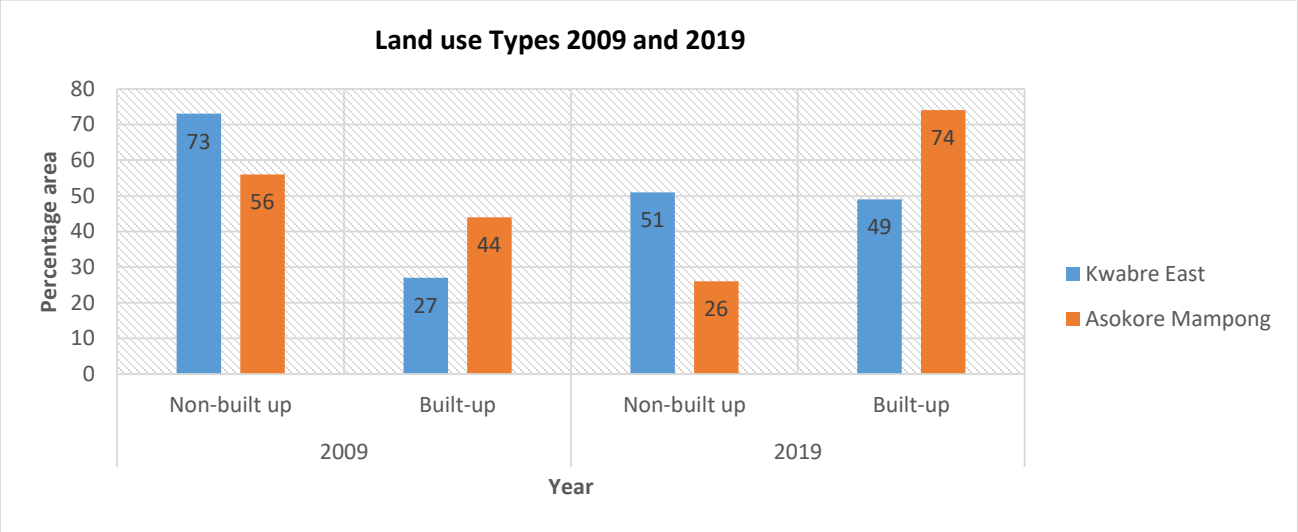
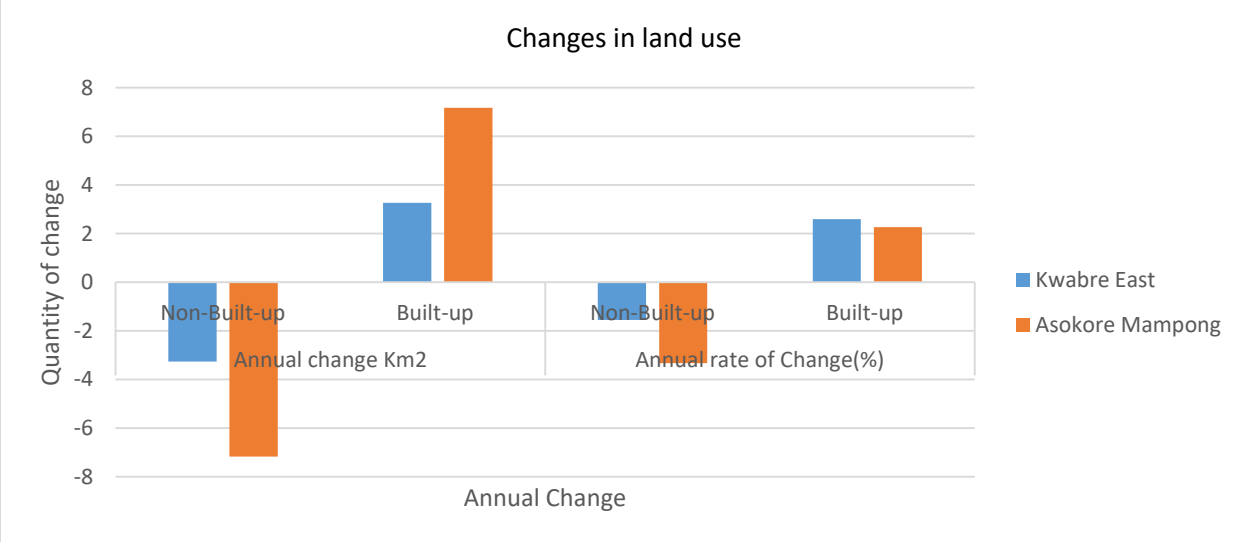


Figure 7: Land use changes



In Asokore Mampong, table 4 and figures 6 and 7 show that the non-built-up area was 13.39Km^2(56%) while the built-up area was 10.52Km^2(44%) in 2009. The non-built-up area was reduced to 6.22Km^2 (26%) in 2019 while the built-up area increased to 17.67Km^2 (74%) in the

same period. The average land use change was 7.17 Km^2 per year. It means that every year, 7.17Km^2 of non-built-up land was being converted to built-up land. The result also shows that the annual rate of change for non-built-up land was negative (-)3.33% while that of built-up land was 2.26%.

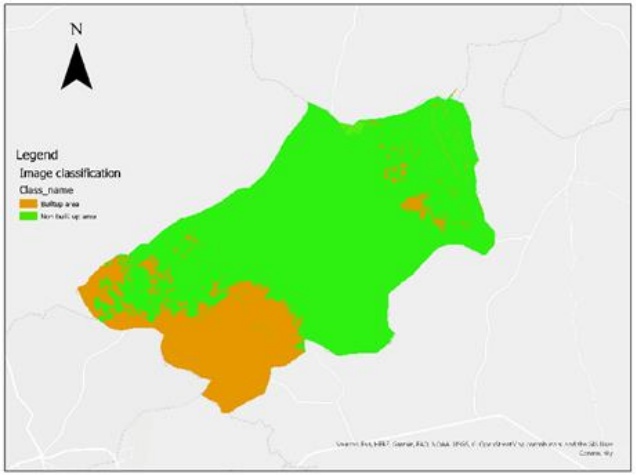
Comparing the annual rate of change for the two municipalities, the result indicates that there was a higher rate of change of green landscapes to urban use in Kwabre East (2.59%) than Asokore Mampong (2.26%) between 2009-2019. This means that more urban development took place in Kwabre East than Asokore Mampong although Asokore Mampong has a larger percentage of its land area under urban use. The higher rate of urban development in Kwabre East seems to indicate that urban developments are moving to the peri-urban areas with less urban development instead of peri-urban areas with more urban development. Therefore, presenting more threat to the green landscapes in the less developed peri-urban areas. A similar finding was illustrated by Acheampong; Agyemang, et al.,(2016) in their study of settlement growth in the Greater Kumasi Sub-region where it was reported that urban growth was higher in the 6 Sub-region districts except for Asokore Mampong which had a similar growth trend with KMA.

To understand the dynamics of land use change, eleven (11) and 12 respondents were interviewed in Kwabre East and Asokore Mampong respectively to get the opinion of respondents on how land use has changed within the past decade. All the respondents in Kwabre East and Asokore Mampong were of the Opinion that land use has changed in the municipalities. The respondents(government officers, customary authorities, family heads, and residents)indicated that land is majorly being converted from non-built land (green landscapes) to residential and commercial use to support residential areas. They linked the changes to increase in population which resulted in high demand for land for residential use. The high demand for residential land was affirmed by a government officer (R16) who stated that land zoned for industrial use is being converted to residential use.

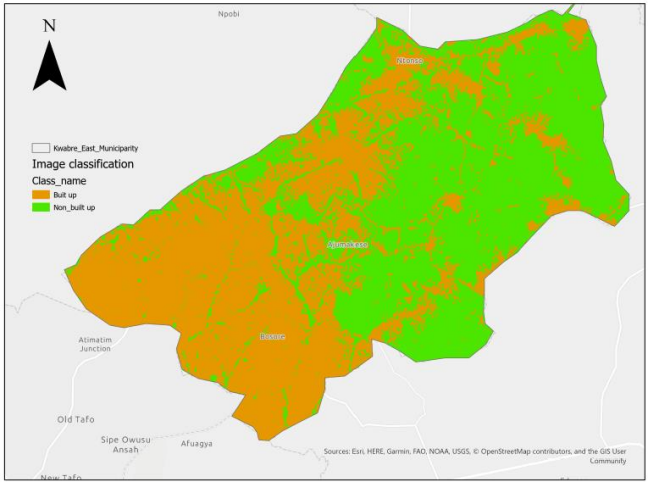
R16(government officer)*: "I have noticed that industrial use is zoned in wetlands so they are normally in the outskirts of the town but these industrial sites are being changed into residential use. Now when you go to the industrial sites, you will see residential buildings*". This statements were also confirmed by government reports in these two municipalities which recognize the proximity of the municipalities to Kumasi has contributed to increase in population and threatening green landscapes as land is being converted from agricultural use to residential use and natural vegetation being depleted due to increased building activities (Republic of Ghana, 2010, Republic of Ghana, 2015).

Further, the two academics from Ghana were of the view that land use had changed at a high rate and green areas are being converted to residential use. They linked the changes to high demand for residential land as people move from Kumasi to settle in areas closer to the city where they can get bigger land and easily commute to the city. Also government reports about both municipalities recognizes the threat to agricultural land and depletion of vegetation from urban expansion (Republic of Ghana, 2019). Based these findings from spatial analysis, interviews, secondary data, and literature, it is concluded that land use changed in the two municipalities due to increase in population which triggered a high demand for land for urban use and mostly for residential use. Green landscapes (non-built-up land) are being changed to urban use (built-up land) at an annual rate of change of 2.56% in Kwabre East and 2.26% in Asokore Mampong.

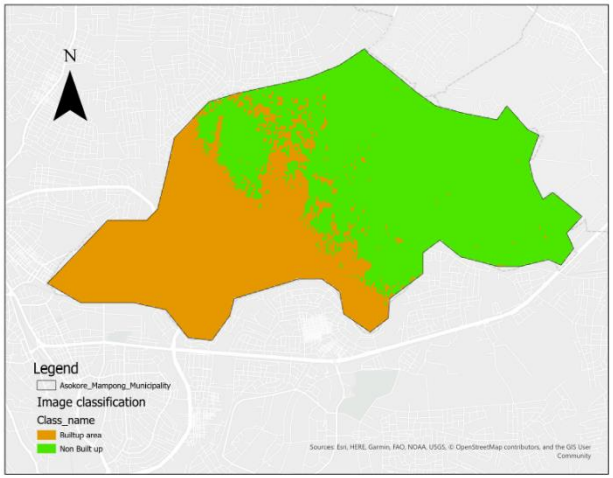
Map 2: Kwabre East Land use 2009



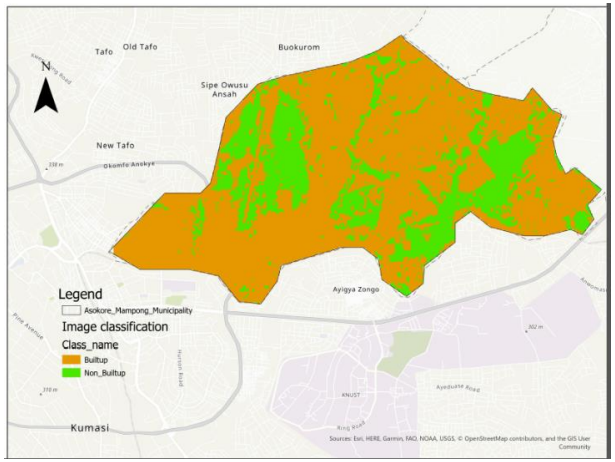
Map 3: Kwabre East Land Use 2019



Map 4: Asokore Mampong land use 2009



Map 5:Asokore Mampong land use 2019



Source: Author, 2020

4.3.2 Land Value change

Indicators used in this research to measure land value change include land price in 2009, Land prices in 2019, and rate of change of land prices. To quantify land value changes data on land prices by type of use (agriculture, residential, commercial, and industrial) in 2009 and 2019 were collected through interviews with 7 and 6 respondents in Kwabre East and Asokore Mampong municipalities respectively. The respondents including regional land valuation officers, physical planners, two customary chiefs in Kwabre East, family heads, municipal planner and real estate agents. In addition, a real estate academic was also interviewed.

The researcher intended to triangulate the data with primary secondary data from land valuation office (sample of land values according to valuation rolls) and land transaction records, however, such records were not availed to the researcher. Therefore, the data are purely based on interviews. However, the data was cross-checked with literature and a real estate academic from Ghana. Lack of data on land values according to valuation rolls and land transaction records may have affected findings negatively because the accuracy of data on land values for 2009 depends on the memory of respondents. Also, land values for some uses for which the respondents did not provide answers could not be established. For example, only one respondent (family head) in Asokore Mampong provided data on the values of agricultural land and commercial land. All the other 5 respondents did not answer questions about the values of commercial and agricultural land.

The reasons for non-response were that within the past 10 years, there was no agricultural land in the municipality. For commercial use, the reasons were that commercial enterprises are mostly owned by homeowners who use part of their land to construct commercial buildings. Another reason given by government officials was that land is sold at residential prices and later the purchasers change the use to commercial use. For instance, 2 government officers (R14) and R18) stated: R14: "*we do not have commercial parcels here. what we do is that someone buys a residential plot and then change the use to commercial. All the parcels in our layout are residential since that is the dominant land use in Asokore Mampong*".

R18: "*With commercial purposes, most of the residents use their left lands in front of their houses for that. They mount metal containers or block structures on these lands for Super Market or kiosks. With agricultural purposes, they are mostly backyard gardens. Currently, the prices of land in Asokore Municipality are very high"***.**
However, the researcher doubts these statements but could not verify them since land values according to valuation rolls and land transaction records were not availed to the researcher.

Land prices in 2009 and 2019 and, rate of change in land values

From the land values obtained during interviews, the average price for each land use type by size was computed for the year 2009 and 2019. The average price of each land use type was used to compute percentage change in value. The results are shown in table 5 below. The researcher is aware that land values are location specific. However, the research assumes the findings present average price of land per land use within each of the municipalities irrespective of the specific location.

It was found that within the past decade, land values had increased within the two municipalities with a range between 105.12%-1057%, representing an annual increase between 10.51%-105.7%.

Table 5:Land values change in Kwabre East and Kwabre East

Land use type	Kwabre East				Asokore Mampong			
	2009 price in GH₵ (*100X100 Feet)	**2019 Price in GH₵** (*80X90 Feet)	**Change %**	**Annual change %**	**2009 Price in GH₵** (*100X100 Feet)	**2019 Price in GH₵** (*80X90 Feet)	**Change %**	**Annual change %**
*Residential	8,357	90,000	976.94	97.70	10,000	106,700	1057	105.7
*Commercial	15,000	130,000	766.67	76.70				
Industrial (1acre)	140, 000	960,000	585.71	58.57	70,000	480,000	585.71	58.57%
Agricultural (1 acre)	6,500	13, 333	105.12	10.51				

* Land size for residential and commercial use in 2009 and 2019

In both municipalities, government officers (R1 and R14) indicated that the chiefs require as a condition that industrial land must be of a minimum size four plots which are equal to 1Acre. R14: "*The chief has made it that industrial land has to be at least four resident plots. Four plots make an acre. So when we prepare the layouts, we make sure that industrial zone consists of larger plots of at least four residential plots"*. The statements were corroborated by the real estate agents (R9 and R21) who mentioned that the size of an industrial plot is set at a minimum of one acre.

Table 5 shows that land values had increased within the past decade in both municipalities. Residential land use had the highest increment between 97.70%-105.70% per year while agricultural land had the lowest increase in land values of 10. 51% per year.

In Kwabre East, 6 respondents (3 government officers, a chief, real estate agent, and a family head) indicated that agricultural land is not sold but temporarily leased on private rental agreements between the landholder and the farmer. The average period of agricultural lease was stated to be 5 years. Therefore, the above prices indicate the cost of renting an acre of land in 2009 and 2019 for 5 years. Table 5 show that in Kwabre East, residential use had the highest annual increase in value at 97.70% followed by commercial at 76.70%, industrial at 58.57%, and agricultural land at 10.51%. Further, the result shows that the annual increment in land value for urban use ranges between 58.70%-97.70%. It also shows that the price of a residential plot measuring 80X90 Feet in 2019 was 6.8 times higher than the price of leasing an acre of agricultural land for 5 years. This means that land use change has created huge disparities between the value of urban land and agricultural land. The result also suggests that there is a higher demand for residential land use compared to all the other land uses.

In Asokore Mampong, the result shows residential land use has the highest annual land value increment of 105.7% while industrial land values increase by 58.57% every year. Due to unavailability of data on commercial use and agricultural use, the researcher could not calculate increments in values for these uses. The findings confirm that residential land is on higher demand. The higher increase in the value of residential land seems to suggest that the economic return of residential land is higher than other land uses.

Comparing the two municipalities, the findings show that residential land has the highest annual increment in value in both municipalities. However, land values are higher in Asokore Mampong than Kwabre East. this can be attributed to the history of Asokore Mampong being part KMA until 2017 when it was carved out. Therefore, it experienced higher demand for land. higher land values in Asokore Mampong was affirmed by R21(real estate agent) who stated that the land values have

reached almost the same level as Kumasi city, hence most people may no longer afford the prices. This seems to suggest people may be moving from Asokore Mampong in search of cheaper lands.

To understand, the reasons behind the changes in land values, the same respondents (7 in Kwabre East and 6 in Asokore Mampong) were asked to list the factors they believed were behind the changes in land values. Respondents in both municipalities stated that demand for land for urban use, urban expansion, and increase in population were behind increase in land values. They elaborated that increase in population is creating high demand for land thus resulting in land value increase. These findings were confirmed by the real estate academic form Ghana(R27) who was of the view that in general, land values in peri-urban Kumasi have increased with over 150% within the past decade. He also attributed the increase to demand for land for residential use.

These reasons suggest that change in land use is responsible for increase in land-use change. For example, a real estate agent(R21) and government officer(R18) linked the increase in land values to developments of residential units and operations of real estate development. R21(real estate agent) stated:" *the place is also being developed by community members, the indigenes of the town. so ones a place is developed, people tend to move there to settle. i can say Asokore Mampong is a second class residential area within Kumasi".* Further R18 stated: R18(government officer): "*The expansion and growth of human settlements as well as the operations of Real Estate Developers".*

The statements by R21 and R18 show that as more residential developments and real estate developments takes place land values are increase. Further the theory review discussed in chapter 2 also illustrated that increase in population creates demand for land for urban use. The increased demand for land results to change in land use as initial uses are out-Bid by the new uses(Alonso, 1964). Since each land use type attracts different in the market(Varkey and Manasi, 2019), the land values increase. Also, literature shows that change of use of one parcel affects the prices of other parcels due to externality of land values(Koomen and Buurman, 2002), where the price at which one plot was sold and its use affect prices of other parcels of land within its vicinity. This was also mentioned by a government officer (R3) who stated that landholders set prices of their plots based on the use and price of neighbouring plots.

R3: "*They do it by comparison and the usage, as soon as they hear that if you are going to use it for commercial, they give it a price tag of 80,000 or 90,000. They also do it by comparison that if I heard that my neighbour is selling his land for 80,000 and I happen to be along the same stretch I will sell mine at the same price*".The effect of land use on land values was further elaborated by R1 (government officer) who stated: R1: "*When we prepare a planning scheme and zone a particular area for residential, commercial or industrial use, and you go to the chief to buy such land, immediately they will tell you different prices for each land use zone".*

The argument by R1 shows that land use plans which are prepared in the peri-urban areas change the use of these areas from predominantly agricultural use to urban use. This was corroborated by another government officer R14, who stated that land use plans in peri-urban areas mostly designate land for residential use. Therefore, preparation of land use plans results in changes in land use through zoning, which affects land values. This is explained by literature on the impacts of land use zoning on land values(Ohls; Weisberg, et al., 1974). Ohls; Weisberg, et al.,(1974) argues that in a competitive land market, an act of changing the zoning of an area directly impacts the land values positively or negatively. In this context, the impact is found to be positive.

Based on the above findings from interviews and literature, the researcher concludes that land use changes have resulted in massive land value increase ranging between 105.12%-1057%, within the past decade. These findings are in tandem with the findings of Naab; Dinye, et al., (2013) who reported that land use changes in peri-urban Tamale, Ghana, had resulted in land value increments of more than 1000% within ten years(2002-2012). This research also showed that the changes in land use have created a huge difference between agricultural and urban land values with a residential plot costing 6.8 times the cost of renting 1 acre of agricultural land. Similar findings on the disparity in values of agricultural land and land for urban use were reported by Debolini; vallete, et al.,(2015), in an assessed land value changes in peri-urban areas of Meknes City, Morocco, which illustrated that real estate developments were paying more than 6 times the price of agricultural land.

4.3.3 Use of betterment charge

Development-right-based betterment charge is payable when land values increase due to provision of a land use plan, change of use of a parcel of land, or planning regulations are altered(Alterman, 2012).

a) **Applicability of betterment charge**

Betterment charges due to land use change are levied if land values increase is caused by the provision of a land use plan, the decision of planning authority(local government) concerning the change of use of land, or an action such as rezoning of an area(Local Governance Act , 2016,(section 102), Land Use and Spatial Planning Act, 2016, (section 111)). It was found that betterment charges are not being applied in the two municipalities when land uses are changed. This is based on interviews with a total of 17 respondents (physical planners, land valuers, finance officers, works officer, municipal development planning officers, real estate agents, customary chiefs, and family heads) who mentioned that the charges are not implemented.

It also emerged that reasons for non-implementation of betterment charge due to land use change include lack of requisite rules to support its implementation. Thus the Assemblies lack the necessary guidance on how to charge and enforce betterment. The other impediment is lack of awareness among government officers and decision makers about the legal provision on betterment charge and, overreliance on inter-governmental transfers which make the assemblies less concerned about raising own-source revenues. These findings based on interviews with the same 17 respondents. The responses and corresponding frequencies are shown in Table 7 below.

Table 6: Reasons for non-implementation of betterment charge

Question	Municipality	Category of respondent	Response	Frequency
Why do you think the Assemblies do not levy betterment charges when use of land is changed?	Kwabre East	Government officials	Betterment not approved by the government	4
		Non-state respondents	Not aware of betterment	2
			Not a priority to assemblies	3
			Total	**9**
	Asokore Mampong	Government officers	Lack of cooperation between state and chiefs	1
			Not approved by the government	1
			Not aware of betterment	3
		Non-state respondents	Not aware	3
			Total	**8**

In Kwabre East, all the 4 government officers interviewed indicated that the application of development-right-based betterment charges have not been approved by the government. Lack of

approval seems to mean that betterment charges have not been authorized by the government. The 4 government officers also stated that they use fee fixing which is approved by the government and had not seen any approval to levy the charges. One government officer (R2) added that he is not aware of the existence of betterment charge. R2: *"What we charge are the property rates. We do not charge or recover a percentage increase in land values from a person whose land increases in value due to the provision of a plan or a decision to change use land. Our charges are gazetted (shown example/produced a copy) and I have not come across what you are saying".* Three non-state respondents (real estate agent, a chief, and a family head) were of the view that betterment may not be a priority compared to other revenue sources like property rates and ground rents. The other 2 (a chief and a family head) were not aware of the existence of development- betterment charges due to land use change.

In Asokore Mampong, 3 out of 5 government officers were not aware of the betterment charges due to land use change. The other two officers had different opinions on why betterment is not levied. Among the reasons included lack of approval by the government as stated by R14: "*In the government sector we work with things that have been approved by the authorities. So we only follow the structure laid down. But we have not seen an approval to levy betterment".* One officer mentioned a lack of cooperation between chiefs and the government. On the other hand, all the 3 non-state respondents (family heads and real estate agent) were not aware of the instrument.

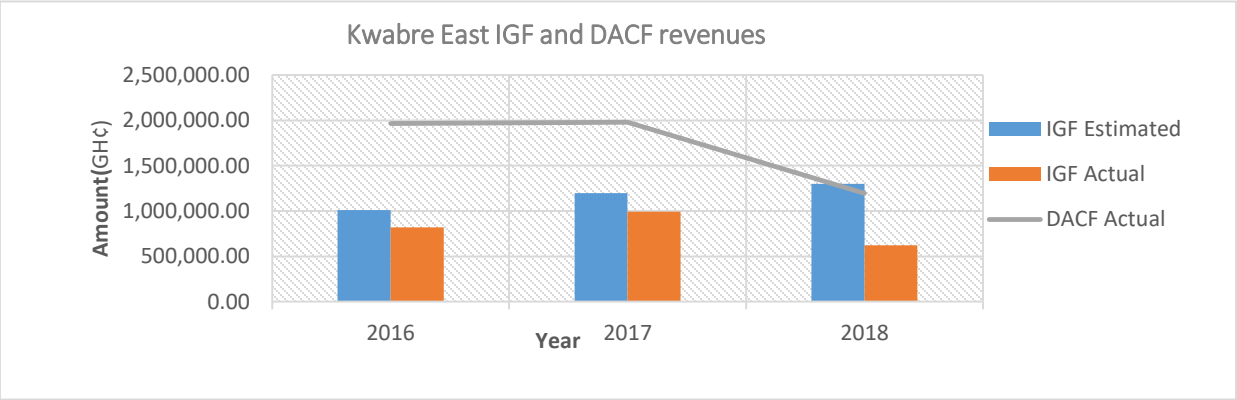
Comparing the two municipalities, the findings indicate that most government officers (5/9) think that lack of approval(authorization) of betterment charge due to land use change by the authorities is the key reason for lack of implementation of the instrument. It was also found that 4 out of 9 government officers interviewed were not aware of betterment charges. Also, 5 other respondents (chiefs, family heads, and a real estate agent) were not aware of the instrument. Lack of awareness of betterment charges among government officers and stakeholders have been highlighted in literature among the challenges that hamper the implementation of betterment charges. For instance, Smolka and Furtado(2002) also identified lack of awareness among government officers and stakeholders among challenges that led to non- implementation of laws on value capture in Latin America.

The findings above were corroborated by the Real estate academic who stated that there is a general lack of awareness of betterment charges due to land use change among state officers and customary authorities. He added that other reasons include lack of political goodwill due to fear by top decision makers of losing political support, overreliance on revenues from the central government like District Assemblies Common Fund(DACF), hence the local assemblies are reluctant to actively generate own-source revenue. He further mentioned that the Assemblies may not implement betterment charges because local governments have not provided infrastructure in the peri-urban areas. However, the researcher is of the opinion that unlike infrastructure-based-betterment charge, the betterment charges due to land use change is not meant to recoup costs of infrastructure investments. Therefore, betterment charges due to change in land use are applicable in peri-urban areas. This argument is supported by Alterman(2012) who highlights the difference between infrastructure-based betterment and development-rights-based betterment. Moreover, in the context of Ghana, development charges are tied to service provision and not betterment charges(Local Governance Act , 2016).

Overreliance on DACF was also confirmed by secondary data. Medium-term plans, composite budgets, and data from government websites confirm that the two assemblies have not met their

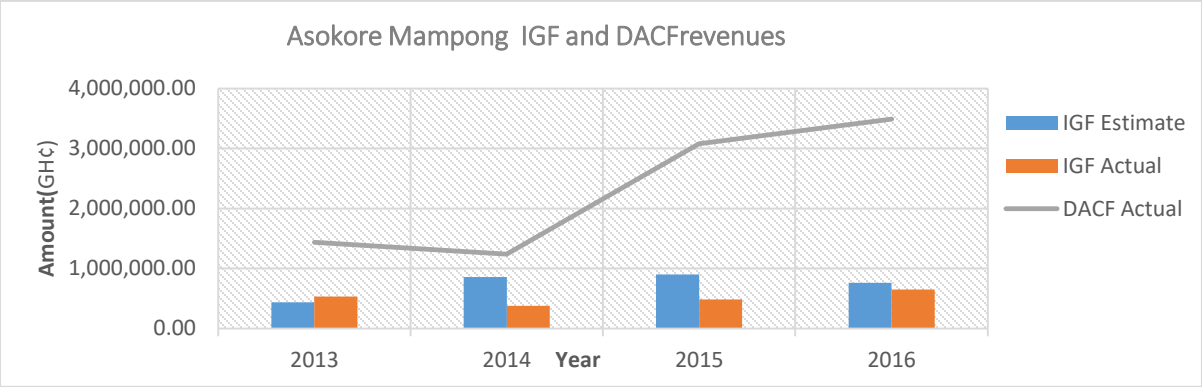
target for Internally Generated Revenues(IGF) and rely heavily on DACF from the central government as shown in figures 8 and 9. These findings are similar to findings by Owusu-Mensah(2015), who reported that over 67% of revenue for MMDAs are from inter-governmental transfers.

Figure 8:Kwabre East IGF and DACF trends



Source: Compiled from Republic of Ghana (2019) and District Assemblies Common Fund (n.d)

Figure 9:Asokore Mampong IGF and DACF trends



Source: Compiled from Republic of Ghana (2015), Anokye and Ashong(2018) and DACF (n.d)

Non-authorization or lack of approval of betterment charges due to land use change by the government emerged as a key reason for the non-implementation of the instrument. Secondary data and literature show that both the central and local governments have responsibilities concerning betterment charges. The central government through the Spatial Planning Authority is supposed to prepare rules to provide for among other, rate of betterment charges, payment of betterment, and effects of failure to pay betterment charges(Land Use and Spatial Planning Act, 2016(section 104(2c-e)). According to Biitir (2019), these rules have not been formulated.

Lack of formulation of rules to operationalize provision of legislation on betterment charges and the consequent non-approval of betterment charge by the government suggests there is lack of political goodwill to levy development-right betterment charge. The argument in literature is that lack of political goodwill could be linked to fear of non-acceptance of betterment charges by the landholders and perception that levying betterment could result to double taxation of increase in land value(Alterman, 2012, Philip, 2012, Walters, 2013). The researcher is of the view that double-taxation may not hold in the context of Ghana. This is because ground rents and property rates which were mentioned by government officers responsible for mobilization of revenues for the

local government(physical planners, finance officer and land valuer) as the instruments being applied to capture increments in land values due to land use change, are not designed to capture increments in land values due to land use change.

7 government officers (R1, R2, R3, R4, R14, R15, and R16) stated that property rates and ground rents are applied in the two municipalities. For example, (R3) stated *"I have been attending the local government planning meetings and I don't think they are using betterment charge at the moment. They are only interested in ground rent. Once someone just acquires land, the only charge one is asked is ground rent. They have fixed rates for ground rents depending on the size of the plot".*

Another government officer (R15) stated: *"Generally our attitude towards the implementation of tax is that the person has bought the land for one or two reasons, the value of land may increase but the person has been paying property rates to the Assembly, that is what we charge and our fee of the property rate increase based on the class of the area. For instance, the area around Pakoso, there are some areas which we now classify as underdeveloped but we have plans to build proper assess roads there. Once we do that, the class will change. If the area is class C, it will change to B and the rates that apply to C are different from B and that is where we take our money from".*

Statements by R3 and R15 suggest that ground rents and property rates indirectly and partially captures increase in land values due to land use change. However, Biitir(2019) argue that taking into account the method of valuation for property rates in Ghana, property rates cannot capture increments in land values either due to infrastructure investment or any locational factors. He adds that valuation for rating is based on the quality of materials used in constructing a building, the nature of finishing, and the building area.

Secondary data indicate that property rates are chargeable on improvements on the land. Rateable value is the replacement cost of the buildings/structures after the deduction of the amount it would cost at the time of valuation to restore the premises to a condition in which they would be when new (Local Governance Act , 2016(sections 145-146)). Valuation for rating based on replacement cost was confirmed by another government officer R1: *property rate is based on the development on the land. we don't look at the value of the land. we use fee fixing which is approved by the government. we look at the development you are going to put on the land. That is how the charges go".* A real estate academic(R27) also corroborated the statements by R1. This may mean that property rates do not capture any form of increase in land value and are fully designed to capture only increase in value of improvements on land.

About ground rents, Secondary Data show that ground rents are part of the stool lands revenues. The rents are assessed and incorporated in the lease documents during land acquisition. Ground rents are assessed by the OASL based on capital market value which is determined through the Annual Equivalent(AE) of similar parcels of land per unit area, the number of years of the lease, and land use type. The amount of rent payable is set at between 3-6% of the economic rent of the land depending on land use type and is subject to revision after every 5 years(Ayitio, 2019). The rents are then collected by a national government agency called the Office of the Administrator of Stool Lands established under Article 267(2) of the Constitution of Ghana,1992. This office is also responsible for the distribution of the revues according to a constitutional formula under Article 267(6)(The Constitution, 1996)

Article 267(6) for the distribution of the stool lands revenue is:

"*Ten percent of the revenue accruing from stool lands shall be paid to the office of Administrator of Stool Lands to cover administrative expenses, and the remaining revenue shall be disbursed in the following proportions –*
(a) Twenty-five percent (25%) to the stool through the traditional authority for the maintenance of the stool in keeping with its status;
(b) Twenty percent (20%) to the traditional authority; and
(c) Fifty-five percent (55%) to the District Assembly, within the area of authority of which the stool lands are situated".

The local governments are legible to receive 55% of stool land revenues after OASLR deduct 10% which may include part of ground rents. The Constitution does not mention specific use for local governments share of the revenues.

Based on the above findings from the interviews with government officials, secondary data, and literature, the researcher is of the opinion that ground rents may capture partial increments in land values due to land use change especially in peri-urban areas where there is high increase in land values and purchase/lease of land. This is because the assessments take into account the value of adjacent, the land use type, and also adjusted every 5 years. However, the rents are only charged on registered land leases. Taking into account that most lands are not registered in peri-urban areas(Biitir, 2019), it cannot fully capture increments in land values due to land-use change. Further, ground rents are not administered by local governments and the revenues do not fully accrue to local governments. Also, the researcher is of view that property rates do not capture increments in land values because the valuation method which excludes land values.

a) Public awareness of betterment charge

To measure the level of public awareness about betterment charge due to land use change, 9 and 8 respondents in Kwabre East and Asokore Mampong Municipalities were asked to rate public awareness based on a Likert-scale of low, very low, average, high and very high. Further 4 residents in each municipality and real estate academic were also interviewed.
It was found that public awareness is very low. All respondents in both municipalities indicated that there is very low awareness among the public. Also, none of the residents interviewed was aware of the betterment charge. This could be attributed to lack of implementation of the betterment charges as discussed in section 4.3.3(a) above. These findings were confirmed by real estate academia who was of the view that there are very slim chances of the public being aware of such charges which are not even being implemented since very few people would be conversant with the provisions of the law. Biitir(2019) also highlights lack of awareness among the public and public officers as challenges facing the implementation of land value capture in Ghana.

Based on the above findings from interviews and literature, the research concludes that public awareness of the betterment charges is very low.

4.3.4 Summary of findings on land value capture through betterment charge (Independent Variable)

Findings from spatial analysis, photo documentation, interviews, secondary data, and literature, showed that land use changed in the two municipalities within the past decade. The land use changes are attributed to high demand for land for urban use (mostly for residential use). The

annual rate of change of green landscapes(non-built-up land) to urban use(built-up land) was 2.56% in Kwabre East and 2.26% in Asokore Mampong.

It was also found that land use changes in the two municipalities have resulted in massive land value increase ranging between 105.12%-1057%, within the past decade. These findings are in tandem with the findings of Naab; Dinye, et al., (2013) who reported that land use changes in peri-urban Tamale, Ghana, had resulted in land value increments of more than 1000% within ten years(2002-2012). Further, this research also showed that changes in land use also created a huge difference between agricultural and urban land values with a residential plot costing 6.8 times the cost of renting 1 acre of agricultural land. Similar findings on the disparity in values of agricultural land and land for urban use were reported by Debolini; vallete, et al.,(2015), in an assessed land value changes in peri-urban areas of Meknes City, Morocco, which illustrated that real estate developments were paying more than 6 times the price of agricultural land.

It was also found that despite the Land Use and Spatial Planning Act,2016, and the Local Governance Act,2016 providing for betterment charges due to land use change, local governments do not apply the instrument. Among the reasons for non-application include lack of political goodwill, lack of awareness among government officers, lack of awareness among other stakeholders involved in decision making on land including chiefs and family, and low public awareness. The other reasons are lack of formulation of rules to operationalize betterment charges and overreliance on revenues from the central government. It was also established that the two instruments (property rates and ground rents) currently applied to capture increments in land values are by design not meant to capture increments in land values due to land use changes. Hence property rate does not capture increments in land values due to land use change while ground rents may partially capture increments in land values due to land use change. however, it is administered by the central government

Based on the above findings from spatial analysis, photo documentation, interviews, secondary data, and literature, it was concluded that despite the legislation in Ghana providing unique value capture instruments (betterment charge due to land use change) to be applied by local governments to capture increments in land values due to land use change, and the existence of massive increase in land values due to changes in land use, the instrument is not being implemented. This is because it has not been operationalized and its existence is not known by some government officers, other stakeholders, and the public. Furthers, property rates and ground rents applied in the two municipalities are not designed to capture increments in land values due to land use change.Hence ground rents may only capture partial increments in land values due to land use change. Therefore, lack of implementation of betterment charges due to land use change is resulting in loss of revenues for local governments. A similar conclusion was pointed by Vitriana(2017) who demonstrated that not capturing land value increase arising from land use changes in Bandung – Cimahi Peri-urban Region, Indonesia resulted in loss of revenue to local governments.

4.4 Preservation of green landscapes

Land use plans and zoning regulations are among the mechanisms used by local governments in Ghana to preserve green landscapes(Ayambire; Amponsah, et al., 2019, Bonye; Yiridomoh, et al., 2020). A total of 9 indicators were used to measure the two mechanisms as discussed below.

4.4.1. Land Use plans

Indicators used in this research to measure use of land use plans as a mechanism to preserve green landsacpaes include the presence of land use plans, public awareness of land use plans, public access to land use plans and level of adherence to land use plans in peri-urban areas.

a) Presence of land use plans in peri-urban areas

Local governments are mandated to prepare land use plans to regulate land uses and control developments within their areas of jurisdiction(Local Governance Act , 2016, Land Use and Spatial Planning Act, 2016).

From interviews with 15 respondents (physical planners, land valuer, works officer, Municipal planning officer, customary chiefs and family heads), It was found that there are land use plans for peri-urban areas. All the 8 respondents in Kwabre East and 7 respondents in Asokore Mampong stated that there are land use plans for all the areas in the municipalities. The two academics with research experience in peri-urban areas also confirmed that there are land use plans for almost all settlements in the peri-urban areas. They contributed this to the active role of chiefs in ensuring their communities are planned. They added that the chiefs are keen in ensuring that plans are prepared with the aim the generate plots for sale.

Planning as a tool to aid the sale of land was also mentioned by a government officer (R14) who stated: R14 "*the chief has lands that are already planned but he has said will not be developed during his tenure. He wants to keep such lands so that when he is gone, whoever will come after him will also have something to sell*". Another government officer (R1) stated that chiefs initiate and fund preparation of land use plans by hiring private surveyors and planners to prepare the plans. R1*: "In the Ashanti region here most of the lands are held by stools headed by chiefs, so the chiefs they either engage professional surveyors and planners to prepare the plans and bring us a copy for approval or we lead them to prepare the schemes when they request".*

The statements by the two government officers (R1, R14) and the two academics seem to suggest that chiefs are key stakeholders in land use planning. It also implies that despite the statutory authority to prepare land use plans and control the use of land, local governments may not have full powers in practice when it comes to decisions on preparation of plans and the use of customary land. The role of chiefs in planning was also reported by Akrofi and Whittal(2011), in a study of Asokore Mampong which reported that the Traditional Council engaged services of professional planners and surveyors to develop layout plans which are used to demarcate the land to be leased to individuals or companies.

Based on the above findings from interviews and literature, the researcher concluded that there are land use plans for peri-urban areas. The effectiveness of these plans in preserving green landscapes depends on the level of public awareness about the plans and level of adherence to the plans. Therefore, these were among the indicators measured in this research. The findings are discussed in the sections below.

b) Public awareness and public access to land use plans

Public awareness of land use plans and ease of public access to land use plans enable the public to know the content of plans about permitted and unpermitted use of land. Thus the public can be able to make informed decisions concerning the use of land. Therefore, public awareness of land use plans is important in determining adherence to the plans.

It was found that the public is aware of existence of land use plans. However, the level of awareness of the contents of the plans low. It was also found that land use plans are easily accessible to the public. This is based on findings from interviews with 8 residents and other 15 respondents(physical planners, land valuers, works officers, customary chiefs, real estate agents, and family heads.

In Kwabre East, 3 government officers rate level of public awareness as low. They elaborated that most of the people know there are plans because they hear about meetings for preparation of land use plans but the majority do not attend those meetings hence are not aware of the content of the plans. Their statements were corroborated by 4 other respondents(chief, real estate agent, and family heads). For example, R9 commented that: "*It's only the chiefs and the people at the Assembly who knows exactly what a particular piece of land has been designated for. The public is mostly not aware of the details".*

On the other hand, interviews with residents in Kwabre East showed that 3 out of 4 residents were aware of land use plans while 1 resident was not aware. Among the three residents who were aware of the plans, 2 explained that they know the plans are shown to anyone who wants to buy land or want to put up a building, for example, R12 stated: "*I know of layout plans which can be gotten from the Town and Country Planning Department. They mostly show it to you when you have to purchase land and you would like to see where it lies".* while one out of 3 residents stated that she knows there is a plan because there were meetings about the plan but she did not attend.

In Asokore Mampong, 4 government officers rated level of public awareness as low, 2 respondents(family heads) indicated level of awareness is high, a real estate agent indicated it is very low. The family heads were of the view that the level of awareness is high because the chief in Asokore Mampong ensures that every person who builds in his community is shown the plans. The government officers on the other hand believe awareness is low because people do not know what is in the plans. Interviews with residents in Asokore Mampong, 3 out of 4 residents stated that they were aware of land use plans because they heard about it in a meeting held by the Assembly

Comparing the two municipalities, the findings indicate that in both municipalities, the public is aware of the existence of land use plans. This is because in each of the municipalities 3 out 4 residents were aware of the existence of land use plans. However, the level of awareness of the content of the land use plans is low in each municipality. This is because the majority of respondents (10/15) including government officers, chiefs, family head, and real estate agent rated level of awareness as low.

Secondary data also indicate that during plan preparation, the local governments are supposed to hold at least three consultative meetings(Republic of Ghana, 2011). Moreover, program implementation reports for years 2014-2016 indicate that the two municipalities held public meetings to sensitize the public on land use plans(National Development Planning Commission, 2019). However, the level of awareness on the content of the plans is low because the majority do not attend these meetings. In addition to public meetings, the other modes of consultation that local governments can use include surveys, notices in newspapers, radio, fliers, television shows, newsletters and conferences(Republic of Ghana, 2011). However, local governments rarely use these modes of reported by a government officer (R14). R14 stated the Assemblies mainly inform communities about the plans through meetings and or show them to those who come to the office but rarely use modes like radio. The statement by R14 and data from secondary sources implies

that local governments mainly rely on public meetings as a way of informing the public about land use plans and rarely use other means of communication.

On access to land use plans by the public, it was found that the plans are easily accessible. All the 8 respondents in Kwabre East and the 7 respondents in Asokore Mampong were of the view that plans are easily accessible. Moreover, 3/4 residents in each municipality responded that plans were easily availed to anyone upon request. The ease of accessibility was confirmed by a family head (R8)who stated that: R18: "*The land use plan is available to every individual who wants to purchase land and the Customary Authority within this municipality even has a copy of the plan"***.**

A government officer (R14)added that it is a requirement by law that approved plans be availed to the public. Sections 87(4) and 91(2) of the Land Use and Spatial Planning Act,2016 which requires the Assemblies to keep copies of approved land use plans in a public data room for inspection by members of the public(Land Use and Spatial Planning Act, 2016).

The two academics confirmed that the public is aware of plans and that the plans are easily accessible to any person who requests a copy at the Assembly or those who go to buy land from the chiefs. They were of the view that the level of awareness is low. they explained that the renters are a majority in the peri-urban areas. And since they do not attend meetings are not interested in land use planning matters, they do not know exactly what the plans look like or the content. This was echoed by a resident (R22) who stated: "*Yes, am aware. I own this plot in which a stay so I have to know what is going on around here".*

Based on the above findings from interviews and secondary data, it was concluded that even though the public is aware of the existence of land use plans, and plans are easily accessible, the level of awareness of the content of plans is low.

c) Adherence to land use plans

The level of adherence to land use plans determines whether the plans meet the objective of preserving green landscapes or not. It was found that adherence to land use plans is low in the two municipalities. The findings are based on interviews with 23 respondents including State officers, chiefs, family heads, real estate agents, and residents, and 2 academics.

In Kwabre East 7 respondents(3 government officers, a chief, a real estate agent, and a resident) stated that land use plans are not adhered to. 3 respondents (chief, family head, and a resident) were of the view that the plans were adhered to while 2 residents stated they do not know. All government officers elaborated that the chiefs have contributed to non-adherence. They commented that their advice is mostly ignored by chiefs and that in most cases, chiefs do not seek advice at all before selling land that is designated for public purpose or green areas. For example, a government officer (R1) stated: "*This work cannot be done by us alone as land use agencies without the involvement of the chiefs and other stakeholders. But sometimes, it is the chiefs that make the work more difficult. when we prepare a land use plan and say, this place is a nature reserve, public playground, or a school, you know we do that based on planning standards. So when all these things are disrupted, you come to the city or a community and everything is a mess".*

The real estate agent(R9) also opined that the chiefs are fully responsible for non-adherence to land use plans. R9: "*If land is designated as marshy area, and it is changed into a building, I will not blame the individuals. It is the chiefs that sell the lands to them. If the chief does not sell it, can any individual have access to that land, the answer is no*".

The statements by R1 and R9 implies that no other person can allocate land except chiefs. Hence change of land use cannot happen without the consent of the chief. If changes in land use go against provisions of a plan, the chiefs must have authorized such changes. A similar argument is put across by Appiah; Bugri, et al.,(2014) who reported that under customary tenure, households have usufruct rights and cannot change the use of land without the authority of families and clans.

In Asokore Mampong, 5 respondents (2 government officers, 2 family head, and 1 resident) stated that that land use plans are being adhered to. They linked the adherence to a digital Land Information System (LIS) which has been set up by the chief to guide him in land administration. One government official added that the chief ensures that all land sales and developments are in line with the approved plans. 2 residents stated they do not know if plans are followed. Four respondents (3 government officers, a real estate agent, and 1 resident) stated that the plans are ignored by the chiefs.

For instance, R14(government official) stated: "*whenever we prepare the land use plans, we provide green spaces but the land doesn't belong to the municipal Assembly, it belongs to the stool and chiefs are custodian so they just sell these places and what was reserved for green spaces are being used for a different purpose. So we have to update the layouts every five years so that it can reflect changes in the ground. the law permits that we should update the schemes to reflect those changes but we don't have a strong law against what the chiefs are doing".*The statement by R14 suggests that land use plans are not obeyed and green areas are continuously being converted to other land uses. It also suggests that the government officials are left with no option but to update land use plans to reflect new developments in areas that had been designated as green areas.

Findings from the two municipalities indicate that out of the 23 respondents interviewed,11/23 respondents believed that land use plans are not obeyed, 4/23 did not know while 8/23 were of the view that plans are adhered to. It also shows that most government officials (5/9) in the two municipalities think that land use plans are not adhered to. They link non-adherence to land use plans to the indiscriminate sale of land by customary chiefs. The findings also show that half of the residents(4/8) could not tell whether land use plans are being adhered to or not. These findings seem to suggest that the low level of public awareness of the content of land use plans as was found in section (b) above may be linked to lack of adherence to land use plans because majority of the public are not aware of the content of land use plans, hence are willing to purchase lands designated as green areas from the chiefs.

The academics also confirmed that there is low compliance to land use plans due to the lack of awareness among the public on why plans designate some areas as open space or nature reserves or public purposes like schools and markets. Thus the public and chiefs think that designating land as green area is a waste of space. Therefore, chiefs prefer to sell land to gain higher economic returns.

Based on the above findings, the researcher concluded that there is low adherence to land use plans. The non-adherence is linked to low public awareness of the content of land use plans, inadequate monitoring of land use plans by government officers, increase in land values which make chiefs ignore land use plans, and indiscriminately sell land. A similar finding was reported by Abass; Afriyie, et al.,(2018) who illustrated that there is general lack of adherence to land use plans in Kumasi metropolis due to the sale of lands designated for green areas and subsequent change of use of such lands to grey areas.

In summary, the findings of section 4.4.1, on land use plans show that even though there are land use plans for peri-urban areas, the level of public awareness of the content of these plans is low. Due to the low awareness, people are willing to purchase lands set aside as green areas from the chiefs who knowingly ignore land use plans and indiscriminately sell these lands to capitalize on the increase in land values. The indiscriminate sale of land has subsequently led to uncontrolled changes of green landscapes to urban use as shown in the photographs in figure 10.

Figure 10: Residential buildings in marshy land

4.4.2. Zoning regulations

Land use plans designate land use zones and outline regulations on permitted and unpermitted use in each zone including regulations on the preservation of green landscapes. These regulations, therefore are crucial in determining if green landscapes are preserved or not. Indicators used in this research to measure zoning regulations include presence of green landscape preservation regulations, public awareness of green landscape preservation regulations, public acceptance of green landscape preservation regulations, instruments for enforcement of the regulation, and annual expenditure on enforcement of the regulations. The responses are indicated in a frequency table *(see annex 6).*

a) Presence of green landscape preservation zoning regulations

Local governments are required to include in land use plans, zoning regulations that promote environmental soundness, orderly development, and proper use of land(Land Use and Spatial Planning Act, 2016, Local Governance Act , 2016). Further, zoning guidelines and Planning Standards(2011) require all land use plans to include land use zones with prescription of permitted and prohibited use in each zone.

It was found that land use plans outline zoning regulations to preserve green landscapes especially riparian lands and nature reserves. However, the plans do not include zoning regulations on preserving agricultural land. this is based on interviews with 15 respondents (physical planners, land valuers, works officers, Municipal planning officer, customary chiefs, and family heads). And 2 academics.

All the 8 respondents in Kwabre East and 7 respondents in Asokore Mampong acknowledged presence of zoning regulations to preserve green landscapes. 3 government officials from Kwabre East and 2 government officials from Asokore Mampong mentioned that agricultural zones are not included in the plans because the chiefs do not agree for any lands to be zones for agricultural use. They non-acceptance of agricultural zoning to higher land prices offered urban use. For example, R1(government official) stated: *"In Ghana and Ashanti region particularly people always demand physical development so hardly would you see that you prepare a planning scheme and leave places for agriculture because these chiefs they will not allow you. So you have to maybe say like this is a buffer zone or nature reserve so, within the nature reserve, somebody can decide to farm*

*there".*A similar statement was mentioned in Asokore Mampong by R14 who stated that all the land is zoned for residential use.

From secondary data, it was found that large-lot zoning with a minimum lot size of 4 Hectares for low-intensity agricultural use is recommended in rural areas located next to urban settlements. Further, different buffer zones are also outlined for wetlands, rivers, streams, lakes, and dams(Republic of Ghana, 2011). However, a sample of local plans(layouts) from the Kwabre East municipal offices *(see annex 7)* shows that in practice, zoning of land for agricultural use is not applied.

The two academics also confirmed that Zoning regulations for preservation of green landscapes are provided for in the law and planning guidelines. However, the actual inclusion of the regulations in the land use plans depend on the chiefs' decisions. They added that agriculture is considered to have lower land prices and less economic return, therefore, the chiefs do not agree to zoning of land for agricultural use. Non-inclusion of agricultural land use zones in land use plans contradicts literature on zoning for preservation of green landscapes which highlights large-lot zoning for agricultural use as one of the tools for preserving green landscapes(Bengston; Fletcher, et al., 2004). The partial application of zoning regulations in practice seems to suggest that Zoning regulations may not fully contribute to preservation of green landscapes because the increase in land values has impacted the type of regulations that are included in land use plans.

Based on the above findings from interviews, secondary data, and literature, it is concluded that legally, zoning regulations for preservation of green landscapes are present. However, based on evidence from interviews with government officials and academics, and secondary data from municipal offices, it is likely that only regulations on the preservation of riparian land and wetlands are included in land use plans. This is because increase in land values coupled with the strong influence of customary chiefs on land use planning has made agricultural zoning unacceptable by chiefs and therefore, not included in land use plans.

b) Public awareness of green landscape preservation regulations

The level of public awareness of green landscape preservation regulations influences decisions making on use of land. Which consequently determines the effectiveness of zoning regulations in preserving green landscapes. It was found that the level of public awareness of green landscape preservation regulations. This finding is based on interviews with 2, academics 8 residents, and 15 other respondents((physical planners, land valuers, works officers, Municipal planning officer, customary chiefs, and family heads).

In Kwabre East,4 respondents(3 government officials and a real estate agent) rated level of public awareness as low. These respondents elaborated that awareness is low because the regulations are outlined in the plans but majority of the public do not know the content of plans. One respondent(real estate agent) stated the level of awareness is very low. One chief rated level of awareness as high. 2 respondents (chief and a family head) indicated the level of awareness is average. Therefore, majority(4/8) of respondents rated level of awareness as low. Furthers, from interview with residents, only one resident(R11) was aware of the regulation.

In Asokore Mampong 3 respondents (government officials) rated public awareness as low, 2 other government officials indicated level of awareness is average, one family head indicated it was high while another family head indicated level of awareness is very low. The 3 government officers who indicated the level of awareness to be low elaborated that awareness of regulations is low

because majority of the public believe only chiefs should know the regulations since they manage the land. Further interview with residents showed that only one resident(R24) was aware of the regulations and was able to give an examples of the regulations. R24 stated: "*For instance, it's stated that building of structures in waterways is prohibited*". The statement by R24 seems to suggest that the public is likely to be aware of zoning regulations for riparian lands and wetlands.this seem to confirm the finding on presence of zoning regulations which showed that plans are more likely to include regulations on wetland preservation and not agricultural zoning.

From the interviews in the two municipalities, it emerged that majority of respondents (7/15) are of the view that the level of awareness is low and only 2 residents were aware of green landscape preservation zoning regulations. Interview with the 2 academics confirmed the level of public awareness of the regulations is low. They link this situation to the fact that majority of the public who are renters do not request plans hence do not know the regulations outlined in the plans. The low awareness of the zoning regulations on preservation of green landscapes due to lack of interest by renters suggests that landholders are more likely to be aware of exact regulations on the preservation of green landscapes. The interest of landholders in knowing the regulations may mean that they are aware that zoning regulations impact land values and therefore want to ensure zoning does not reduce their land values. For example statement by R1(government officer) that chiefs do not allow for zoning of land for agriculture could be an indication of awareness of the impact of zoning on land values.

Based on above findings from interviews with government officials, academics, chiefs, family heads, and residents it was concluded that the level of public awareness of zoning regulations is low. Evidence from interviews with government officials and academic indicate that landholders are more likely to be aware of the regulations on preservation of green landscapes while the majority of renters may not know regulations on preservation of green landscapes.

c) Public acceptance of green landscape preservation regulations

Public acceptance of green landscape preservation regulations determines whether people obey regulations meant to preserve green landscapes or not. Thus influences the effectiveness of regulations in preserving green landscapes. It was found that the level of acceptance of the green landscape preservation regulation is very low. This is based on interviews with 8 residents, 2 academics and 15 other respondents(the physical planning officers, land valuers, works officers, customary chiefs, real estate agents, and family heads)

In Kwabre East, 5 respondents (3 government officials, a real estate agent, and a family head) were of the view that acceptance of regulations is very low. The other 3 respondents(2 chiefs and a family head) each rated the level of acceptance as low, average, and high. The 3 government officials added that lack of acceptance is demonstrated by the fact that the community members are willing to purchase land designated as green areas even after being advised by the Assembly staff. For example, R1(government official) stated: "*people come here for advice, we advise them then they go back and still buy the lands designated as nature reserves in the marshy areas and we only come to know when their houses are flooded"*. The statement by R1 suggests that people do not think that the regulations on preserving green landscapes are important. It also suggests ineffective enforcement of regulations to preserve green landscapes by the local governments.

From interviews with residents, only 1 resident(R11) who was also aware of the regulations stated that he agrees with the regulations because the regulations are meant to protect nature which is the

source of livelihood. The other 3 residents had indicated they were not aware of any regulation hence could not answer whether they accept the regulation.

In Asokore Mampong, 6 respondents (4 government officials, 2 family head) rated level of acceptance of the regulations as very low while the real estate agent indicated acceptance is low. The four government officers elaborated that public acceptance of the regulations on preservation of green landscapes is very low because chiefs and the public want to make money out of the land and they view any regulation to preserve green landscapes as a waste of land and therefore, the chiefs always wait for the opportunity to sell any available land to people who are also willing to buy any land irrespective of the regulations. For example, R17(government official) stated: "*in our layouts we provide for buffer zones of about 150m along river banks. But you know during dry seasons, some chiefs sell these lands to buyers. So the plans and the regulations are not fully followed*". Another government official (R14) added that "*The norm is that the chiefs are looking for money and they do not see why the green spaces should be there".*

The statement by R17 seems to indicate that level of acceptance of green landscape preservation regulations may have some influence on the adherence to land use plans and zoning regulations. Further, only one resident(R24) who was also aware of the regulations indicated that she accept the regulations. The other 3 had indicated they were not aware of any regulation hence could not answer whether they accept the regulation.

Comparing the two municipalities the findings indicate that majority of respondents in Kwabre East (5/8) rated the level of acceptance of regulations as very low while in Asokre Mampong, majority (6/7) rated the acceptance as very low. These respondents linked low acceptance of the regulations to lack of awareness on the importance of the regulations, desire to get more economic benefits from land, and lack of awareness on the importance of green landscapes. Additionally, 1 out of 4 residents in each municipality who were aware of the regulations stated that they accept regulations on preservation of green landscapes. This suggests that the level of awareness of regulations on preservation of green landscapes may be having some influence on the acceptance of the regulations. The interview with the two academics confirmed that the level of acceptance is very low and the chiefs who are influential in land use decisions do not accept these regulations due to the desire to generate money and sell land to people who are also willing and able to buy.

Further, secondary data indicate that green landscape regulations require buffer zones of minimum 30 meters around wetlands, 10-50m for rivers and streams, and additional meters 150m based on the slope(Republic of Ghana, 2011). The presence of residential developments within the buffer zones as evident from photographs taken during field data collection (*see figure 10 above*) shows that these regulations are not respected. It also suggests a high demand for residential land which has made the public willing to buy land even in areas that are supposed to be preserved as green areas. A similar conclusion was reported by Abass; Appiah, et al.,(2019) who reported that there is lack of commitment by the public and government officers to protect green spaces in Greater Peri-urban Kumasi due to high demand for land for residential use.

Based on the above findings form interviews, secondary data, and photo documentation, the researcher concluded that there is low acceptance of green landscape preservation zoning regulations. Evidence from interviews with government officials, real estate agents, family heads, and academics and data from secondary sources suggest that the level of awareness of green landscape preservation regulations may have some influence on the level of public acceptance of the regulation on preservation of green landscapes. It also suggests that the level of acceptance of

the zoning regulations on preservation of green landscapes is low because the chiefs overlook the regulations and sell lands that are supposed to be preserved as green areas to the public who are also willing to buy such lands due to high demand for residential lands.

d) Mechanisms for enforcing zoning regulations

Enforcement of zoning regulations is crucial in determining the level of adherence to land use plans. Thus crucial in determining effectiveness of zoning regulations in preserving green landscapes. In Ghana, the enforcement mechanisms outlines in legislation include development permits, notice of sermons, stop-work notice, prohibiting the use of land in a manner that disregards the land use plans, demolishing of buildings and structures, and fines(Land Use and Spatial Planning Act, 2016, Local Governance Act , 2016).

It was found that the mechanisms used by the two municipalities are: notices of sermon to developers asking for an explanation why the Assembly should not take an action against unpermitted use; stop-work notices issued after expiry of notice of sermon and no explanation is provided by the developer; refuse to give development permits and fines. It was also found that the Assemblies rarely demolish buildings.This is based on interviews with 23 respondents(include physical planners, public works officers, municipal planning officer, land valuer, chiefs, family heads, real estate agents, and residents) and 2 academics.

In Kwabre East, 11 respondents (3 government officials, 2 chiefs,2 family heads,4 residents) were of the view that all the mechanisms provided in law are used. A real estate agent mentioned that that no mechanism is used to enforce zoning regulations. He elaborated that despite the Assembly having legal authority to enforce land use regulations, unauthorized and non-compliant land uses have become a norm. This seems to suggest that the local governments have not effectively enforced zoning regulations.

In Asokore Mampong, all 11 respondents interviewed indicated that all the mechanisms mentioned in the law are applied. R17(government official) elaborated that the Assembly rarely demolish buildings due to social considerations. 2 government officers (R14 andR18) added that developers or landowners mostly apply for a change of use to necessitate amendment of the land use plan to ensure conformity. This seems to suggest that if unpermitted development is sited in areas zoned as green landscape, continued amendment of land use plans to regularize such developments may render land use plans and zoning regulations ineffective in preserving green landscapes.

The two academics commented that the Assemblies mainly issue stop-work notices. They added that notices are mostly not obeyed by developers as the developers always inform the chiefs when a notice is issued and then chiefs request for re-zoning to reflect the new use and the government officers have to comply. This seems to suggest that customary chiefs have more power on land use decisions than the statutory planning authorities. Similar findings have been confirmed by studies in Accra (Barry and Danso, 2014) and Kumasi(Amaoko and Adom-Asamoah, 2017)which reported that the government officers are helpless when it comes to re-zoning of green areas since the customary authorities still feel entitled to lands reserved for green areas although such lands belong to state agencies.

Based on above findings from interviews, secondary data, and literature, it was concluded that there are mechanisms to enforce zoning regulations on preservation of green landscapes. However, evidence from interviews with government officials, real estate agents, and academics seem to

indicate that the mechanisms may be ineffective due to contradictions on land use decisions between customary structures and statutory planning structures. A similar conclusion was reported in Wa Municipality, Ghana (Bonye; Yiridomoh, et al., 2020).

e) Expenditure on enforcement of zoning regulations

Financing of enforcement of zoning regulations is crucial in determining effectiveness of the regulations in preserving green landscapes. To measure the level of financing of enforcement, the researcher interviewed the physical planners, works officers, and finance officers. The researcher also intended to collect secondary data from financial reports obtained from the municipal offices. However, no figures on expenditure were obtained both from interviews and financial reports were not available.

In Kwabre East, 2 respondents indicated that enforcement is funded based on demand hence no money is assigned for the purpose.1 respondent stated that enforcement is not directly mentioned in the budget but are considered as part of land use activities. However, he could not provide any figures on budget for the land use activities.

In Asokore Mampong, 2 respondents did not answer while one respondent indicated that enforcement of zoning regulations is not a priority of the Assembly hence no budget is assigned for that purpose and it is funded based on demand. However, He acknowledged that enforcement is not cheap and requires adequate funding. R14*: "the amount is not workable since it is done on demand but if the Assembly were to seriously focus on enforcing plans and regulations it will not be cheap but it is not a priority for the Assembly that is why it is not even captured in the budget".*

This finding means inadequate financing of enforcement activities by the municipalities. literature shows that financing of enforcement is crucial in determining the effectiveness of land use plans and zoning regulations in preserving green landscapes(Kleemann; Inkoom, et al., 2017). The inadequate financing, therefore suggests failure of land use plans and zoning regulations to effectively preserve green landscapes.

In general, Section 4.4.2 on zoning regulations, found that legally, zoning regulations for preservation of green landscapes are present. However, based on evidence from interviews with government officials and academics, and primary-secondary data from municipal offices, suggest that it is likely that only regulations on the preservation of riparian land and wetlands are included in land use plans. Public awareness of the regulations is also low which has resulted in low acceptance of zoning regulations. Therefore, the regulations are overlooked by both chiefs and the public. Further increase in land values, contradictions between customary land ownership and statutory planning, and inadequate financing of enforcement of zoning regulations have resulted in the regulations being ineffective in preserving green landscapes.

4.4.3 Summary of findings on preservation of green landscapes (dependent variable)

It was found that land use plans and zoning regulations for preserving green landscapes are present in the peri-urban areas. However, in practice, the regulations are mainly limited to riparian zones and wetlands and do not include agricultural land due to resistance to agricultural zoning by the chiefs.

It was also found that the public is aware of the existence of the land use plans while awareness of zoning regulations is very low. This is because majority are not aware of the content of land use plans and exact regulations for preserving green landscapes. This is explained by the fact that even

though the plans are easily accessible to the public, landholders and people who want to buy land are more likely to request for land use plans and get to know the zoning regulations while renters who are the majority assume that plans and zoning regulations are only relevant to landholders and chiefs who are custodians of land.

It also emerged that land use plans are not adhered to and acceptance of zoning regulations is very low. This is despite the existence of mechanisms such as notices, fines, and development permitting to enforce plans and zoning regulation. These mechanisms are ineffective due to contradictions between customary tenure practices on land use and formal planning and inadequate financing. Hence the continuous loss of green landscapes evident by change in the use green landscapes.

In conclusion findings from interviews, secondary data and literature show that land use plans and zoning regulations have are ineffective in preserving green landscapes due to the contradictions between customary land ownership structures and formal statutory planning, and inadequate financing of enforcement of zoning regulations.

4.5 Summary of the Chapter

It was established that land use changed in the two municipalities within the past decade characterized by conversion of non-built-up land (green landscapes) to built-up land (urban use). The green landscapes are reducing at an annual rate of between negative (-)1.56% and negative (-)3.33% while built-up area (urban use) are increasing at an annual rate of 2.26% and 2.56%. The land use changes have resulted in massive increase in land values ranging between 105.12%-1057%, within the past decade. The increase in value also created huge difference between agricultural and urban land values with a residential plot costing 6.8 times the cost of renting one acre of agricultural land.

The study revealed that despite, the huge increments in land values due to land use change, and the provision for betterment charges in the Land Use and Spatial Planning Act,2016 and the Local Governance Act,2016 to enable local governments to capture increments in land values due to land use change, the charges are not applied by the two municipalities. The impediments to application of betterment charge due to land use change include lack of political goodwill; lack of rules to operationalize betterment charge, lack of awareness by both government officers, other stakeholders like customary chiefs and family heads, and the public, and dependency by the local governments on financial transfers from the central government. It was also established that the two instruments (property rates and ground rents) which were mentioned by government officers to be applied in peri-urban Kumasi to capture increments in land values, are by design not meant to capture increase in land values due to land use. Hence do not capture or may not capture in full such increments in land values, resulting in loss of revenues by local governments.

It was also established that there are land use plans and zoning regulations for preserving green landscapes in the peri-urban areas. However, regulations applied in practice are mainly limited to riparian zones and wetlands and do not include regulations on preservation of agricultural land due to resistance by the chiefs. It was revealed that though the public are aware of the existence of the land use plans, awareness of zoning regulations is very low and majority of the public do not know the actual content of land use plans and the zoning regulations on preserving green landscapes. The lack of awareness of content of land use plans and zoning regulations on preservation of green landscapes has resulted in low acceptance of zoning regulations evident by willingness of the

public to purchase lands in areas which are zoned as green areas leading to non-adherence to land use plans and the regulations. Which consequently leads to ineffective preservation of green landscapes.

It emerged that land use plans are not adhered to and acceptance of zoning regulations is very low due to increase in land values which make chiefs overlook plans and zoning regulations. Further, the enforcement of zoning regulations is less effective in preserving green landscapes because of inadequate financing as evidenced by the non-inclusion of funds to enforce land use plans in the municipal budget and demand-based funding practice. Moreover, the contradiction between customary tenure practices on land use and formal planning is a challenge to enforcement. Hence ineffective preservation of green landscapes.

In conclusion, the study findings from interviews, spatial analysis, secondary data, and photo documentation revealed that land use change led to huge increase in land values. However, the increments in land values are not fully captured due to non-application of betterment charges leading to loss of revenues for local governments while local governments have limited financial capacity. On the other hand, inadequate funding of enforcement of zoning regulations and the contradictions between customary land tenure practices and statutory planning, have resulted in non-adherence to land use plans and change in the use of land zoned as green areas. Hence the continued loss of green landscapes.

Chapter 5: Conclusions and Recommendations

5.1 Introduction

This study was founded on the premise that land use changes in peri-urban areas impact land values by increasing the values. The increase in land values due to change in land use are unearned increments that local governments should capture through development-right-based betterment charge to generate revenues to provide services including preserving green landscapes through enforcement of land use plans and zoning regulations. Therefore, the objectives of this research are to explain the extent by which local governments capture increment in land values due to land use change through betterment charge to finance preservation of green landscapes in peri-urban Kumasi, and to investigate if betterment charge is known by actors within and outside government, if the instrument is operationalized and if it is used to capture increments in land values arising from changes in land use. To realize the objective, a case study strategy was found to be the most suitable approach because it allowed for selection of two cases in peri-urban Kumasi and also ensured internal validity by triangulation of data through collection of data from different sources and use of different methods of data collection.

This study confirms the conceptual framework in chapter 2. It shows that land use changes in peri-urban Kumasi led to huge increase in land values within the past decade. Because the increments are not fully captured, local governments lose revenue which could have been used to finance the preservation of green landscapes. It also shows that inadequate funding of enforcement of land use plans and zoning regulations render them ineffective in preserving green landscapes. Therefore, the information is important for policy formulation on inclusive green growth and also contributes to academic literature on value capture for financing green landscapes.

Section 5.2, highlights the main findings from face-to-face and online interviews, secondary data and spatial analysis supported by photo documentation. It also outlines conclusions drawn from the data analysis detailed in the previous chapter along the lines of the research questions.

5.2. Conclusions

5.2.1. How has land use changed in peri-urban Kumasi with the past decade?

The spatial extent of Land use change was quantified by comparing 2009 and 2019 land use maps of the two municipalities. The maps were generated through supervised image classification of Landsat 7 and Landsat 8 images for 2009 and 2019 respectively. The limitation with spatial data used is that Landsat 7 image had many cloud cover and scanline errors which made the image unclear, unlike Landsat 8 image which was very clear. This may have affected the findings since the researcher may have missed some details on the 2009 images during image classification.

The results showed that within the past decade, land use changed in the two municipalities with conversion of green landscapes to urban use. However, annual rate of change is higher in Kwabre East ((2.59%) than Asokore Mampong ((2.26%). Further from interviews, it emerged that Land is mainly converted from green areas to residential use due to high demand for residential land occasioned by population increase. A similar finding was illustrated by Acheampong; Agyemang, et al.,(2016) in a study of settlement growth in the greater Kumasi sub-region where it was reported that urban growth was higher in the 6 sub-region districts except for Asokore Mampong which had a similar growth trend with KMA. The research, therefore concludes that non-built-up land (green

landscapes) was changed to built-up land (urban use) in peri-urban urban Kumasi within the past decade.

5.2.2. How have land values changed in peri-urban Kumasi within the past decade?

Data on land values were collected through interviews with a total of 13 respondents including government officials(physical planners, land valuers,public works officers, municipal planning officer) chiefs, Family Heads, and real estate agents. The researcher intended to triangulate the data with primary-secondary data from land valuation office and land transaction records, however, such records were not availed to the researcher. In view of the above, the data are purely based on interviews. This might have limited accuracy, especially data about land values in 2009 as it depends on memory of respondents. Also, majority of respondents did not answer questions on values of commercial and agricultural land in Asokore Mampong due to the reasons highlighted in chapter 4 (section 4.3.2) hence these data were missing. Further, chiefs in Asokore Mampong were unavailable and could not be interviewed yet they are key actors in land transactions. Thus the unavailability of data on land values from chiefs and missing data on land values of agricultural and commercial uses in Asokore Mampong may have affected the results of the research.

The findings indicate that land values had increased with a range between 105.12%-1057%, within the past decade. The increase in land values was linked to changes in land use either through change of land use plans(layouts) of an area or through changes to the use of individual plots. The increase in value due to change of layout plan is consistent with literature on impacts of land use zoning on land values(Ohls; Weisberg, et al., 1974). Ohls; Weisberg, et al.,(1974) argue that in a competitive land market, an act of changing the zoning of an area directly impacts the land values positively or negatively. In this context, the impact is found to be positive. Further change of use of one parcel affects the prices of other parcels due to externality of land values(Koomen and Buurman, 2002), where the price at which one plot was sold and its use affect prices of other parcels of land within its vicinity.

The findings also showed that land value increments were higher in Asokore Mampong than Kwabre East. It was indicated by respondents that the high land values in Asokore Mampong may be the reason why most urban development took place in Kwabre East as was shown by a higher rate of annual change in land use as discussed in section 5.2.1. This means most people moved to Kwabre East in search of cheaper land. Search for cheaper land is explained in literature as reasons for lateral expansion of urban development in Kumasi(Abass; Adanu, et al., 2018).

Also, the findings show that the values of all land use types increased within the past decade. However, agricultural land had the lowest increment in land values. This means agricultural land is being out-priced as evident by statements government officers and the academics. This is similar to findings reported by Sharif,(2014) in peri-urban areas of Dhaka area and Debolini; vallete, et al.,(2015)in peri-urban areas of Meknes City, Morocco. The finding is also consistent with the Bid-rent theory(Alonso, 1964), which argues that out-pricing of existing land uses can only occur when new uses are able to offer a higher price. The research, therefore, concludes that changes in land use resulted in land values increased in peri-urban Kumasi within the past decade.

5.2.3. Are increments in land values due to land use change captured in peri-urban Kumasi?

It was found that despite, the huge increments in land values due to land use change, and the provision for betterment charges in law, to enable the local governments to generate revenues from such increments, the charges are not applied. The reasons for non-implementation include lack of political goodwill; lack of rules to operationalize betterment charge; lack of awareness by both

government officers, non-state actors like chiefs and family heads, very low public awareness, and dependency by the local governments on transfers from the central government. These findings are consistent with findings by Smolka and Furtado(2002) about the challenges of implementing laws on betterment charges in Latin America.

It was also found that property rates and ground rents are the common land value capture instruments applied in peri-urban Kumasi as stated by some government officials tasked with mobilizing revenues for local government. However, it was established that these instruments are not designed to capture increments in land values due to land use change. Property rates do not capture increments in land values because the valuation method for property rating used in Ghana excludes land values(Local Governance Act , 2016). Ground rents, on the other hand, may indirectly capture partial increments in land values due to land use change due to the assessment method used which takes into account the values of adjacent lands and the land use type(Ayitio, 2019). However, the rents are only charged on registered land leases. Taking into account that most lands are not registered in peri-urban areas(Biitir, 2019), it cannot fully capture increments in land values due to land-use change. Moreover, ground rents are administered by the central government through the OASLand, not local governments. Further revenues from ground rents do not fully accrue to local governments.

It was established that lack of implementation of betterment charge is resulting in loss of revenues for local governments leading to inadequate financial capacity as indicated by the inability of local governments to meet targets for IGF. A similar finding was reported by Vitriana(2017) who demonstrated that not capturing land value increases due to land use changes in Bandung – Cimahi Peri-urban Region in Indonesia, resulted in loss of revenue to local governments.

Based on the above findings and taking into account the fact that betterment charges are not implemented and that property rates and ground rents are not designed to capture increment in land values due to land use change, the research concludes that increments in land values due to land use change are not fully captured.

5.2.4. How are captured increments in land values used, to preserve green landscapes in peri-urban Kumasi?

As discussed in section 5.2.3 above, the research established that betterment charges are not applied. Also it emerged that ground rents and property rates as currently applied in Ghan are not designed to capture increments in land values due to land use change. Therefore, increments in land values due to land use change are not fully captured. It was also found that even though, ground rents are not designed to capture land value increments due to land use change, ground rents which are part of stool lands revenues collected and distributed by OASL among different beneficiaries based on a constitutional formula, is a source of revenues to the local governments since they receive 55% of revenues after OASL deduct 10%.

Secondary data showed that use of stool lands revenue shared with local governments is not tied to any specific expenditure item. Therefore, it may be possible that part of these revenues from stool lands are used to preserve green landscapes. The same could also be a possibility for revenues property rates even though rates are chargeable on improvements on land and are administered by local government, unlike ground rents. However, the researcher wants to clarify that this research was not focused on the application of these two instruments hence the researcher did not collect any primary data or substantive secondary data on their application and therefore, cannot authoritatively comment on the utilization of revenues from property rates or ground rent.

It was established that betterment charge due to land use change is not implemented despite huge increase in land values due to land use change, and that property rates do not capture increments in land values while ground rents are not designed to capture increment in land values due to land use change, thus do not fully capture such increments in value. Hence local governments lose revenues due to the non-implementation of betterment charges, which consequently contributes to the inadequate financial capacity of local governments evidenced by the inability of local governments to meet annual IGF targets.

The inadequate financial capacity has resulted in underfunding of enforcement of zoning regulations as was highlighted by government officers that enforcement is not a priority and is funded on a need basis, and also that proper enforcement will require substantive finances because it is not cheap. Literature shows that financing of enforcement is crucial in determining effectiveness of zoning land use plans and zoning regulations in preserving green landscapes(Kleemann; Inkoom, et al., 2017). Therefore, the researcher concludes that land value capture **may not fully but partially** contributing revenues to be used for the preservation of green landscapes. However, based on the huge increments in land values due to land use change, there is huge potential for capturing land value increments from land use change to finance preservation of green landscapes.

5.2.5 To what extent do local governments capture increase in land values due to land use change through betterment charge, to finance preservation of green landscapes in peri-urban Kumasi?

It emerged that despite the huge increase in land values due to land use changes in peri-urban Kumasi, and the existence of a unique land value capture instrument in an African context, (betterment charges due to land use change) the instrument is not applied due to failure of the central government (Spatial Planning Authority) to formulate the rules to operationalize betterment charges. The other reasons are lack of political goodwill and low awareness of betterment charge among state officers, customary chiefs and the public, and over-dependency of local governments on transfers from the central government.

It was also established that property rates do not capture increments in land values while ground rents are not designed to capture increase in land values due to land use change, thus do not fully capture such increments in value. Therefore, local governments lose revenues due to the non-implementation of betterment charges, which consequently contributes to inadequate financial capacity of local governments as they cannot meet IGF. This has led to inadequate financing of enforcement of land use plans and zoning regulations. As a result, the land use plans and the zoning regulations are not adhered to. Hence land use plans and zoning regulations are ineffective in preserving green landscapes. Inadequate funding of monitoring land use plans and enforcement of zoning regulations was also highlighted by Abass; Afriyie, et al.,(2018).

Another reason that makes land use plans and zoning regulations ineffective in preserving green landscapes is linked to the increase in land values due to land use change. Land use changes has resulted in huge disparity in value of agricultural land and land for urban use. As a result, the customary chiefs do not accept zoning for agricultural use. This means all the lands are zoned for urban use and mostly residential use as mentioned by government officials. This contradicts literature on zoning for preservation of green landscapes which outlines large-lot zoning for agricultural use as one of the tools to preserve green landscapes(Bengston; Fletcher, et al., 2004).

It also contradicts planning standards on agricultural zones in rural areas located next to urban settlements(Republic of Ghana, 2011).

Further, high increase in land values and contradictions between customary land tenure and formal planning has resulted in consistent rezoning of lands which were originally zoned as nature reserves or riparian land as chiefs sell these lands and use is changed to urban use (mostly residential) and later request for plans to be revised to reflect the new use. The effect of this type of zoning is that it leads to unsustainable use of peri-urban land. Moreover, majority of the public are not aware of the content of land use plans or zoning regulations since they do not attend meetings to discuss land use plans. Thus are willing to purchase lands reserved for nature reserves, riparian lands, and open space.

Based on the above findings and answers to sub-questions ***it can be concluded that to a large extent, local governments do not capture increments in land values due to land use change through betterment charge, therefore, it has not contributed revenues for preservation of green landscapes.*** However, there could be partial capture of increments in land values due to land use change through ground rents which are administered by the central government. The revenues from ***ground rents*** are part of stool lands revenues which are shared with the local governments, such revenues ***may have partially been used by the local governments to finance the "demand-based enforcement of zoning regulations"*** and therefore minimally contributing to the preservation of green landscape. The same could apply for property rates because the rates are fully administered by local governments even though they do not capture increments in land-use change. Taking into account the huge increase in land values due to land use change, and the existence of legal framework for land value capture, there is potential for full/improved capturing of increments in land values due to land use change to finance the preservation of green landscapes.

5.3. Recommendations

From the findings and conclusions, the researcher recommends the following:

1. The Spatial Planning Authority in consultation with other stakeholders to formulate the rules to operationalize betterment charges due to land use change.
2. Once the rules are formulated, the Spatial Planning Authority should create awareness among government officials, customary chiefs, and the public.
3. The local governments to explain to the chiefs the importance of including agricultural zones in land use plans and also discuss mechanisms to implement agricultural zoning. This may include percentage of land in a layout plan that must be retained as agricultural land. Once agreed, it becomes a condition for approval of layout plans by the local governments.
4. The local governments in collaboration with other government agencies to take necessary steps to ensure land zoned as riparian land, nature reserves, or open spaces are vested with the national/local government as applicable immediately a layout plan is approved to prevent rezoning.
5. The Assemblies to create public awareness on the content of plans and zoning regulations. This should be done through use of other modes of communication in addition to the consultative meetings during plan preparation.

5.3.1. Recommendation for further study

It has emerged from this study that property rates and ground rents are applied to capture in peri-urban Kumasi. However, none of these are designed to capture increments in land values due to land use change. Among the two instruments, property rates are administered by local governments. However, the method for valuation for property rating applied in Ghana excludes land values. Since it is currently being implemented, it may be cheaper and politically less controversial to use it to capture increments in land values due to land use change if it becomes politically difficult to implement betterment charge as a stand-alone instrument. Therefore, further research should be undertaken to ascertain the feasibility of changing the method of valuation for property rating to include land values.

The research also established that contradictions between customary land tenure practices concerning land use and the statutory planning have resulted in non-adherence to land use plans and zoning regulations. However, since this was not the focus of the research, the researcher did not look into details of the nature of these conflicts and how they impact planning. Therefore, further research can be done on such issues.

This research experienced challenges in obtaining data due to corona pandemic, unavailability of some respondents, lack of access to primary-secondary data from municipal offices especially land values and expenditure on enforcement of zoning regulations, therefore further research should be undertaken on this topic to determine the changes in land values due to land use change and value capture for financing preservation of green landscapes.

5.3.2 Recommendations for PBL

This research was part of the PBL project which focuses on exploring strategies and scenarios for inclusive green growth in the Kumasi peri-urban landscape. The research has established that land use changes have resulted in a substantial increase in land values ranging between 105.12% - 1057% within the past ten years. It was also established that local governments face financial challenges in funding preservation of green landscapes. There is potential to capture increments in land values due to land use change to finance preservation of green landscapes. Therefore, taking into account the challenges identified in this research, it is prudent that further research on this topic is undertaken to inform the use of land value capture in funding any of the strategies aimed at achieving inclusive green growth in peri-urban Kumasi.

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Appendix 1: Research Instruments

INSTITUTE FOR HOUSING AND URBAN DEVELOPMENT STUDIES (IHS)
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In line with this, I would like to request for your time for an interview which is to be conducted by research assistant on my behalf. Information obtained will be strictly confidential and will not be subjected to any other use apart academic use in this research only.
Moreover, I would also like to ask for your approval to record this interview for transcription.
Do you consent to recording of the interview and use of data collected for the purpose of this research?

[ ] Yes

[ ] No

Thank you very much.

Interview guide 1: Physical/ Town Planning Department, Works Department, Municipal Planning Department

Name of Assembly:

Position of interviewee:

Years of work in the municipality:

Part1*:* Land use change

No	**Question**
1	How has land use changed in the municipality between 2009-2019?
2	what are the main reasons for the change in land use?
Part 2: Land value change	
3	What were the land values in 2009 within the peri-urban areas for the following uses: a) Residential, b) Commercial, c) Industrial and d) Agriculture

	If respondent has not mentioned sizes of land per value, then ask :what were the average size of land for each value
4	What were the land values in 2019 within the peri-urban areas for the following uses a) Residential, b) Commercial, c) Industrial and d) Agriculture *If respondent has not mentioned sizes of land per value, then ask* :what were the average size of land for each value
5	From your experience, what factors have contributed to changes in land values in the peri-urban areas?
	Part 3: Betterment charge
6	*According to section 102(2), of the Local Governance Act,2016; the District Planning Authority is supposed to recover a percentage increase in land values from a person whose land increases in value due to the provision of a plan or a decision or action of a District Planning Authority* Is the above section of the law being implemented in the municipality? [ ] Yes *(If yes, go to question 11*) [ ] No
7	If no, why?
8	If not, what should be done to ensure the implementation of betterment charge due to land use change?
9	If yes, what is the criteria for levying betterment charge due to land use change?
10	What is the percentage rate used for levying betterment charge for the following uses: a) Residential, b) Commercial, c) Industrial and d) Agricultural?
11	Which activities are funded by revenues from betterment charge?
12	How would you rate public awareness about payment of betterment charge to the Assembly? [ ] Low [ ] Very low [ ] Average [ ] High [ ] Very high

13	Which mechanisms are used by the Assembly to enforce payment of betterment charges when land use is changed?
Part 4: Land use plans and regulations	
14	Does the Municipality have land use plans(layouts) covering peri-urban areas? [ ] Yes [ ]No
15	If no, why?
16	If yes, how would you rate public awareness of the land use plans? [ ] Low [ ] Very low [ ] Average [ ] High [ ] Very high
17	Are the plans easily available to the public?
18	Does the plan outline regulations for protecting agricultural land, forests, woodlands and wetlands from change to other uses? [ ] Yes [ ]No
19	If yes, mention examples of such regulations?
20	How would you rate public awareness of the Zoning regulations aimed at protecting agricultural land, forests, woodlands and wetlands from change to other uses? [ ] Low [ ] Very low [ ] Average [ ] Hig [ ] Very high
21	Do the public accept zoning regulation aimed at protecting agricultural land and nature from change to other uses?
22	Are the provisions of the land use plans and the regulations adhered to?
23	What mechanisms are used by the government to enforce provisions of land use plans and zoning regulations?
24	What were the annual expenditure on enforcement of land use plans and zoning regulations in 2009 and 2019?
Do you have any further comments? Thanks for your time	

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In line with this, would like to request for your time for an interview which is to be conducted by research assistant on my behalf. Information obtained will be strictly confidential and will not be subjected to any other use apart academic use in this research only.
Moreover, I would also like to ask for your approval to record this interview for transcription.
Do you consent to recording of the interview and use of data collected for the purpose of this research?

[ ] Yes

[ ] No

Thank you very much.

Interview guide 2: Finance/ Revenue Department

Name of Assembly:

Position of interviewee:

Years of work in municipality:

No	Question
1	*According to section 102(2), of the Local Governance Act,2016; the District Planning Authority is supposed to recover a percentage increase in land values from a person whose land increases in value due to the provision of a plan or a decision or action of a District Planning Authority* Is the above section of the law being implemented in the municipality? [ ] Yes (*If yes, go to question 4*) [ ] No
2.	If no, why?
3	If not, what should be done to ensure the implementation of betterment charge due to land use change?
4	If yes, what is the criteria for levying betterment charge due to land use change?

5	What is the percentage rate used to levy betterment charge for the following uses: a) Residential, b) Commercial, c) Industrial and d) Agricultural?
6	What were the annual estimated revenues from betterment charges in 2009 and 2019?
7	What were the actual revenues from betterment charges in 2009 and 2019?
8	How would you rate public awareness about payment of betterment charge to the Assembly when use of land is changed? [ ] Low [ ] very low [ ] Average [ ] High [ ] Very high
9	Which mechanisms are used by the Assembly to enforce payment of betterment charge when land use is changed?
10	What were the annual expenditure on enforcement of land use plans and zoning regulations in 2009 and 2019?
Do you have any further comments? Thanks for your time	

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In line with this, I would like to request for your time for an interview which is to be conducted by research assistant on my behalf. Information obtained will be strictly confidential and will not be subjected to any other use apart academic use in this research only.
Moreover, I would also like to ask for your approval to record this interview for transcription.
Do you consent to recording of the interview and use of data collected for the purpose of this research?

[ ] Yes

[ ] No

Thank you very much.

Interview guide 3: Land Valuation department and Real Estate agents

Name of Assembly:	
Position of interviewee:	
Years of work in the municipality:	
Part1*:* Land use change	
No	**Question**
1	How has land use changed in the municipality between 2009-2019?
2	what are the main reasons for the change in land use?
Part 2: Land value change	
3	What were the land values in 2009 within the peri-urban areas for the following uses: a) Residential, b) Commercial, c) Industrial and d) Agriculture *If respondent has not mentioned sizes of land per value, then ask* :what were the average size of land for each value
4	What were the land values in 2019 within the peri-urban areas for the following uses a) Residential, b) Commercial, c) Industrial and d) Agriculture *If respondent has not mentioned sizes of land per value, then ask* :what were the average size of land for each value
5	From your experience, what factors have contributed to changes in land values in the peri-urban areas?
Part 3: Betterment charge	
6	*According to section 102(2), of the Local Governance Act,2016; the District Planning Authority is supposed to recover a percentage increase in land values from a person whose land increases in value due to the provision of a plan or a decision or action of a District Planning Authority* Is the above section of the law being implemented in the municipality? [ ] Yes *(If yes, go to question 11*) [ ] No
7	If no, why?

8	If not, what should be done to ensure the implementation of betterment charge due to land use change?
9	If yes, what is the criteria for levying betterment charge due to land use change?
10	What is the percentage rate used for levying betterment charge for the following uses: a) Residential, b) Commercial, c) Industrial and d) Agricultural?
11	Which activities are funded by revenues from betterment charge?
12	How would you rate public awareness about payment of betterment charge to the Assembly? [ ] Low [ ] Very low [ ] Average [ ] High [ ] Very high
13	Which mechanisms are used by the Assembly to enforce payment of betterment charges when land use is changed?
Part 4: Land use plans and regulations	
14	Does the Municipality have land use plans(layouts) covering peri-urban areas? [ ] Yes [ ]No
15	If no, why?
16	If yes, how would you rate public awareness of the land use plans? [ ] Low [ ] Very low [ ] Average [ ] High [ ] Very high
17	Are the plans easily available to the public?
18	Does the plan outline regulations for protecting agricultural land, forests, woodlands and wetlands from change to other uses? [ ] Yes [ ]No
19	If yes, mention examples of such regulations?

20	How would you rate public awareness of the Zoning regulations aimed at protecting agricultural land, forests, woodlands and wetlands from change to other uses? [ ] Low [ ] Very low [ ] Average [ ] High [ ] Very high
21	Do the public accept zoning regulation aimed at protecting agricultural land and nature from change to other uses?
22	Are the provisions of the land use plans and the regulations adhered to?
23	What mechanisms are used by the government to enforce provisions of land use plans and zoning regulations?
Do you have any further comments? Thanks for your time	

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Moreover, I would also like to ask for your approval to record this interview for transcription.
Do you consent to recording of the interview and use of data collected for the purpose of this research?

[ ] Yes

[ ] No

Thank you very much.

Interview guide 4: Customary chiefs and Family heads

Name of Assembly:

Position of interviewee:

Years of residency in the municipality:	
Part1*:* Land use change	
No	**Question**
1	How has land use changed in the municipality between 2009-2019?
2	what are the main reasons for the change in land use?
Part 2: Land value change	
3	What were the land values in 2009 within the peri-urban areas for the following uses: a) Residential, b) Commercial, c) Industrial and d) Agriculture *If respondent has not mentioned sizes of land per value, then ask* :what were the average size of land for each value
4	What were the land values in 2019 within the peri-urban areas for the following uses a) Residential, b) Commercial, c) Industrial and d) Agriculture *If respondent has not mentioned sizes of land per value, then ask* :what were the average size of land for each value
5	In your opinion what factors have contributed to changes in land values in the peri-urban areas?
Part 3: Betterment charge	
6	*According to section 102(2), of the Local Governance Act,2016; the District Planning Authority is supposed to recover a percentage increase in land values from a person whose land increases in value due to the provision of a plan or a decision or action of a District Planning Authority* Is the above section of the law being implemented in the municipality? [ ] Yes *(If yes, go to question 11*) [ ] No
7	If no, why?
8	If not, what should be done to ensure the implementation of betterment charge due to land use change?

9	If yes, what is the criteria for levying betterment charge due to land use change?
10	What is the percentage rate used for levying betterment charge for the following uses: a) Residential, b) Commercial, c) Industrial and d) Agricultural?
11	How would you rate public awareness about payment of betterment charge to the Assembly? [ ] Low [ ] Very low [ ] Average [ ] High [ ] Very high
12	Which mechanisms are used by the Assembly to enforce payment of betterment charges when land use is changed?
Part 4: Land use plans and regulations	
13	Are there plans(layouts) covering for your community/neighbourhood [ ] Yes [ ]No
14	If no, why?
15	If yes, how would you rate public awareness of the land use plans? [ ] Low [ ] Very low [ ] Average [ ] High [ ] Very high
16	Are the plans easily available to the public?
17	Does the plan outline regulations for protecting agricultural land, forests, woodlands and wetlands from change to other uses? [ ] Yes [ ]No
18	If yes, mention examples of such regulations?
19	How would you rate public awareness of the Zoning regulations aimed at protecting agricultural land, forests, woodlands and wetlands from change to other uses? [ ] Low [ ] Very low

	[ ] Average [ ] High [ ] Very high
20	Do the public accept zoning regulation aimed at protecting agricultural land and nature from change to other uses?
21	Are the provisions of the land use plans and the regulations adhered to?
22	What mechanisms are used by the government to enforce provisions of land use plans and zoning regulations?
Do you have any further comments? Thanks for your time	

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Moreover, I would also like to ask for your approval to record this interview for transcription.
Do you consent to recording of the interview and use of data collected for the purpose of this research?

[ ] Yes

[ ] No

Thank you very much.

Interview guide 5: Academia (Land use expert) from KNUST

No	**Question** Note: If the interviewee has no specific experience about the chosen municipalities, general overview of the issues in peri-urban areas of Kumasi will suffice
1	What is your view about change of land land use between 2009-2019 in: a) Asokore Mampong Municipality? b) Kwabre East Municipality?
2	In your opinion what as contributed to changes in land use in peri-urban Kumasi?
3	What is your view about the rate of change of land use in: a) Asokore Mampong Municipality? b) Kwabre municipality?
5	Are betterment charges applied when land use is changed?
6	If not, what are the reasons for non-implementation of betterment charges?

7	How would you rate public awareness about payment of betterment charge to the Assembly? [ ] Low [ ] Very low [ ] Average [ ] High [ ] Very high Please elaborate.
Part 4: Land use plans and regulations	
8	Are there plans(layouts) covering for your community/neighbourhood
9	If no, why?
10	If yes, how would you rate public awareness of the land use plans? [ ] Low [ ] Very low [ ] Average [ ] High [ ] Very high Please elaborate.
11	Are the plans easily available to the public?
12	Does the plan outline regulations for protecting agricultural land, forests, woodlands and wetlands from change to other uses?
13	How would you rate public awareness of the Zoning regulations aimed at protecting agricultural land, forests, woodlands, open spaces and wetlands from change to other uses? [ ] Low [ ] Very low [ ] Average [ ] High [ ] Very high Please elaborate.
14	Do the public accept zoning regulation aimed at protecting agricultural land and nature from change to other uses?
15	what is your opinion about adherence to land use plans?
16	What mechanisms are used to enforce land use plans and zoning regulations?
Do you have any further comments? Thanks for your time	

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Moreover, I would also like to ask for your approval to record this interview for transcription.
Do you consent to recording of the interview and use of data collected for the purpose of this research?

[ ] Yes

[ ] No

Thank you very much.

Interview guide 6: Real estate academic, KNUST

Part1*:* Land use change

No	**Question** Note: If the interviewee has no specific experience about the chosen municipalities, general overview of the issues in peri-urban areas of Kumasi will suffice
1	How has land use changed in Kwabre East and Asokore Mampong municipalities between 2009-2019?
2	what are the main reasons for the change in land use?
Part 2: Land value change	
3	What were the land values in 2009 within the peri-urban areas for the following uses: a) Residential, b) Commercial, c) Industrial and d) Agriculture *If respondent has not mentioned sizes of land per value, then ask* :what were the average size of land for each value
4	What were the land values in 2019 within the peri-urban areas for the following uses a) Residential, b) Commercial, c) Industrial and d) Agriculture *If respondent has not mentioned sizes of land per value, then ask* :what were the average size of land for each value

5	In your opinion what factors have contributed to changes in land values in the peri-urban areas?
Part 3: Betterment charge	
6	Are betterments charges levied when land use is changed?
7	If no, why?
8	If not, what should be done to ensure the implementation of betterment charge due to land use change?
9	what is the criteria for levying betterment charge due to land use change?
10	What is the percentage rate used for levying betterment charge for the following uses: a) Residential, b) Commercial, c) Industrial and d) Agricultural?
11	How would you rate public awareness about payment of betterment charge to the Assembly? [ ] Low [ ] Very low [ ] Average [ ] High [ ] Very high Please elaborate.
12	Which mechanisms are used by the Assembly to enforce payment of betterment charges when land use is changed?
Part 4: Land use plans and regulations	
13	Are there plans(layouts) covering peri-urban areas?
14	If no, why?
15	how would you rate public awareness of the land use plans? [ ] Low [ ] Very low [ ] Average [ ] High [ ] Very high Please elaborate
16	Are the plans easily available to the public?
17	Does the plan outline regulations for protecting agricultural land, forests, woodlands, open spaces and wetlands from change to other uses?

18	How would you rate public awareness of the Zoning regulations aimed at protecting agricultural land, forests, woodlands, open spaces and wetlands from change to other uses? [ ] Low [ ] Very low [ ] Average [ ] Hig [ ] Very high Please elaborate
19	Do the public accept zoning regulation aimed at protecting agricultural land and nature from change to other uses?
20	Are the provisions of the land use plans and the regulations adhered to?
21	What mechanisms are used by the government to enforce provisions of land use plans and zoning regulations?
Do you have any further comments? Thanks for your time	

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Moreover, I would also like to ask for your approval to record this interview for transcription.
Do you consent to recording of the interview and use of data collected for the purpose of this research?
[ ] Yes
[ ] No
Thank you very much.

Interview guide 7: Residents

Name of Assembly:

Name of community/ neighbourhood:

Gender:

Years of residents in community:

No	Question
Part 1: Land use change	
1	Has there been conversion of land from agriculture, open spaces, forests, wetland or vegetated areas to urban use like residential, commercial, industrial use within your community/neighbourhood between 2009-2019?
2	What do you think is reason behind the change?
4	If yes, what are the main reasons for the change of agricultural land to urban use?
Part 2: Betterment charge	
5	Are you aware a fee called betterment charge paid to the Assembly when land use is changed say for example, from agriculture to a rental house? [ ] Yes [ ] No
6	If yes, how did you know about the betterment charge?
Part 2: Land use plans and zoning regulations	
7	Are you aware of land use plan (layout) for your neighbourhood/community? [ ] Yes [ ]No *(if No, please end the interview)*
8	If yes, have you ever requested a copy of the plan from the Assembly? [ ] Yes [ ]No
9	If yes, was the plans easily given to the you?
8	Does the plan outline measures for protecting agricultural land, forests, woodlands and wetlands from change to other uses? [ ] Yes [ ]No
9	If yes, mention examples of such measures?
10	Do you agree with the measures aimed at protecting agricultural land, forests, woodlands and wetlands from change to other uses?
11	In your opinion, do people obey provisions of the land use plans and the measures for protecting forests, woodlands and wetlands?
12	What mechanisms are used by the Assembly to ensure people obey provisions of land use plans and measures to protect agricultural land, forests, woodlands and wetlands?
Do you have any further comments? Thanks for your time	

Annex 2: Coding scheme

Project: Thesis analysis

Report created by Admin on 8/17/2020

Code Report

All (36) codes

- C. Green Landscapes
- C. Land Value Capture
- I.GL.PGL.Change. type of change
- I.GL.PGL.Change.rate of change
- I.GL.PGL.LUP. Presence
- I.GL.PGL.LUP. public access
- I.GL.PGL.LUP.Adherance
- I.GL.PGL.LUP.Awareness
- I.GL.PGL.regulations. Acceptance
- I.GL.PGL.regulations. Awarenness
- I.GL.PGL.regulations. enforcement expenditure
- I.GL.PGL.regulations. enforcement mechanism
- I.GL.PGL.regulations. presence
- I.LVC.BC. LUS.drivers of Change
- I.LVC.BC. LUS.land use types 2009
- I.LVC.BC. LUS.Land use types 2019
- I.LVC.BC.Land value. price in 2009
- I.LVC.BC.Land value. price in 2019
- I.LVC.BC.Revenues.Actual revenue
- I.LVC.BC.Revenues.collection rate
- I.LVC.BC.Revenues.criteria for levying betterment
- I.LVC.BC.Revenues.enforcement mechanisms
- I.LVC.BC.Revenues.Estimated revenue
- I.LVC.BC.Revenues.Rate per land use
- I.LVC.BC.Revenues.use of reveues
- I.LVC.BC.UBC.Apllicability
- I.LVC.BC.UBC.Awareness
- SV.GL.PGL.change of green landscapes
- SV.GL.PGL.land use plans
- SV.GL.PGL.Zoning regulations
- Sv.LVC.BC. Land use Change
- Sv.LVC.BC. Land value Change
- Sv.LVC.BC. Use of betterment charge
- Sv.LVC.BC.Revenues from betterment
- V.GL.Preservation of green landscapes
- V.LVC. Betterment charge

Annex3: Respondent Characteristics

Table 7:Respondent characteristics Kwabre East

Respondent	Designation	No .	Level of management/ expertise/no. residence years
Physical planner	Assistant physical planner	1	Middle
Land valuer	Regional Land Valuer	1	Senior
Public works officer	Head of public works	1	Senior
Finance officer	Head of finance	1	Senior
Real estate agent	Real estate agent	1	11 years' work in Kwabre East
Customary authority	Chiefs and	2	Custodian and decision maker on land.
	Family heads	2	Decision maker on land at family level
Residents	Males	2	while males had 11and 20 years' residency.
	Female	2	Female respondents had lived in study area for a period of 12 and 15 years
	Total	**13**	

Table 8: Respondent characteristics Asokore Mampong

Respondent	Designation	No.	Level of management/ expertise/no. residence years
Physical planner	Technical officer	1	Middle
Municipal planning	Head municipal planning	1	Senior
Land valuer	Regional Land Valuer	1	Senior
Public works officer	Head of public works	1	Senior
Finance officer	Head of municipal finance	1	Senior
Real estate agent	Formal real estate agent	1	14 years' work in Asokore Mampong
Family head	Family heads	2	Decision makers on land matters.
Residents	Males	2	Both males had 16 years' residency.
	Females	2	Female respondents had lived in the municipality for a period of 12 and 13 years while
	Total	**12**	
General respondents			
Academia	Land use change and real estate	2	Over 15 years research in land use change and real estate

Annex 4: Respondent codes

Table 9: Respondent Codes

Code	Respondent
Location1: Kwabre East	
R1	Assistant physical planner, kwabre East
R2	Finance officer, Kwabre East
R3	Regional land valuer, Kwabre East
R4	Head of public works, kwabre East
R5	Chief Mampongteng, Kwabre East
R6	Chief Fawoade, kwabre East
R7	Family Head1, Kwabre East
R8	Family Head1, Kwabre East
R9	Real estate agent, kwabre East
R10	Male resident1, kwabre East
R11	Male resident 2, kwabre East
R12	Female resident 1, kwabre East
R13	Female resident 2 kwabre East
Location 2: Asokore Mampong	
R14	Technical officer, physical planning Asokore Mampong
R15	Finance officer , Asokore Mampong
R16	Regional Land valuer, Asokore Mampong
R17	Head of public works, Asokore Mampong
R18	Municipal Planning Officer, Asokore Mampong

R19	Family Head1, Asokore Mampong
R20	Family Head1, Asokore Mampong
R21	Real estate agent, Asokore Mampong
R22	Male resident1, Asokore Mampong
R23	Male resident 2, Asokore Mampong
R24	Female resident 1, Asokore Mampong
R25	Female resident 2, Asokore Mampong
Academic experts	
R26	Academic, Land use change expert
R27	Academic , Real estate expert

Annex 5: Land Use Response frequency

Table 10: Response frequency for land use plans

Municipality	Indicator	Question	Respondent	Response	Frequency
Kwabre East:	Presence of land use plans	Presence of land use plans covering peri-urban areas	State officers, chiefs, family heads, real estate agent,	Yes	8
				No	0
				Total	**8**
	Level of Public awareness of land use plans	How would you rate the level of public awareness of land use plans	State officers, chiefs, family heads, real estate agent	Low	6
				Very low	0
				Average	1
				High	1
				Very high	0
				Total	**8**
		Are you aware of land use plans	Residents	Yes	3
				No	1
	Ease of public access to land use plans	Are land use plans easily accessible to the public	State officers, chiefs, family heads, real estate agent	Yes	8
				No	0
				Don't know	0
				Total	**8**
		Have you ever requested for a copy of land use plan from the Assembly and was the plan availed to you	Residents	Requested and plan availed	3
				Not requested/don't know	1
				Total	**4**
	Adherence to land use plans	Do people adhere to land use plans?	State officers, chiefs, family heads, real estate agent ,Residents	Yes	3
				No	7
				Don't know	2
				Total	**12**
Asokore Mampong:	Presence of land use plans	Presence of land use plans	State officers, family heads, real estate agent	Yes	7
				No	0
				Total	**7**
	Level of Public awareness of land use plans	How would you rate the level of public awareness of land use plans	State officers, family heads, real estate agent	Low	4
				Very low	1
				Average	0
				High	2
				Very high	0
				No response	1
				Total	**7**
			Residents	Yes	3

		Are you aware of land use plans		No	1
				Total	**4**
	Ease of public access to land use plans	Are land use plans easily accessible to the public	State officers, chiefs, family heads, real estate agent	Yes	7
				No	0
				Do not know	0
				Total	**7**
		Have you ever requested for a copy of land use plan from the Assembly and was the plan availed to you	Residents	Requested and plan availed	3
				Not requested	1
				Total	**4**
	Adherence to land use plans	Do people adhere to land use plans	State officers, chiefs, family heads, real estate agent, residents	Yes	5
				No	4
				Do not know	2
				Total	**11**

Annex 6: Zoning regulation response frequency

Table 11: Zoning regulations response frequencies

Municipality	Indicator	Question	Respondent	Response	Frequency
Kwabre East:		Does the land use plan outline green landscape preservation regulations?	State officers, chiefs, family heads, real estate agent,	Yes	8
	presence of regulations			No	0
				Total	**8**
	Level Public awareness of regulations	How would you rate the level of public awareness of the green landscape preservation regulations?	State officers, chiefs, family heads, real estate agent	Low	4
				Very low	1
				Average	2
				High	1
				Very high	0
				Total	**8**
		Are you awareness of green landscape preservation regulations? *Please give an example	Residents	Yes	1
				No	3
				Total	**4**
	Level of public acceptance	How would you rate the level of public acceptance of the green landscape preservation regulations	State officers, chiefs, family heads, real estate agent	Low	1
				Very low	5
				Average	1
				High	1
				Very high	0
				Total	**8**
		Do you agree with green landscape preservation regulations? *Please explain	Residents	Yes	1
				No	0
				can't tell/I don't know regulation	3
				Total	**4**
	Enforcement mechanisms	Which mechanisms are used by the Assembly to enforce zoning regulations in peri-urban areas	State officers, chiefs, family heads, real estate agent ,Residents	Issue notice	
				Refuse to grant development permission	
				Fines	

				Demolish buildings	
				All of the above	11
				No enforcement	1
				Total	**12**
	Expenditure on enforcement	On average how much does your office/municipality use to enforcement of zoning regulations per annum?	finance officer, Physical planner, works officer,	No specific amount it is demand based	1
				I can't tell, we request on demand	1
				No response	1
				Total	**3**
Asokore Mampong:	Presence of regulations	Does the land use plan outline green landscape preservation regulations?	State officers, chiefs, family heads, real estate agent,	Yes	7
				No	0
				Total	**7**
	Level of public awareness	How would you rate the level of public awareness of the green landscape preservation regulations	State officers, chiefs, family heads, real estate agent	Low	3
				Very low	1
				Average	2
				High	1
				Very high	0
				Total	**7**
		Are you awareness of green landscape preservation regulations? *Please give an example	Residents	Yes	1
				No	3
				Total	**4**
	Level Public acceptance	How would you rate the level of public acceptance of the green landscape preservation regulations	State officers, chiefs, family heads, real estate agent	Low	1
				Very low	6
				Average	0
				High	0
				Very high	0
				Total	**7**
		Do you agree with green landscape preservation regulations? *Please explain	Residents	Yes	1
				Can't tell	3
				Total	**4**
	Enforcement mechanisms	Which mechanisms are used by the Assembly to enforcement of zoning regulations in peri-urban areas	State officers, chiefs, family heads, real estate agent, residents	Issue notice	
				Refuse to grant development permission	
				Fines	
				Demolish buildings	0
				All of the above	11
				No enforcement	0
	Expenditure on enforcement			**Total**	**11**
		On average how much does your office use to enforcement of zoning regulations per annum?	Physical planner, works officer	Not captured in budget because it is not priority	1
				No response	2
				Total	**3**

Annex 7: Example of a layout plan

Note: some information has been erased for confidentiality purpose.