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Understanding the Link between Customary Land Governance and Land-use Changes of Green Spaces in Peri-urban Kumasi, Ghana

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Summary

Rapid urbanization in Africa has caused an increase in land demand and peri – urbanization. In Ghana, the growth of cities has engulfed surrounding green spaces in the peri-urban, undermining the ability of ecosystems to cope with natural disasters brought by climate change. Land – governance in Ghana has been inadequate in dealing with the loss of green spaces that have been caused by land-use change. The situation is complicated by the dual land tenure system, where customary land governance works side by side with statutory land planning.

The main objective of this research is to elucidate the effect of customary land governance in land-use change patterns of green spaces in peri-urban Kumasi, Ghana. In line with this, the study aims to explain customary perception, regulations, institutions, and processes at play in governing green areas of peri-urban Kumasi, Ghana.

The research aims to achieve the objective by answering the research question: "How does customary land governance affect land-use change patterns of green spaces in peri-urban Kumasi, Ghana?" Key concepts such as peri – urbanization, land – tenure, customary land tenure, green spaces, and land governance were reviewed, conceptualized, and operationalized.

The research utilized a qualitative case study to answer the research question. The peri-urban districts of Asokore Mampong and Kwabre East were selected due to proximity to Kumasi, the amount of greenery, population density, and land – size. The research data collection methods were purposive semi-structured interviews, secondary data analysis, photo documentation, field visits, and GIS analysis.

The findings indicate that customary processes and institutions have situated customary chiefs in a position without accountability to influence land-use change of green spaces directly. Moreover, customary chiefs commonly practice commissioning state actors and third – party surveyors to draft plans and initiate land-use changes of green spaces and customary land.

Recommendations for further research were made for the quantitative aspect of the study, exploring other drivers of land-use change of green spaces, and adopting the research on other peri-urban regions.

Keywords

Customary land tenure, land governance, green spaces, land-use change, peri-urban, Kumasi, Ghana

Acknowledgements

This study is my humble contribution to a better future where the next generations will have fresh air to breathe, clean water to drink, and a safe place to live.

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Finally, I dedicate this thesis to my Father, Alex; my brother, Joeven; and my dearest mother, Susan.

In Service to the People | Paglingkuran ang Sambayanan!

Abbreviations

IHS	Institute for Housing and Urban Development Studies
PBL	Netherlands Environmental Assessment Agency/Planbureau voor de Leefomgeving
CLT	Customary Land Tenure
CLI	Customary Land Institutions
LC	Land Commission
TCPD	Town and Country Planning Department
EPA	Environmental Protection Agency
LTR	Land Title Registry
OASL	Office Administrator of Stool Lands
KNUS	Kwame Nkrumah University of Science and Technology
LI	Legislative Instrument
BIRD	Bureau of Integrated Rural Development
LUC	Land-use Change
FGD	Focus-group Discussion
KMA	Kumasi Metropolitan Assembly
ES	Ecosystem Services
FAO	Food and Agricultural Organization
UN	United Nations
IPCC	Intergovernmental Panel on Climate Change
SDGs	Sustainable Development Goals
CFS	Committee of World Food Security
MEA	Millennium Ecosystem Assessment

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Chapter 1: Introduction

1.1 Background

Traditional forms of land tenure govern land in many parts of Africa. This system is a product of centuries of communal relations with family, tribes, and lineage entrenched in African communities (Wily, 2012). In Ghana, customary land tenure is legally recognized by the state through article 36(8) of the 1992 Ghanaian constitution. In this sense, the government of Ghana inculcates traditional law into the common law. The legality of customary land law resulted in a dual land tenure system (Ubink and Amanor, 2015). However, the dual land tenure system of Ghana has complicated land-use planning (Yeboah and Obeng-Odoom, 2010). Since most of the land in Ghana is customary land, traditional chiefs who manage these lands have a significant influence on spatial planning. For instance, Yaro (2010) claims that customary chiefs and elders frequently engage in land transactions outside planning laws. Moreover, traditional leaders try to circumvent planning policies and rules to accumulate profit from land commodification. According to Chigbu and Ansah (2020), these practices were due to the national liberalization of the Ghanaian economy. Traditional chiefs and families commission fraudulent surveyors to formulate spatial plans overpassing state planning bodies (Ubink and Amanor, 2015; Yeboah and Shaw, 2013). These customary land governance practices are standard in Ghana, complicating land governance in the country (Arko-Adjei, 2011).

According to the United Nations (2015), in 2050, 68% of the world population is expected to live in urban areas. Almost 90% of the increase occurs in countries of Asia and Africa. The overwhelming demand from people and urbanization can be associated with an increase in demand for land. The need for land is derived from the ground for agriculture, residential, services, industries, and other economic activities. However, the land is scarce regardless of the consistent surge of demand (Yeboah and Shaw, 2013). In Africa, continuous population increase has been consistently compromising the integrity of the environment and has been continuously creating informal settlements and urban sprawl. Growth of cities has engulfed surrounding green spaces, nature reserves, forest covers, flood plains, water resources, and public parks, undermining the ability of ecosystems to cope with the uncertainty and severity of natural disasters brought by climate change (Cobbinah et al., 2019; Yeboah and Shaw, 2013). However, climate change perturbations intensify already existing problems African cities face: underlying challenges such as air pollution, traffic congestion, fragmentation of green spaces, and heatwaves, which have been afflicting urban ecosystems in the 21st century (Zuniga-Teran et al., 2020). These challenges pose a danger to humans, and the environment compromising the many ecosystem services it provides. In this context, the study intends to review the land-use change of green spaces patterns in the urbanization process of peri-urban Kumasi, Ghana.

1.2 Problem Statement

Ghana is an emerging economy and one of the 21 countries in Africa with more urban dwellers than the rural, exhibiting the global urbanization trend (Obeng-Odom, 2014). In 1921, Ghana had a population of 2,298,000 people; and in 2020, the population of Ghana is expected to be more than 30 million people (United Nations, Department of Economic and Social Affairs, 2018). Thus, the people of the country are expected to increase more than fifteen times in 91 years. Likewise, aside from the total population increase, Ghana has been experiencing rapid urbanization at an alarming rate. In the same census of 1921, the urban population has risen from eight percent of urban dwellers to 57.3 percent in 2020, classifying Ghana from a rural

society to an urban country (Government of Ghana, 2010; United Nations, Department of Economic and Social Affairs, 2018). Rapid urbanization necessitates effective and efficient management of land and protection of green spaces, some of the land-use planning functions. However, land-use planning in Ghana is often complicated by customary or indigenous institutions that hold unilateral power over land (Boamah and Amoako, 2019). A significant portion of these lands is unfarmed forests, grasslands, wetlands collectively owned through customary tenure (Wily, 2012). Almost 80% of all Ghana lands are customary lands governed by an appointed traditional leader, usually a chief or an elder. Customary actors manage land-use through customary rules, norms, and practices passed down across generations and are the primary source of land for development (Arko-Adjei, 2011; Yeboah and Obeng-Odoom, 2010; Yeboah and Shaw, 2013).

As urbanization moves towards peri-urban areas, the ambiguity between statutory and customary land tenure intensifies and causes conflicts. In the urban fringe and peri-urban areas, African cities are viciously extending and multiplying because of an increase in land-use change of green spaces accompanied by other land disputes (Ubink and Amanor, 2015). Land-use change of green spaces has been one of the leading causes of green spaces depletion in Africa (Adjei Mensah, 2014). Essential environmental resources and services derived from them have been degrading at an alarming rate (Cobbinah et al., 2019). The Intergovernmental Panel on Climate Change or IPCC (2014) reports that further land-use change will amplify the existing social and environmental challenges in peri-urban areas and the impacts of climate change by magnifying these challenges to food insecurity, desertification, and land degradation, among others.

Moreover, customary structures are overwhelmed by increasing population density, resulting in breaking down of accountability among land custodians. In such instances, the traditional authorities act as landlords who sell lands as their private property (Berry, 2009). Further, Wily (2012) claims that customary tenure is most eminent in peri-urban and rural areas, significantly influencing land tenure arrangements and land-use decisions. Thus, customary land governance plays a vital role in the sustainable management of green spaces amidst urbanization. To date, land delivery in peri-urban areas is still governed by customary tenure arrangements. Yet, customary institutions have not been able to cope with the number, rate, and complexity of land management problems in the peri-urban (Arko-Adjei et al., 2010). Therefore, land governance in customary land tenure demands critical analysis, especially customary regulations, processes and institutions. A clear understanding of customary land governance will provide a framework in dealing with the many problems of customary land tenure (Arko-Adjei et al., 2010; Arko-Adjei, 2011).

1.3 Relevance of Research Topic

Several researchers have identified that the dominance of customary land ownership and customary land tenure practices have been an influencing factor of land-use changes (Marfo et al., 2012). Moreover, empirical evidence shows that traditional chiefs and actors respond to the increasing land demand by facilitating the conversion of less economically worthwhile lands to more profitable land uses. Most of the time, the process of land-use allocation and transformation are carried illegitimately through the assistance of third-party surveyors or planners or sometimes in tandem with state authorities (Boamah, E. F. and Amoako, 2020; Yeboah and Shaw, 2013). Furthermore, much of the studies in customary land governance are skewed on social impacts (social exclusion and formation of informal settlements) and economic effects (loss of livelihood and market failures) of customary land tenure schemes to

land-use planning and land-use change (Boamah, E. F. and Amoako, 2020; Marfo et al., 2012). However, a lack of literature exists in analyzing the role of the customary land tenure system, specifically between customary land governance in the land-use change of green spaces and vegetation in Ghana and Africa.

The study also contributes to the need to investigate peri-urbanization in the global south, as suggested by La Rosa, et. al (2017). Lastly, the research is part of a broader research project of PBL Netherlands Environmental Assessment Agency to understand better-existing land-use change drivers and dynamics in peri-urban Kumasi, Ghana, and eventually, identify strategies and scenarios for inclusive green growth in the Kumasi landscape in Ghana.

1.4 Research Objectives

The main objective of this research is to elucidate the effect of customary land governance in land-use change patterns of green spaces in peri-urban Kumasi, Ghana. In line with this, the study aims to explain customary perception, regulations, institutions, and processes at play in governing green areas of peri-urban Kumasi, Ghana. Another purpose of the study is to contribute to the growing body of research regarding global south peri-urbanization and green spaces.

1.5 Main research question and research sub-questions

Main Research Questions: How does customary land governance affect land-use change patterns of green spaces in peri-urban Kumasi, Ghana?

Sub-questions:

- What is the land-use change pattern of green spaces in peri-urban Kumasi, Ghana?
- What is the relationship between perceptions of principal customary land actors to green space land-use changes in peri-urban Kumasi, Ghana?
- What are the existing customary regulations that affect the land-use change of green spaces in peri-urban Kumasi, Ghana?
- What are the customary processes in customary land governance that affect the land-use change of green spaces in peri-urban Kumasi, Ghana?
- What are the customary land institutions that affect the land-use change of green spaces in peri-urban Kumasi, Ghana?

Chapter 2: Literature and Theory Review

In this chapter, concepts and terms will be demarcated. Theories and case studies will also be examined to build on the conceptual framework of the study. In section 2.1, peri-urbanization will be contextualized. Then, in Section 2.2, land tenure focusing on customary land tenure, dual land tenure, and existing challenges are analyzed in the context of Ghana. Next, in Section 2.3, the relationship of customary land tenure with peri-urbanization will be investigated and specific examples are discussed. Section 2.4 looks at the interlinkages of peri-urbanization, green spaces, and customary land tenure. It includes how land-use changes of green spaces are affected by perception stakeholders on green spaces. Finally, in Section 2.5, the concept of land governance will be defined and unpacked into regulations, processes, and institutions.

2.1 The Peri-urban and Peri-urbanization in Context

Researchers have considered peri urbanization and peri-urban areas as diverse and complex concepts. Therefore, ambiguity in the definition of peri-urban exists across the literature (Ravetz et al., 2013). Chigbu and Ansah (2020) mentioned that the term peri-urban is a place, process, or concept. As a place, the peri-urban is the zone in-between urban and rural areas; as a process, the peri-urban is a gradual transformation of rural and traditional communities to acquire more urban characteristics; and as a concept, the peri-urban is when urban and rural activities meet (Chigbu and Ansah, 2020; Iaquinta and Drescher, 2000; Narain and Nischal, 2007). Additionally, different disciplines have described peri-urbanization. For instance, sociologists distinguish peri-urban as zones of conflict and social growth where social evolution manifests in rural and traditional communities bounded by homogenous belief systems (Iaquinta and Drescher, 2000). Ecologists view peri-urban as a diverse assemblage of natural and urban ecosystems perpetuated by urban and rural interactions (Allen, 2003). Urban planners conceptualize peri-urban as a transition zone, principally urban, existing between urban areas and rural areas (Piorr et al., 2011). In urban research and planning policy, a geographical definition is prioritized. However, Ianquinta and Drescher (2000) argue that socio-economic and institutional aspects should also be incorporated to portray the peri urban reality.

On the other hand, Ravetz et al. (2013) suggest that peri-urban is a spatial process in constant transition. This perspective deals with conflicting views and situations in defining peri-urban areas. This research will adopt the definition of peri-urban as an area of "customary land transition into urban lands" (Chigbu and Ansah, 2020 p. 3). Researchers used this definition in examining customary land governance in the context of peri-urban, Ghana (Chigbu and Ansah, 2020; Kasanga, R. K. et al., 1996). Although peri-urbanization is present globally, the nature of peri-urbanization varies in each country (Chigbu and Ansah, 2020). Some scholars have associated physical environmental degradation and cultural deterioration to peri-urbanization, while others have linked it with socio-economic growth (Barau, 2017; Iaquinta and Drescher, 2000; Satterthwaite et al., 2010). The difference in peri-urbanization is also present in developed countries and developing countries. Chirisa (2010) posits that in most developed countries, peri-urbanization is preceded by industrial development. In developing countries, the process has led to urban sprawl, compromising both physical planning and the natural environment. In Ghana, most of the peri-urban areas are customary lands. As such, traditional authorities have managed peri-urban areas, with limited involvement from state actors (Chigbu and Ansah, 2020).

2.2 Understanding Land Tenure

It is essential to define 'land tenure' in examining the relationship between customary land tenure and peri-urbanization. The Food and Agriculture Organization (2020 p. 1) describes land tenure as the rules created by society to regulate human-land relations. In this aspect, "land" means natural resources such as vegetation and water, and the "rules of tenure" state how members of society are granted property rights such as rights to use, transfer land, control, and the limits and responsibilities accompanies it (Chigbu and Ansah, 2020; Food and Agriculture Organization, 2020). Land tenure has been essential in socio-economic, political, and institutional decision-making and has been implemented in law or by customary institutions of a community (Food and Agriculture Organization, 2002; Hughes et al., 2019). Globally, land tenure systems were formed from formal written rules or customary laws. In this lens, Payne (2004 p. 169) states that previous researches on land tenure were categorized either as "formal" or "informal." Legal property rights are legally recognized by the state; while informal property rights are devoid of legal recognition or violate the law.

However, such broad categorization falls short in describing the complexity of land tenure, specifically in cases where formal and informal is ambiguous (Food and Agriculture Organization, 2002). For example, in countries that outlaw leasing, a landowner can illegally lease out land to a tenant, creating formal and informal rights within the same plot of land. In this case, the landowner has legal ownership while the tenant has illegal use on the same land. In some countries where state ownership is granted through the law, leases can be made unilaterally by the state without the consent of customary landowners. These complicated cases are challenging to be analyzed by merely using the lens of formal-informal dichotomy.

In response to this complexity, the Food and Agriculture Organization (2002) categorized land tenure into four types: private, communal, open access, and state. Private land tenure entails exclusive allocation of rights to private entities: individual families, parties, or organizations. This includes the exclusion of other community members to use the land without the consent of those who hold the rights. Communal refers to the right of each member of the community to use a common land or common areas. Open access is areas where no one can be excluded, and explicit rights have not been set. Open access differs from communal as non-members of the community are banned from using the land in the latter. Lastly, state or public tenure refers to property rights allocated to a public authority. Most types of property rights can be present in a community. For example, in a community, there can be private ownership of residential settlements, common cropping rights, state ownership of the forest, and open access to rivers.

Land tenure can also be considered "extra-legal," which is land that is not illegal but also not recognized by the law; an example of this is customary land tenure. Wily (2012 p. 3) defines customary or indigenous land tenure as a "major tenure system on a worldwide scale." It is prevalent in Asia and Africa and governing rural commons of Italy, Portugal, Space, Switzerland, and even in indigenous minorities in Oceania, Europe, and North America (Wily, 2012). Customary land tenure is a type of communal tenure which denotes collective security and exclusivity of an enforceable bundle of rights to members of customary groups or tribes (Andersen, 2011). Further, customary groups have collective rights of ownership, management, possession, access, regulate the use, and transfer land and nature (Andersen, 2011; Wily, 2012). Customary tenure is governed by customary laws that community members are obliged to abide by (Wily, 2012). Usually, the customary lands are vested to the customary leaders or state authorities "in trust" for the community members (Food and Agriculture Organization, 2002 p . 9).

Nevertheless, extra-legal land tenure has been decreasing where customary tenure is recognized in their constitutions, laws, or statutes (Andersen, 2011; Wily, 2012). In these

countries, customary tenure exists with state tenure (Andersen, 2011). Thus, the management of land is sometimes shared by customary and state actors. This arrangement usually complicates land governance and create complex issues related to urbanization and peri-urbanization.

2.2.1 Understanding the Customary Land Tenure in Ghana

In Africa, urban planning is riddled with colonial history and traditional norms. During the colonial era, the inception of the legal land system amidst the existing customary tenure created what is now recognized as a dual land tenure in Africa (Agbosu, 2000; Wily, 2012). The dual land tenure system presents a dichotomy between customary and statutory interests in land, a matrix of informal-formal processes on land ownership, use, and transaction (Boamah and Walker, 2017). This dual planning tenure system created multiple issues in African cities. For instance, the ambiguous extent of the power of customary chiefs and customary landowners have been a source of local land disputes and informal negotiations (Ubink, 2010; Ubink and Amanor, 2015). Such conflicts are common in Ghana, where local chiefs have acted as outright landowners. This is despite customary law declaring chiefs as custodians of land in trust of their families or community members (Ubink, 2010).

Ghana has a pluralistic tenure system composed of statutory and customary laws (Arko-Adjei, 2011; Boamah, E. F. and Amoako, 2020; Hughes et al., 2019). The Constitution of Ghana recognizes customary institutions known as "stools" or "skins" as custodians of customary lands or "communal lands" in trust for their communities. Customary land tenure is the primary form of landholding which provides residential, agricultural, commercial, and other activities to most Ghanaians (Kasanga, K. and Kotey, 2001; Wily, 2012). The land has been an essential part of the lineage, beliefs, language of Ghanaians. Historically, customary land ownership has been acquired through long-term settlement, conquest, consequent settlement, a gift from a customary authority or traditional group, or a purchase from another traditional group or authority. Customary lands also symbolize community heritage, and for community members, its ownership extends not only to the living but also the deceased ancestors and future generations (Arko-Adjei, 2011; Hughes et al., 2019).

In at least 100 distinct ethnolinguistic clans and groups, customary land tenure in Ghana is divided into two broad categories: chiefdoms and clans. Chiefdoms are landholdings in trust to chiefs or council of elders based on their jurisdiction. The chiefs and council of elders manage customary lands on behalf of their communities. Moreover, a series of customary arrangements, rules, and norms set between members of the customary community govern access to customary land. Chiefdoms are common in Southern Ghana, mainly among Akans (Arko-Adjei et al., 2010). The latter category is stools. In this case, land ownership is vested collectively in clans where customary lands have been inherited from a common ancestor. In some cases, land ownership resides in "tindamas" or land priests responsible for land allocation, conflict resolution, and performance of rituals (Aryeetey, 2007). Stools are commonly present among northern, non-Akan communities such as Ga Adangme and the Anlo clans (Arko-Adjei et al., 2010).

In customary land tenure, the community has all forms of land rights, including building, farming, hunting; sometimes, these rights can overlap (Arko-Adjei, 2011). For instance, Hughes et al. (2019) explain that a customary member may have exclusive right to cultivate a swathe of the land and share the right to use or sell trees within the same land with other customary members. Land rights can also be acquired through informal market transactions in

the customary land tenure system. However, titling, registration, building permitting, and other formal transactions are processed through statutory land processes (Arko-Adjei et al., 2010).

2.2.2 Navigating the Dual Land Tenure in Ghana

Aside from customary land tenure, legal or formal land tenure exist in Ghana. The presence of two land tenure system creates land planning problems which have persisted in Ghana for decades. Despite several reforms, the dual land tenure dichotomy has been amplified by the vagueness in land and planning laws. In these laws, both customary and statutory authorities are delegated with often unclear yet prevailing authority on land ownership and land-use decisions. This overlapping authority usually leads to local land disputes (Boamah and Walker, 2017; Hammond et al., 2006; Ubink, 2010).

Within the dual land tenure system, customary and statutory actors have multiple actors and bodies involved in land ownership and land management decisions and procedures. The framework of the dual land tenure system is based on a) numerous laws, namely: 1962 Land Registry Act (Act 122), 1965 Land Registry Regulations (L.I. 439), 1986 Land Title Registration Act (PNDCL 152) and Land Registration Regulations (L.I. 1341), 1992 Constitution of Ghana, 1993 Local Government Act (Act 462), 1994 National Development Planning Systems Act (Act 480), 1996 National Building Regulations (L.I. 1630), 2008 Chieftaincy Act (Act 759), 2016 Land Use and Spatial Planning Act, (Act 925), 2018 Ghana Building Code (GS 1207); b) policy frameworks, and c) local government bylaws (Arko-Adjei, 2011; Boamah and Walker, 2017; Boamah, E. F. and Amoako, 2020; Government of Ghana, 2010). Through multiple laws, frameworks and bylaws were created to streamline the dual planning system that produced an array of interlinkages within the dual land tenure system, as exhibited in the figure below.

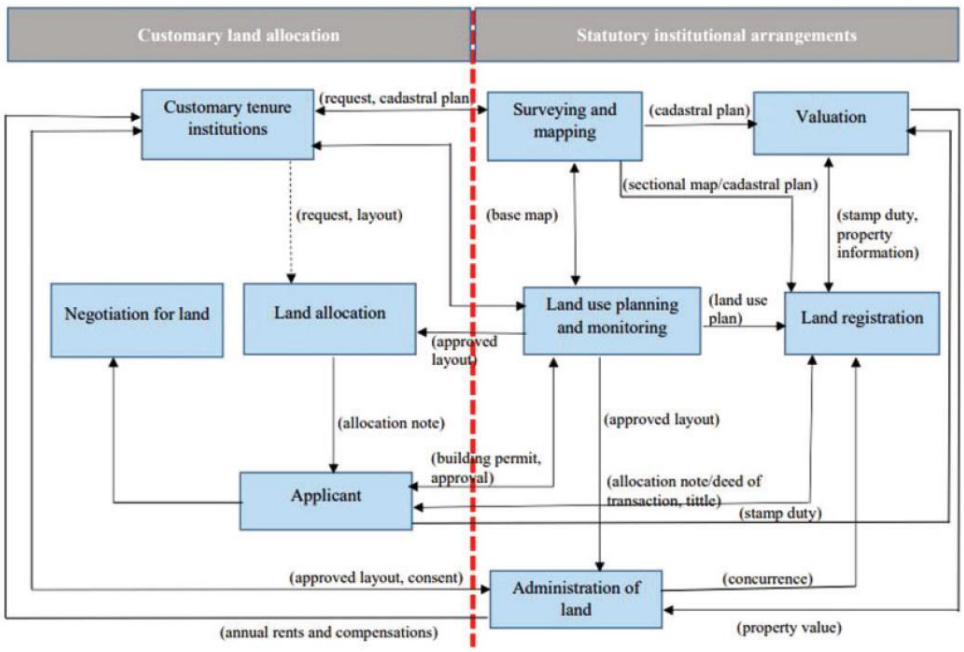


Figure 1. Interrelationship of landownership and land-use processes within customary and statutory tenure systems (Arko-Adjei, 2011)

Legal pluralism shapes the dual land tenure system. Amanor (2008) suggests that statutory and customary laws on land have influenced land ownership in Ghana, illustrated in Figure 1. The dual land tenure landscape exists across different land development stages in Ghana: from land

acquisition to final development of land. According to Boamah and Amoako (2020), there are at least four different land ownership paths, which illustrates the complicated land-use, land ownership, and procedures in Ghana. These pathways are expressed in Figure 2 below.

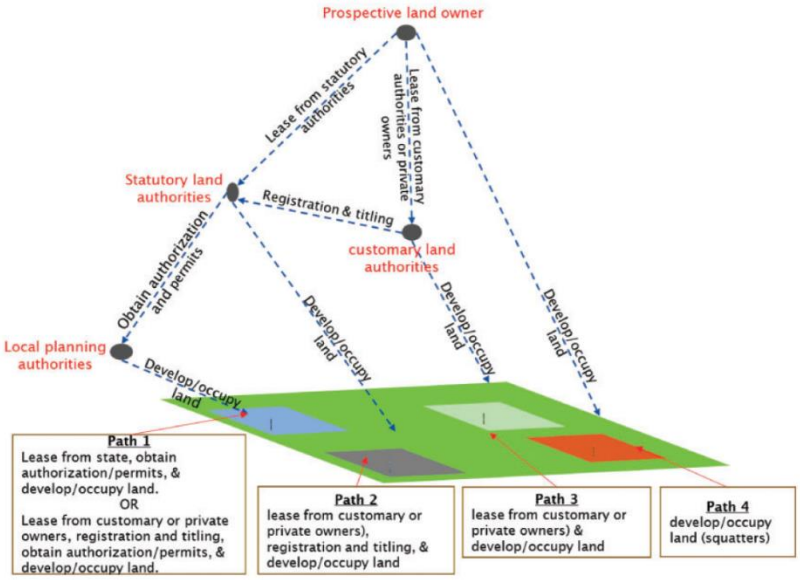


Figure 2. Different paths to acquiring land rights and ownership within Ghana's dual planning system (Boamah, E. F. and Amoako, 2020).

Path one starts from either land lease from a customary or private landowner, statutory land registration, acquisition of permits and authorization for land development from local state planning authorities and start of land development consistent with building and zoning regulations. The same potential landowner can lease land from the government instead, which entails subsequent land registration and titling for the landowner, then procurement of permits and authorization from local state planning office, and lastly, develop the land. Path two starts with a land lease transaction from a private or customary landowner, land titling and registration, then developing land without local government authorization and permitting. The third path is to obtain land from a customary or private landowner and immediately develop the land without official permit and approval from the state. Lastly, the last path is to occupy land and illegally develop it without a) satisfying from statutory and customary land laws, b) statutory land registration, and c) land development according to formal land laws. Path one is called the ideal or "legal" path to land ownership, while the other three courses are considered "illegal" paths (Boamah, E. F. and Amoako, 2020 p. 100). It is essential to point out there may be other pathways not included in the matrix. The function of the illustration is to exhibit multiple paths, processes, and procedures that allow different stakeholders to legally or illegally acquire land rights and land ownership within the dual tenure system in Ghana (Arko-Adjei, 2011; Boamah, E. F. and Amoako, 2020; Ubink and Amanor, 2015).

2.2.3 "Misrule" of Customary and Statutory Land Laws

Ambiguous and contrasting customary and statutory law has created challenges in the land governance in Ghana. Hughes et al. (2019) state that the laws and government regulations have been unclear in clarifying the rights of customary authorities in the transaction of customary lands. At the same time, authority of state actors alongside the customary authorities in land governance have been unclear (Arko-Adjei, 2011; Boamah, E. F. and Amoako, 2020; Hughes

et al., 2019). The state has initiated efforts to restructure and streamline land ownership and land-use processes through the enactment of the State Land Acts, National Land Policy, and Chieftaincy Act. The laws were followed by a series of land reform projects, such as the Land Administration Project, Land Use Planning and Management Project, Ascertainment of Customary Law Project, and National Urban Policy Framework (Boamah, E. F. and Amoako, 2020; Ubink, 2010). Unfortunately, these land governance policies and projects could not create the necessary effect of reconciling the customary land tenure system within the statutory land planning system (Boamah, E. F. and Amoako, 2020). Historically, some laws have contradicted other laws and, sometimes, even the Ghanian constitution. For instance, in the Chieftaincy Act of 2008, the right to sell or alienate the customary land is allowed upon approval of the traditional council. This is an apparent contradiction to the vested role of customary chiefs as land custodians in the constitution and creates a precedence of freehold interest (Hughes et al., 2019; Sarpong, 2006). The land tenure reform analysis does not extend to the recent Land Use and Spatial Planning Act (Act 925) in 2016. As explained by Boamah and Amoako (2020), the effect of the law is yet to be felt fully being a recently implemented policy.

Thus, misinterpretation of laws, illegal transactions, and conflicts between and of customary authorities and formal institutions continue to persist (Arko-Adjei, 2011; Boamah, E. F. and Amoako, 2020; Ubink and Amanor, 2015). The customary authorities owning most lands now finds themselves wrestling with the formal state planning institutions who decide how and what land will be used. The product is a tug-of-war of two planning systems in post-colonial Ghana. As a result, Dowuona-Hammond (2003) reports that 40% of cases filed in Ghana state courts are related to land disputes. These issues are intensified in the urban fringe and peri-urban areas where African cities are viciously extending and multiplying (Ubink and Amanor, 2015).

Boamah and Amoako (2020 p. 102) state that land governance and implementation of laws can be "misused" by customary and statutory actors in the dual land tenure system due to legal pluralism and vagueness of existing land policies. In summary, both state and customary authorities have a) misuse both state and customary land governance laws (full misuse), b) misuse either state or customary laws (partial misuse), and c) properly use or comply with both state and customary land governance laws (rule of laws).

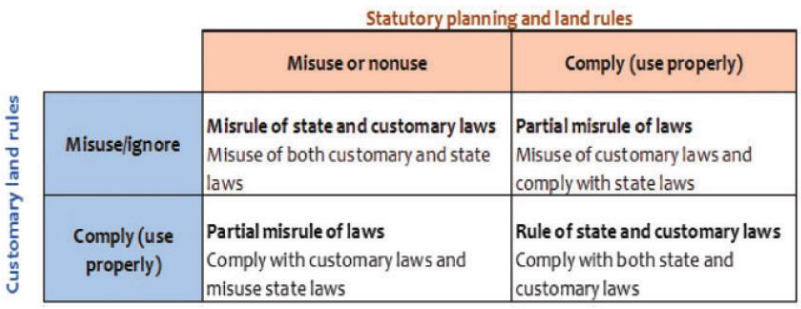


Figure 3. Conceptual Matrix of dual land tenure system "misuse" by statutory and customary authorities (Boamah, E. F. and Amoako, 2020).

The matrix illustrates different ways that both state and customary actors misuse land governance laws. The first type, full misuse: the state and customary authorities both misuse the formal state policies and customary laws by transacting within and outside the bounds of these laws. The second type, partial misuse, manifests in two ways: a) statutory land governance misuse, where state authorities enforce eminent domain, public lease transfer to private developers, informal land transactions, and refusal of compensation to public land

acquisition; and b) customary land governance misuse, where customary authorities illegally negotiate with state and potential landowners, leasing of customary land to multiple owners (double-dipping), and leasing of public land to private developers. Finally, the third type, the rule of law: both state and customary authorities comply with dual land tenure system laws and policies (Boamah, E. F. and Amoako, 2020). The activities and arrangements of state and customary heads have shaped the dual land tenure system and dictated urbanization and peri-urbanization in Ghana.

The framework presented from existing evidence suggests that analysis should extend from simply prescribing stricter or proper implementation of laws. External factors that influence implementation such as the dual nature of existing land and planning laws, and misuse of the same laws by both customary and state actors are some of the factors that (Arko-Adjei et al., 2010; Boamah, E. F. and Amoako, 2020; Hughes et al., 2019) point out to be an important area that needs more attention in land governance of Ghana to increase land tenure security.

2.3 The Dynamics of Customary Land Tenure and Peri-urbanization

Food and Agricultural Organization (2012) has considered issues of land tenure a global concern. In May 2012, the "Voluntary Guidelines on the Governance of Tenure of Land, Fisheries, and Forests" was initiated by the Committee of World Food Security (CFS) at the Global Food Security Symposium. The guidelines provided an outline of tenure conditions that ensure equitable access to land for all. Moreover, the Sustainable Development Goals (SDGs) include reducing poverty and achieving sustainable development by securing land tenure systems, which was adopted in 2015 at the U.N. Sustainable Development Summit (United Nations, 2016). International attention towards ensuring land tenure security has been explicitly highlighted in Global South countries like Ghana.

In Ghana, most peri-urban land is customary tenure; therefore, customary land is at the center of peri-urbanization. Changes in land tenure is present in peri-urbanization (Chigbu and Ansah, 2020). In this sense, a transition of rural areas into peri-urban areas corresponds to the transformation of land tenure. Iaquinta and Drescher (2000) and Chigbu and Ansah (2020) add that peri-urbanization is a reciprocal process, where changes in peri-urban cause change in land tenure, and vice versa.

In the peri-urban areas where customary land tenure is prevalent, a shift from collective ownership to individual rights occurs. Mends (2006) note that the concept of customary land rights has evolved from joint ownership of the community to private ownership of the custodians (traditional authorities) of the land. This effectively transforms a communal or communitarian nature of customary land tenure into individualization. Wehrmann (2008) suggests that such privatization happens gradually in the form of tenure insecurity, land disputes, and contestations. Consequently, Akor-Adjei (2011) states that less security of tenure and an increase in land disputes accounts for most land cases in Ghana.

Mahama and Dixon (2006) claim that common issues in access to land and security of tenure are loss of rights, involuntary eviction, divorce, and exclusion as a product of intercultural marriages, which may cause their children to lose their inheritance rights. On the other hand, access to land for migrants and tenants was difficult as land values increase due to increasing demand and competition (Obeng-Odom, 2014). Responsible land administration has been the role of customary leaders on behalf of the community. However, as customary rules and laws are being manipulated, accountability of chiefs has diminished (Obeng-Odom, 2014). Some customary leaders act as landowners of large swathes of customary areas and pursue their

economic interests in land transactions without consent from the community members (Obeng-Odom, 2014; Ubink and Amanor, 2015).

Further, Chauveau and Colin (2010) observed that customary tenure responds to changes based on the diversity of socio-cultural conditions and the economic state of the area. Deininger et.al, (2014) found that customary land tenure is pressured by increasing population density, growing land demand from private developers, and subsequent increase in land values. Ghanian newspapers have recorded several accounts of customary chiefs isolating communal land within their jurisdiction to make way for urban growth, private lease to investors and outsiders, conversion of agricultural plots to residential areas. These actions lead to chiefs being accused of accruing economic gains from land transactions often without consultation to community members, leading to dispossession land from vulnerable and poor community members (Deininger et al., 2014; Ubink and Amanor, 2015). Chauveau and Colin (2010) suggest that government action is necessary to manage peri-urban land when customary land governance has eroded. In some instances, customary tenure remains resilient despite external pressure. Traditional authorities in these areas have maintained customary land governance (Deininger et al., 2014).

2.4 Peri-urbanization, Green Spaces, and Customary Land Tenure

An essential feature of peri-urban areas is significant green spaces that yield ecosystem services such as food production, recreation, water provision, and biodiversity (La Rosa et al., 2017). However, these green spaces are either privatized or reduced because of pressure from housing, agriculture, and other land development projects. As a result, current inhabitants are being displaced, consequently converting swathes of forests, grasslands, woodlands, and different ecosystems (Barau, 2017).

The work on analyzing the relationship between peri-urbanization and the environment has developed in the past decades. Cobbinah et al. (2019) explain that the awareness of environmental degradation posed by urbanization has been acknowledged widely globally, specifically in the global south. At the turn of the 20th century, there has been a worldwide demand for achieving sustainable cities. Recently, one of the Sustainable Development Goals (SDG): Target 7 of Goal 11, forwarded by United Nations aims to “provide universal access to safe, inclusive and accessible green and public spaces” by 2030, consistently highlighting the need for green spaces in urban areas (United Nations, 2016).

The formal use of green space can be traced back to the European urban nature conservation movement and green space planning that originated in the United Kingdom (Swanwick et al., 2003). Adjah-Mensah (2014) states that green spaces are used interchangeably with other urban planning terms such as open spaces and public open spaces. Initially, European planners would define green space to underpin all naturally or artificially covered areas with vegetation, which includes trees, shrubs, and grasses (Fam et al., 2008; Fratini and Marone, 2011). Besides, green spaces are a physical manifestation of the garden city movement, including green belts, green fingers, and greenways (Adjei Mensah, 2014). The concept of green spaces has yet to be established in the global south, which has resulted in the limited interpretation of green spaces in developing countries. Regardless, Fuwape and Onyekwelu (2011) identified green spaces in the context of Africa, which are areas with a significant amount of vegetation such as parks, plantations, gardens, green belts, woodlands, rangeland, and forests close to urban areas.

The importance of green spaces has grown steadily in the past decades. In the late 19th century to the early 2000s, ecosystems services were used as a term to describe the myriad of benefits received from green spaces and of valuing the fundamental ecosystem processes and systems at offer these benefits (Deal et al., 2017; Kline, 2006; Reid et al., 2005). The term “ecosystem

services" was coined to depict the collective natural products and processes provided by nature to society (Deal et al., 2017). The concept emerged in the 1960s and 1970s. Ehrlich and Ehrlich (1981) used to gather support for sustainable development initiatives. In 2005, the term achieved international recognition when ecosystem services were defined at the Millenium Ecosystem Assessment as "the benefits people obtain from ecosystems," and developing it into four categories: provisioning, regulating, supporting and cultural ecosystem services (Reid et al., 2005 p. 2). The four types with the corresponding definitions are illustrated in Table 1.

<table>
<tr><th colspan="2">Ecosystem Services</th></tr>
<tr><td rowspan="3">Supporting Services
Nutrient Cycling
Soil Formation
Primary Production</td><td>Provisioning Services
Food (crops, livestock, wild foods, etc..)
Fiber (timber, cotton, hemp/silk, wood fuel)
Genetic Resources
Biochemicals, natural medicines, pharmaceuticals
Freshwater</td></tr>
<tr><td>Regulating Services
Air quality regulation
Climate Regulation
Water Regulation
Erosion Regulation
Water Purification and waste treatment
Disease Regulation
Pest regulation
Pollination
Natural Hazard Regulation</td></tr>
<tr><td>Cultural Services
Aesthetic Values
Spiritual and religious beliefs
Recreation and ecotourism</td></tr>
</table>

Table 1. Ecosystem Services Framework adopted from The Millennium Ecosystem Assessment (Reid et al., 2005)

In contemporary planning, urban planning and land management have adopted the concept of ecosystem services. The U.S. Department of Agriculture (2014) defines ecosystem services based on MEA's definition of benefits acquired from ecosystems, namely:

A. Provisioning services: clean air, fresh water, energy fuel, forage, fiber, and minerals
B. Regulating services: long-term carbon storage, climate regulation, water filtration, purification, and storage, flood control, disease regulation, and soil stabilization
C. Supporting services: pollination, seed dispersal, soil formation, and nutrient cycling
D. Cultural services: aesthetic, spiritual, and cultural heritage, values and educational, recreational and tourism

The ecosystem services approach has helped identify the value of benefits people receive from green spaces and nature while explaining the underlying ecosystem functions and processes (Carpenter et al., 2006; Fisher and Kerry Turner, 2008). Ecosystem services are also called "natural capital, " where land is deemed natural assets by landowners and land managers. Natural capital also means high costs to the subsidiary community, relying on these ecosystem functions and processes if these landscapes are lost (Collins and Larry, 2007; Deal et al., 2017; Kline, 2006). Ecosystem services have been globally and locally recognized by government bodies, private corporations, and financial institutions as essential concepts in land management and decision-making (Deal et al., 2017; Patil, 2012; Waage and Kester, 2014).

2.4.1 Land-use Change of Green Spaces

As the world faces the devastating impacts of climate change such as flooding, widespread diseases, increasing temperature, and drought, to name a few, the need to preserve and create green spaces have been vital now more than ever (Cobbinah et al., 2019). Unfortunately, recent statistics show that green spaces have been depleting at an unprecedented rate worldwide (Adjei Mensah, 2014). Cobbinah et al. (2019) indicate that environmental resources such as open spaces, nature reserves, flood plains, water resources, and public parks are at risk of pollution and degradation at an alarming rate.

The process of green space depletion and land degradation is usually driven by land-use change (Lambin and Meyfroidt, 2010). Kleeman et al. (2017) explain that land use refers to specific management activity on land and differs from land cover related to the vegetative and physical land surface. The process of altering an existing land-use is called land-use change (Turner II and Meyer, 1994). In Africa, researchers indicate that interrelated direct and indirect factors drive land-use change. Whereas direct factors impose an apparent effect on land surface and indirect factors (national policies, market) are underlying direct factors. Aspects of land-use change are also clustered into anthropogenic (cultural, social, economic, political, technological), and biophysical factors (Díaz et al., 2015). Understanding relevant driving forces and their effect on green spaces contributes to better policymaking and governance decision in dealing with peri-urbanization (Larigauderie and Mooney, 2010).

The Intergovernmental Panel on Climate Change (IPCC) has emphasized the urgency to halt and reverse the excessive exploitation of green spaces and other land resources to mitigate climate change. Further, a land-use change driven by population growth, which entails increasing stress on ecosystem services, is projected to amplify existing environmental (pollution, depletion of green spaces) and social challenges (rapid urbanization, lack of equitable access to land and resources). IPCC reports that climate change will augment these challenges through direct and harmful interference on ecosystem services, causing food and water insecurity, desertification, and land degradation.

2.4.2 Perception of Green Spaces

Vargas-Hernandez et al. (2018) report that green space decisions and uses are significantly affected by users' perceptions. Likewise, the perception of the value of green spaces has been seen to affect the level of sustainability of management and the use of green spaces. Fongar et al. (2019) describes the perception of green spaces as a personal impression on the quality of green spaces. This relies on the respondent’s judgment of quality and not of prescribed indicators. In literature, quality means both attractiveness and quality of green spaces (Fongar et al., 2019).

The perception of green spaces also involves investigating green spaces as a priority in decision-making. This entails comparing, checking, and analyzing planning regulations and policies where green spaces are available as an agenda or concept. This analysis would lead to a possible explanation of how customary land governance actors perceive green spaces. Theoretically, a higher perception of green spaces would yield to the inclusion of green spaces in different dimensions of customary land governance (Vargas-Hernández et al., 2018).

2.5 Customary Land Governance

Since customary land tenure has an influence on the land-use changes of green spaces and peri-urbanization, it is essential to examine land governance in the concept of Ghana. In this section, land governance with be described based on the context of the study. The concept of

governance has changed over time. There is no consensus on academic literature as researchers have long debated the meaning, criteria, dimensions, and indicators of what constitutes governance (Devaney, 2016). Early definitions of governance have centered on "regulatory relationships" (Devaney, 2016 p.1), "rules and institutions" (Donahue, 2002 p.1), "process which has the potential to empower citizens" through consultation (Haugaard and Ryan, 2007 p. 194). Alternatively, a specific facet of governance is comprised of land governance. Land governance includes ways land tenure, land-use, and land management is "defined, transformed, and exercised." It also includes "access to land, conflict resolution, and information dissemination" of land details (Burns et al., 2011 p.2).

Recently, numerous international organizations have highlighted the necessity of investigating land governance of customary institutions. Arko-Adjei (2010), suggests that this trend was warranted by a growing recognition of the role of customary institutions in land tenure and administration. Further, in Africa, as most lands are customary, the role of customary land governance is as essential as ever as it guarantees that sustainable planning policies and formal regulations would materialize (Yeboah and Obeng-Odoom, 2010). Therefore, as peri-urban areas are faced with global land pressures, rapid urbanization, and climate change, the effective use and management of customary land as a resource is crucial. There is a need to analyze governance in customary institutions. For this study, customary land governance will be unpacked into three sub-variables: 1) regulations, 2) processes, and 3) institutions. Each sub-variable will be discussed in the following:

2.5.1 Governance as Regulations

Regulations are of customary law, which is a set of rules and norms governing decision making, hierarchal status, and resource allocation in many parts of Africa (Arko-Adjei, 2011). In Sub-Saharan Africa, customary land regulations are legally recognized in addition to statutory laws (Joireman, 2008). Customary laws have the utmost influence in rural areas, which influences land tenure arrangements and land-use decisions.

2.5.2 Governance as Process

FAO (2007) cites governance processes relates to how governance institutions deliver different activities and actions. In this manner, processes include consistent reporting and explanation of the performance of authorities. Frequency of interaction with stakeholders, the existence of feedback, and documentation are also included in the definition of the process (Arko-Adjei, 2011). Saunier and Meganck (2009 p. 270) explain that the objective of land governance is "sharing information and acting in such a way to allow stakeholders to gather the information that may be critical to uncovering abuses and defending their interests." This objective is central to the definition of a process in customary institutions that constitutes governance (Arko-Adjei, 2011).

2.5.1 Governance as Institutions

According to the World Bank (2007 p. 67), governance is "how public officials and institutions acquire and exercise the authority to shape public policy and provide public goods and services." It also includes "formal and informal rules, rights, conventions and practices that establish patterns interaction" (Bruce, 2013 p. 2). Therefore, land governance entails various configuration of institutions by state, customary actors, and other stakeholders (Spyra et al., 2020). These arrangements are institutionalized by customary regulations that lead to indirect or direct collective guidance, control, and customary land management (Kjaer, 2004).

2.6 Conceptual Framework

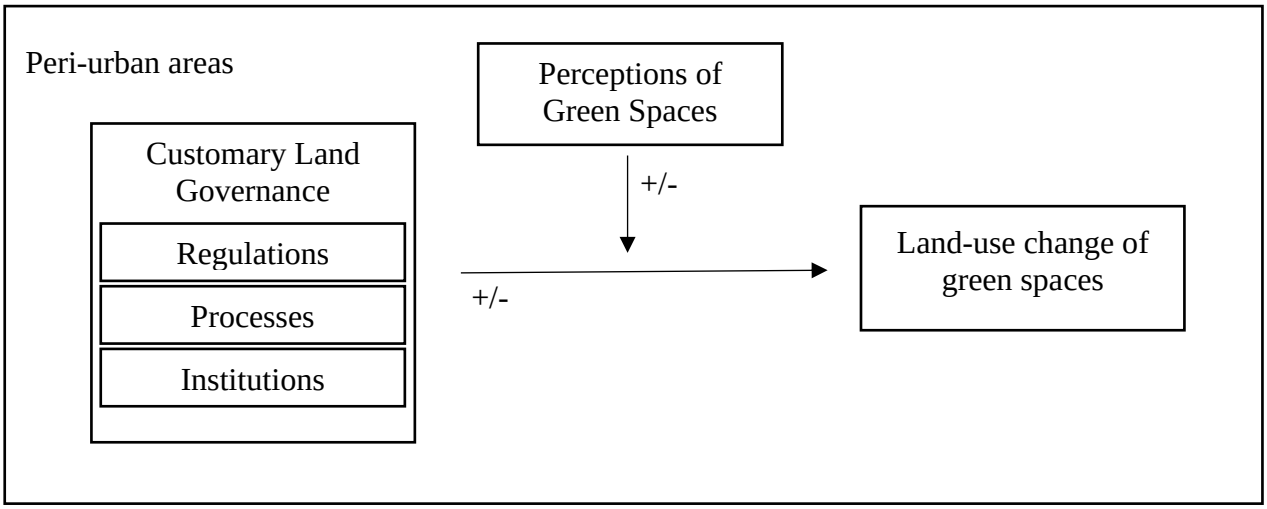


Figure 4. Conceptual Framework of the Study.

The conceptual framework of the research is based on the theories and evidence gathered from the literature review. The conceptual framework illustrates the relationship between customary land governance, land-use change of green spaces, and the perception of green spaces within the landscape of peri-urban Ghana (Figure 4). The customary land governance is the independent variable where it is assumed to directly influence the land-use change of green spaces, the dependent variable (Boamah, E. F. and Amoako, 2020; Kleemann et al., 2017). Further, the perception of green spaces, the moderating variable, is conceptualized to positively or negatively impact the relationship of customary land governance and land-use change of green spaces (Fongar et al., 2019).

Chapter 3: Research design, methods, and limitations

3.1 Introduction

The study is part of a more extensive PBL Netherlands Environmental Assessment Agency (PBL) project in partnership with the Institute of Housing and Urban Development Studies, Erasmus University Rotterdam (IHS - EUR), and Bureau of Integrated Rural Development, Kwame Nkrumah University of Science and Technology (BIRD – KNUST). The larger research project aims to explore scenarios and strategies by understanding the urbanization dynamics for green and inclusive growth in the Kumasi landscape of Ghana. The research team comprises six MSc research students from the Philippines, India, Ghana, and Kenya. While, the PBL staff, experienced in GIS modeling, assisted in spatial analysis and research. On the other hand, two academic experts on peri-urban Ghana and green spaces with three research assistants were part of the BIRD-KNUST team. The research assistants were BIRD - KNUST students recruited through a screening process initiated by both KNUST and IHS staff. Overall, two research coordinators from IHS supervised the research team providing essential support across all research stages.

3.2 Description of the Research Design and Methods

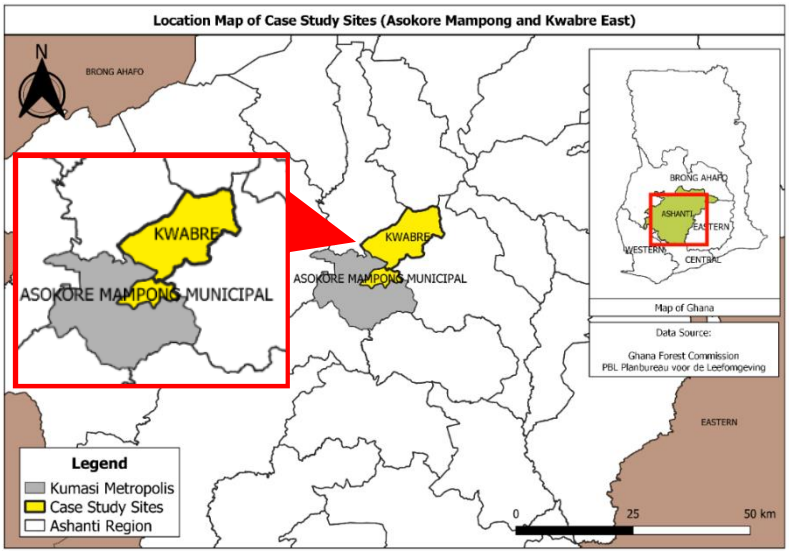
The study employed a qualitative data collection and analysis. The qualitative data allows an in-depth understanding of customary land governance by investigating the regulations, processes, and institutions vis a vis the perception of green spaces of customary land governance actors in the context of peri-urban areas. The research strategy utilized a case study as the main strategy.

3.2.1 Case Study

A case study strategy will be employed to effectively analyze the link between customary land governance and land-use changes in green spaces in the peri-urban, Kumasi. This decision is based on three general factors: nature of research question, degree of researcher control to an actual phenomenon, and contemporary nature scenario being studied (Yin, 2014). First, the research objective is to investigate causal relationships where the research question examines "how" specific a scenario occurs. Second, there is little to zero control the researcher has over actual scenario studied in the context of the study. Third, customary land governance and land-use changes in green spaces are contemporary issues. This decision is also consistent with several studies examining customary land tenure and institutions that employed case study method for their analysis (Arko-Adjei, 2011; Siiba et al., 2018). Furthermore, since the research focuses on a limited number of scenarios and aims for an in-depth and qualitative study, a case study is suitable as a strategy to fully explain the context of a phenomenon (Yin, 2014).

The research team narrowed down the preliminary case studies in peri-urban Kumasi into three sites: Asokore Mampong, Kwabre East, and Afigya Kwabre. For this research, Asokore Mampong and Kwabre East were selected as case studies (see 4.1). These two districts were selected due to the contrasting nature (low vs. high) of population density (see Table 2) and green spaces depletion (see Section 4.3). The heterogeneous design utilizes a multiple-case study approach to elicit a comparison of an "extreme example of the phenomenon of interest" (Thiel, 2014 p. 89). Moreover, other criteria from selection were similarity of the customary land tenure system, as both districts belong to the Akan ethnic group, and proximity to the Kumasi Metropolitan Assembly (see Map 1). The similarity of the predominant ethnic group present in both districts would allow comparison of customary land governance practice. The

research team also decided on the proximity to KMA for convenient access of researchers from KNUST to case study sites. The accessibility of the case study sites will also create less time dedicated to traveling to these sites and creating more time in data collection. The location of both case studies in reference to KMA and the Ashanti region is illustrated in Map 1 below.



Map 1. Location Map of Case Study Sites (author's construct)

In terms of population size, Asokore Mampong has a higher population size in comparison to Kwabre East. Also, Asokore Mampong has a higher population relative to all districts in the Ashanti region. On the other hand, Kwabre East has a lower population compared to the average population but a larger land area of 148 km^2 resulting in a lower population density of 145.6 inhabitants per square kilometer compared to Asokore Mampong with 23.91 km^2 land and 15,443.91 inhabitants per square kilometer (Asokore Mampong Municipal Assembly, 2014; Ghana Statistical Services, 2019).

District Ashanti Region	2010	2019	Land Area	Population Density (per km in 2019 km^2)
Kumasi Metropolitan Assembly	1,730,249	2,096,053	299 km^2	7010.21
Asokore Mampong	304, 815	369, 264	23.91 km^2	15,443.91
Kwabre East	115, 556	139, 983	148 km^2	145.6
Average Population (Ashanti Region)	159, 346	193, 073	-	-

Table 2. Total population and population density of Case Study sites in comparison to KMA and the average population of districts in the Ashanti region.

The research will utilize land-use changes in green spaces in a 15-year period (2000, 2010, 2015) to analyze case studies. This time sequence is based on the available dataset on green spaces land-use changes from the PBL Netherlands Environmental Assessment Agency. The research team acquired datasets from the Ghana Forest Commission, which contains land – use data on built-up areas, municipal and regional demarcation, forest cover, agricultural cover, open spaces, and water bodies. The dataset acquired was also used on previous research about land-use changes in peri-urban Ghana (Kleemann et al., 2017). This decision is provided by practical matters of limited time and resources (Thiel, 2014).

3.3 Data Collection, Sampling Selection and Size

3.3.1 Data Collection

In this research, primary and secondary data collection methods were used. Primary data collection includes a semi-structured interview and focus-group discussions. Secondary data collection includes content analysis of government documents, academic database and scientific reports. The research team composed of academics and research assistants from the Bureau of Integrated Rural Development (BIRD) of Kwame Nkrumah University of Science and Technology (KNUST) implemented data collection. The arrangement was initiated by the Institute for Housing and Urban Development Studies (IHS) with financial support from the PBL Netherlands Environmental Assessment Agency.

Since case studies require in-depth qualitative results, semi-structured interviews were selected as a method of data collection. The method is also expected to collect a wealth of qualitative insights into the phenomenon being studied comparing the two case studies (Thiel, 2014 p. 95). Yin (2014) explains that interviews are important sources for a case study because case studies are usually about human understanding of scenarios. Furthermore, semi-structured interviews allow flexibility in responses, which can yield unanticipated responses. Because of the ongoing pandemic, the researcher was not able to conduct the interviews face-to-face. Instead, research assistants from the BIRD, KNUST conducted the interviews on behalf of the researcher. The research assistants were given interview guides containing interview questions and topics of interest. The interview guide (See Annex 1) is based on the variables and indicators on the operationalization and conceptual framework (see Table 5) to be asked to the respondents. The research aims to collect novel and wealth of information from the interviews. So, in formulating the questionnaires and interview guides, the researcher observed a balance between openness and clarity of questions (see Annex 1). The research assistants were also instructed to ask supplementary questions to achieve a more profound and broader understanding of the answers provided during the interview. The interviews with state actors and academics were also recorded, with authorization from respondents, for transcription by the researcher. On the other hand, interviews with customary chiefs, elders, and household heads conversed in Twi, a local Ghanian language, were translated and transcribed by the research assistants.

In addition to the semi-structured interviews, the research assistants conducted a focus-group discussion composed of three customary chiefs in Kwabre East. The FGD was done in the latter part of data collection due to a lack of time and resources and allowed the interview of a large representative of customary authorities in a short amount of time. The FGD followed the same set of questions indicated in the interview guides to compare and triangulate the data collected.

Finally, secondary data collection was used for supplementary triangulation of primary data collected from semi-structured interviews and focus group discussions. The local research team of BIRD - KNUST collected secondary sources of data. Moreover, secondary literature available from academic databases such as SCOPUS, Google Scholar, and Science Direct were also collected. Likewise, the researcher requested photos of case study sites, local newspapers, official policy documents, and laws, and statutes (see Annex 1.6). The secondary data collected were analyzed to understand customary land governance, land-use changes of green spaces, and perceptions of customary actors on green spaces.

3.3.2 Sampling Selection and Size

Thiel (2014 p. 45) describes a sample as " a selection from the total population of possible units of study. Sampling is done since in most research, it is unrealistic to include every member of a target population. Specifically, a purposive sampling type was utilized, given the limited time and resources for the research. For this type of sampling, respondents were selected based on their position, expertise, and knowledge about green spaces, land-use change, and customary land tenure, consistent with qualitative data collection techniques (Thiel, 2014). Hence, appointments with state actors, academics, elders, and traditional chiefs were set by the research assistants on behalf of the researcher.

In terms of the sample size, two respondents of each customary land actor type (chiefs, elder, and household heads) and one for state actor and traditional council representative in each district were initially intended to represent customary land governance per the case study site. Similarly, as the study aims to collect perceptions and elucidate assumed links between variables, a smaller sample is adequate to understand such perceptions, opinions, and reasons (Thiel, 2014). However, due to the COVID - 19 pandemic, it was challenging to secure the availability of several respondents. In the end, one customary chief and an elder with two respondents of household heads and state actors were interviewed (see Table 3). It is also important to note that due to the COVID – 19 pandemic, it will be almost impossible to gather a significant amount of response by the researcher himself. Therefore, the presence of a BIRD - KNUST local research team contributed in making the identification and sampling of respondents feasible as the suitable respondents for the study were interviewed despite the prevailing conditions.

A focus-group discussion was supplemented in the interview to attain data saturation where information becomes repeated, and no new information is found. Furthermore, while a higher number of respondents can ensure higher representation, it is also essential to balance data collection. Too many respondents may lead to less depth in qualitative studies. Likewise, since the primary research strategy is a case study, generalization and statistical representation are not aimed. The goal of the sampling is to acquire depth and novel insights. Overall, 13 respondents were interviewed for the study, and additional three respondents from the focus-group discussions yielded 16 respondents sampled, which is consistent with the sample size of similar qualitative case study research in Ghana (Arko-Adjei, 2011; Siiba et al., 2018). Table 3 provides a summary of data collection and sampling.

Table 3. Summary of Primary Data Collection Methods and Sampling

Data Collection Method	Sampling Method	Respondent Type	Sample Size	Criteria
Semi-Structured interviews	Purposive	State Actors (Physical Planning Office, Works Department)	**3**	Knowledge and experience in land-use planning, civil works, land management
		Academic Experts/Researchers (KNUST)	**2**	Expertise and experience in customary land tenure and governance, green spaces
		Customary Actors (chiefs, elders, or priests)	**4**	Knowledge and experience in customary land governance practice

		Household Heads or representative	**4**	Knowledge and experience in customary land practice
Focus – group discussion		Customary Chiefs	**3**	Knowledge and experience in customary land practice
		Total	**16**	

3.4 Operationalization: Variables and Indicators

Qualitative data were collected based on the following: a) what are the land-use changes of green spaces in selected case studies, b) what are the perception of green space, and c) measuring customary land governance. These concepts will be used to operationalize the study into realistic and measurable concepts that respondents can interpret.

The variables described were based on several concepts. These concepts are defined using different literature (see Table 4) and based on the conceptual framework (see 2.6). These concepts were translated into measurable indicators (see Table 5) for data coding and analysis. Further, the indicators were used as a basis for the interview guide, and the variables serve as topics of interest during interviews.

The following table lists the definitions of essential concepts that were used to achieve the research objectives (see section 1.4). Table 4 summarizes the list of sub-variables, definitions, and data sources employed to analyze three main variables of the research.

Table 4. Sources and Definition of Variables.

Concept/Variable	Definition	Source
Customary Land Governance	Ways land tenure, land-use, and land management is defined, transformed, and exercised	(Burns et al., 2011)
Regulations	Set of rules and norms governing decision making, hierarchal status, and resource allocation in customary areas	(Arko-Adjei, 2011)
Processes	Relates to how governance institutions deliver different activities and actions	(Arko-Adjei, 2011)
Institutions	Various configuration of institutions by state, customary actors, and other stakeholders	(Spyra et al., 2020)
Perception of Green Spaces	Perception of green spaces as a personal impression of the quality of green spaces	(Fongar et al., 2019)
Land-use Change of Green Spaces	Process of altering an existing land-use, green space vegetation or physical landscape	(Kleemann et al., 2017)

Table 5. Operationalization Variables and Indicators.

Concept/Variables	Sub-variables	Indicators	Data collection method	Data Type	Data Source
Customary Land Governance	Regulations	• Number of customary laws related to green spaces/conservation/management • Type of customary laws related to green spaces (the kind of green space conserved or protected) • The medium of customary law (documented or oral) • Implementation of customary law	Primary qualitative data collection: semi-structured interviews	Qualitative	- Kwabre East and Asokore Mampong selected stakeholders (primary) - Academics (primary)

	Processes	• Community seats/representation in decision-making in the land-use change of green spaces • Community seats/representation of community members in the formulation of regulations about green spaces • Number of meetings/dialogues about land-use of green spaces between customary leaders with community			
	Institutions	• Number of customary land/green space-related disputes • Presence of conflict-resolution mechanism • Types of collaboration with other stakeholders (state, private developers, academe) in decision-making regarding green spaces			
Perception of Green Spaces	Perceived Green Space Value Priority in customary land decision making	• Perceived importance of green spaces • The perceived necessity of conserving green spaces • Perception of green spaces as a priority in the decision making of customary leaders	Primary qualitative data collection: semi-structured interviews	Qualitative	- Kwabre East and Asokore Mampong selected stakeholders (primary) - Academics (primary)
Rate of Green Spaces Land-use	Quantitative rate of Land-use changes of Green Spaces	• % of green space of district (the trend in 15 years) • % of built-up areas (the trend in 10 years)	Secondary data collection: academic and government reports	Quantitative	GIS datasets (secondary)
	Perceived rate of Land-use changes of Green Spaces	• Perceived rate of Land-use changes of Green Spaces	Primary qualitative data collection: semi-structured interviews	Qualitative	- Kwabre East and Asokore Mampong selected stakeholders (primary - Academics (primary)

3.5 Validity, Reliability, Challenges and Limitations

The research strategy and method should be consistent with the research questions and must be reported transparently to achieve the validity of the research. Since a case study strategy was selected as the main strategy, validity is achieved by observing consistency across all research methods: semi-structured interviews, focus-group discussion, and secondary data collection. Consistency means a logical chain of evidence between the research question, related literature, conceptual framework, and operationalization into the research methods.

Yin (2014) and Thiel (2014) enumerates two types of validity: external and internal validity. External validity refers to the findings of the study to be generalized to other cases or situations (Thiel, 2014). For testing and statistical research, external validity is essential. However, in qualitative analyses and case studies, external validity is limited. Findings are typically specified in the context of the identified case study.

Further, the research employed a qualitative strategy to produce empirical knowledge about the situation studied. Internal validity refers to accurately measuring what is intended to be measured in the study (Thiel, 2014). Specific measures were taken to increase the internal

validity of the study: selected indicators were based on peer-reviewed and published academic theories, academics from PBL, IHS, and BIRD-KNUST were consulted, multiple questions were formulated to measure the same variable and evaluate the consistency of respondent, and research proposals were checked by co-researchers through peer-review.

Reliability refers to the association of research variables being consistently and accurately measured. In other words, reliability is high if the research findings are not coincidental but rather reflect reality (Thiel, 2014).To increase reliability, numerous precautions were taken to address the flexibility and openness of semi-structured interviews. First, systematic documentation of every action of the entire process was observed. This allows a review of each step taken for later. Second, the interview guide and questions underwent multiple testing and evaluation from co-researchers, IHS - PBL supervisors, and BIRD - KNUST local research team before the commencement of data collection to reduce the bias of researchers. During data collection, regular briefing and debriefing of research assistants with academics were done to revise the interview guide based on comments of research assistants. Moreover, the evaluation of interpretations and coding in data analysis was coordinated with co-researchers. Third, since the topic of the research is sensitive (e.g. customary land governance), measures to reduce socially acceptable answers from respondents were done. Specifically, trust-building and neutral tone in conducting interviews were emphasized in interview guides and briefing of research assistants. Further, local language (Twi) was also used primarily for customary members: chiefs, elders, and household heads to create a rapport. Fourth, BIRD, KNUST researchers, and academics reviewed recordings and translation of transcripts and cross-validated by the IHS student research team members from Ghana. Lastly, various data collection was done because of the small number of respondents: semi-structured interviews, focus-group discussions, and secondary data. Furthermore, three sources of respondents were considered for triangulation: customary chiefs, state actors, and academics.

Another challenge for the study was the impact of the COVID-19 pandemic. Because of the pandemic, availability for interviews of respondents is low. Local research assistants were contracted for the study to address this. The research assistants and local academic experts also provided credibility, local knowledge, and connections to respondents, making data collection efficient. Moreover, respondents were also contacted beforehand to ensure their availability during the interview. The research team also organized regular meetings with IHS, PBL, and BIRD, KNUST team for troubleshooting.

In summary, a consistent chain of evidence and triangulation is essential. A logical chain of evidence on the research question, theories, and operationalization into the research methods were ensured. The triangulation methods utilized were: a. primary sources and secondary sources (academic reports, government documents), b. triangulation of primary sources (semi-structured interviews and focus group discussion), c. triangulation of respondents (customary chiefs, state actors, and academics), and triangulation of operationalization, with multiple measurements per variable.

3.6 Data Analysis

Data analysis of the study was done using the Atlas.Ti and QGIS. For qualitative data collected from semi-structured interviews, focus-group discussions, and secondary sources will be analyzed using Atlas.Ti. QGIS is utilized to present land-use changes and conduct an analysis of the patterns and rate of land-use change of green spaces in selected case study sites.

After the data collection, the researcher receives two types of data from the research assistants: recordings and transcriptions. The recordings obtained contains interviews between state actors and academics. Simultaneously, the transcriptions were interviews with customary chiefs, elders, and household heads in the local language (Twi). The researcher transcribed the recordings in English, while the transcriptions in Twi were transcribed and translated by the research assistants to English for data analysis. Express Scribe Transcription Software was used to manually transcribed the English recordings. Afterward, the transcripts were consolidated in Atlas.Ti for the coding process. Words, phrases, and statements were labeled into codes to highlight essential concepts related to the research variables. The researcher observed peer-review from co-researchers to remain unbiased and consistent with the logical chain of evidence.

Further, qualitative data analysis was conducted by making connections from different themes and categories of codes. After the coding process, the researcher used the co-occurrence tool and query tool to identify a combination of codes co-occurring in a quotation. Through the co-occurrence tool, quotes where a respondent explicitly discusses a clear relationship or codes at the same time were recorded. Next, the query tool is used to assess the relationship between codes, which guides the researcher in interpreting the link between different research variables. A detailed version of data analysis with Atlas.Ti is explained in Section 4.2.

Spatial analysis was also utilized in the research. Through QGIS, the rate of green spaces degradation and land-use changes of green spaces was analyzed using geoprocessing. For the rate of green spaces land-use change, a spatial calculator was used to measure the proportion of green spaces and built-up areas across time. Kogure and Takashi (2019) express that GIS approaches are ideal for research on spatial problems. The existing database from Ghana Forest Commission and PBL Netherlands Environmental Assessment Agency was obtained for the study. The trend of change and different types of green spaces will be used to triangulate the general perception of land-use changes gathered from primary data sources.

In brief, data analysis of the study was done using the Atlas.Ti and QGIS. Data analysis on Atlas.Ti is used to answer all research sub-questions. On the other hand, QGIS is utilized in supplementing the findings for research sub-question 1. Finally, the findings will be presented in the next chapters.

Chapter 4: Research Findings

This chapter will discuss data collection and data findings. First, the context of the selected case studies in peri-urban Kumasi, Ghana, will be provided. Then, Section 4.2 presents the research data preparation and analysis. Further, the next chapters look at the main findings on the study variables: land-use changes of green, perception of customary stakeholders to green spaces, and customary land governance. The findings of each variable are presented and compared per district. Lastly, a summary is presented, highlighting the relationships between main variables that form the answers to the research questions in the next chapter.

In section 4.3 to 4.5, the names of the respondents were not reported in the findings. Given the perceived sensitivity of some topics for respondents, not all of them permitted their names to be recorded. Therefore, to give context to the quotations, only the position or type of respondents were reported (see Table 3).

4.1 Context of Study: Asokore Mampong and Kwabre East

Findings for the case study were based on collected reports from government officials, specifically, from the district assembly of Asokore Mampong and Kwabre East. Further, the research team created the maps based on the GIS dataset acquired from the Forest Commission of Ghana and the PBL Netherlands Environmental Assessment Agency. Area photos in the case study sites were collected on-site taken by the research assistants during scheduled field visits.

4.1.1 Asokore Mampong Municipal District

Location and Demographics

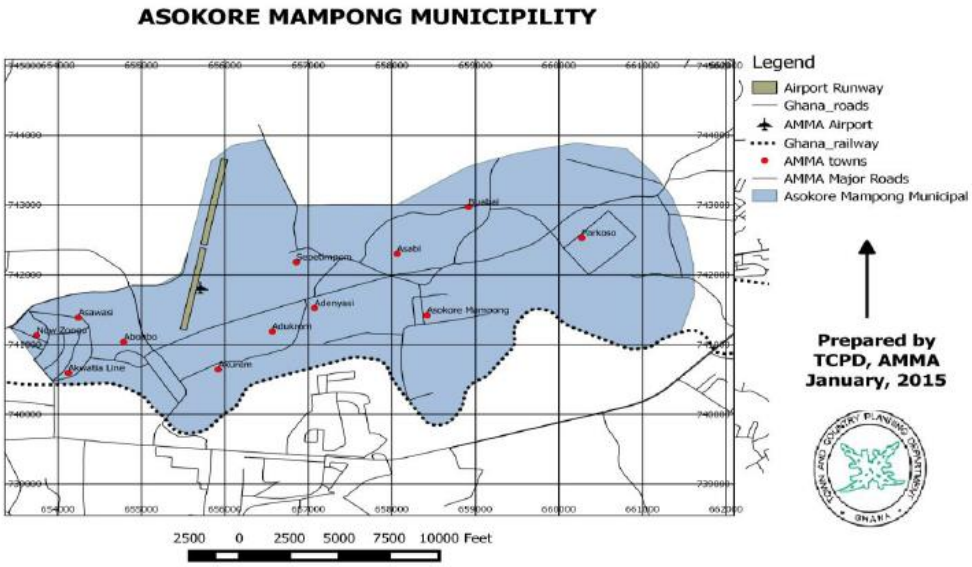
On June 29, 2012, the municipal district of Asokore Mampong was established through the Legislative Instrument (L.I.) 2112 (Asokore Mampong Municipal Assembly, 2014). Initially, the municipal district was part of the Kumasi Metropolitan Assembly but was separated due to the Decentralization Programme of the Ghanaian government.

The municipal district is situated in the north-east of the Kumasi Metropolitan Assembly. With Kwabre East district located at the north-west and Ejisu-Juabeng municipality to the south-east. Asokore Mampong municipal district covers a total land area of 23.91 km^2, significantly lesser compared to adjacent districts. Still, with a population of 369, 264 people, the district is the most populated district in Greater Kumasi Region and second most populated district (second to Kumasi Metropolitan Assembly) in the Ashanti region (Ghana Statistical Services, 2019).

Asokore Mampong Municipal District Facts and Figures

- Composed of 10 electoral areas, which are: Aboabo 1, Aboabo 2, Adukrom, Akurem, Sawaba, Asawasi, New Zongo, Sepe-Tinpom, and Akwatialine and Asokore Mampong, the district capital
- Undulating topography characterized by lowlands and highlands
- Main water bodies situated are Aboabo River, Parko and Wewe streams
- Site to Kumasi Metropolitan Airport

Box 1. Asokore Mampong Facts and Figures.

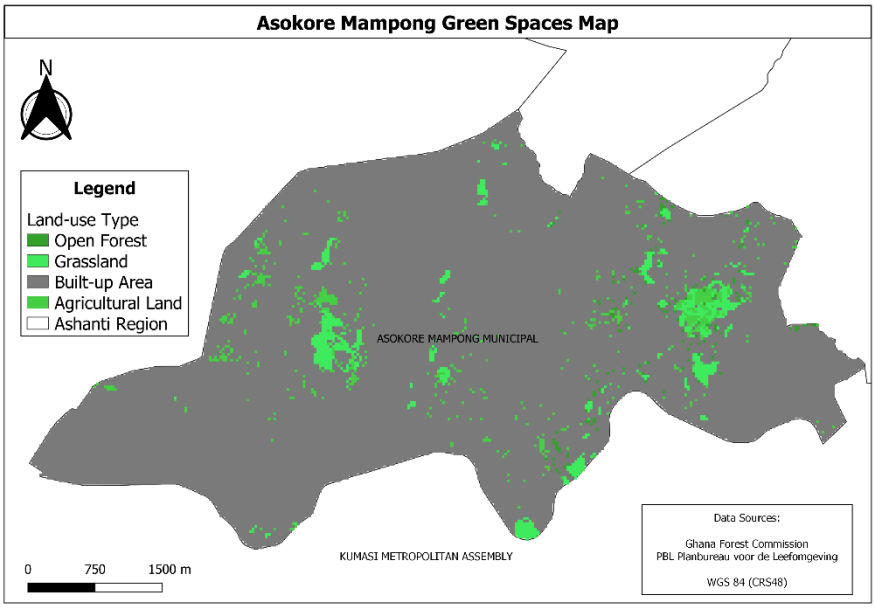


Map 2. Asokore Mampong Municipal Map (Asokore Mampong Municipal Assembly, 2014).

Photo 1 Asokore Mampong area photos.

Green Spaces in Asokore Mampong

Asokore Mampong belongs to the moist semi-deciduous ecological zone of Ghana. Additionally, Forest Ochrosol is the primary soil type that provides rich nutrients for vegetation in the area. Patches of exotic tree species of Ceiba, Triplochlon, and Celtis are found in the municipality, mostly in the peripheries. Green spaces in the district are scant (see Map 3), especially forest areas and wetlands (Asokore Mampong Municipal Assembly, 2014).



Map 3. Asokore Mampong Green Spaces Map in 2015 (author's construct).

4.1.2 Kwabre East District

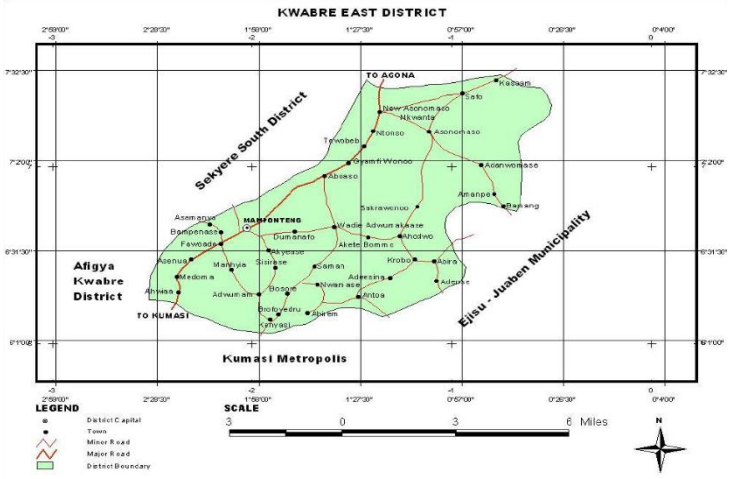
Location and Demographics

Kwabre East district, formerly part of Kwabre District, was established as a separate district after the Afigya Kwabre District formation in 2008. Mamponteng, the district capital, is part of the 42 settlements with 27 electoral areas (Kwabre East Municipal Assembly, 2010).

Kwabre East District Facts and Figures

- Composed of 27 electoral areas, which are: Asonomaso, Adawomase, Antoa, Meduma, Fawaode, Kenyase, Kasaam, Ntonso, Ahwiaa, Bampenase, Aboaso, Bamang and Mamponteng, the district capital to name a few.
- Diverse topography with land heights range from 305m to 355m above sea level in eastern section of the districts with hilly swathes of land in the eastern, western section is undulating with mostly 290m below sea level
- Location of perennial main water bodies such as Akawsua, Anyinasu, Daku Wiwi, Ayiresua, Owai,

Box 2. Kwabre East Facts and Figures.



Map 4. Kwabre East Municipality Municipal Map (Kwabre East Municipal Assembly, 2010).

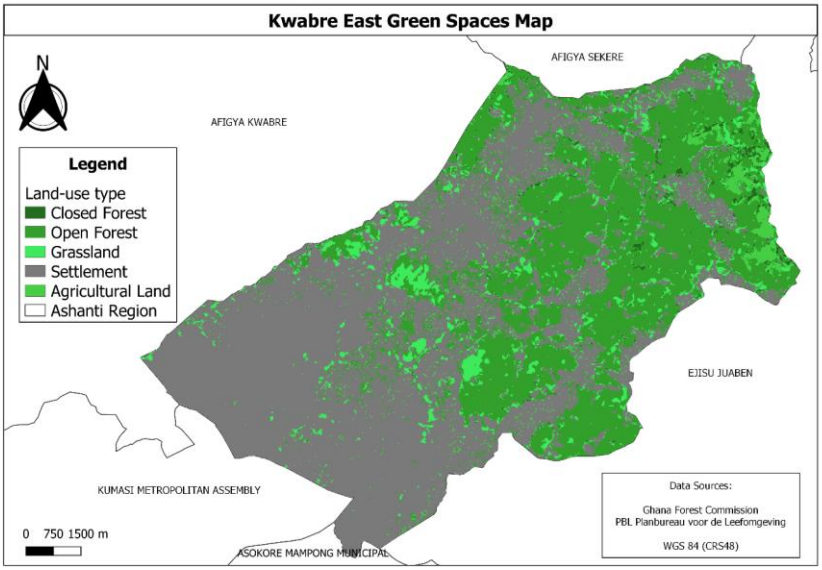
Kwabre East shares boundaries with Kumasi Metropolitan Assembly in the south; Sekyere South District in the north, while Ejisu Juaben District and Afigya Kwabre District is located

to the east and west, respectively. Also, the district is almost situated in the center of the Ashanti region. Kwabre East district covers a total land area of 148 km^2 and a population of 139, 983 in 2019 (Ghana Statistical Services, 2019).

Photo 2. Kwabre East District area photos.

Green Spaces in Kwabre East

Kware East district hosts vast arable agricultural lands, grasslands, and moist semi-deciduous forest. The district also has rich mineral resources such as granitic outcrops, clay, and sand deposits. However, most forest cover and vegetation are found in the northern part of the district (see Map 4) and along river streams. Relative to Asokore Mampong, Kwabre East has a considerable amount of green spaces (Kwabre East Municipal Assembly, 2010).



Map 4. Kwabre East Municipality Green Spaces Map in 2015 (author's construct).

4.1.3 Customary Land Tenure in Case Studies

Both Asokore Mampong Municipal District and Kwabre East District are part of the Ashanti region. Akan is the predominant cultural group in the Ashanti region, which is based on kingship. The Akan customary system is composed of a hierarchy of chieftaincies, which include: the Abusaupanin (household head), the Odikro (village chief), the Ohene (sub-chief or chief of substool), and the Omanhene (paramount chief). Usually, chiefs are men, but there are instances where they are women (called 'queen mothers'). The chiefs represent the customary members in governance matters (Arko-Adjei, 2011).

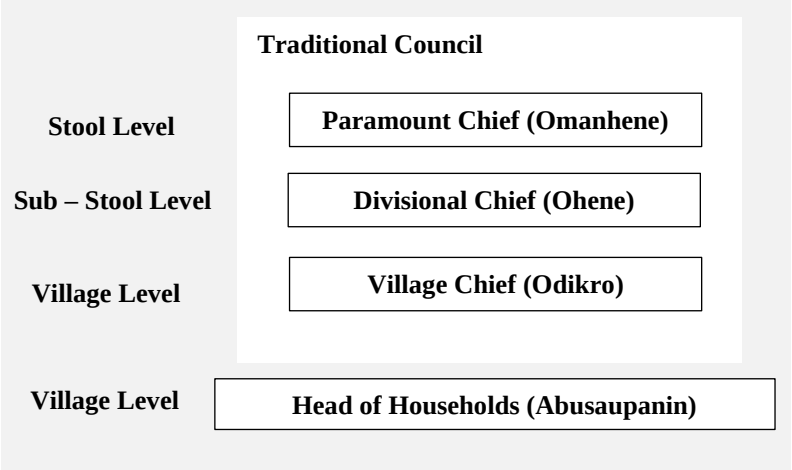


Figure 5. Hierarchy of Chieftaincies (Arko-Adjei, 2011).

Customary Land Tenure in Asokore Mampong District

Asokokore Mampong is comprised of multiple ethnicities. While Akans (40.9%) dominate the municipality, there are a considerable number of inhabitants from Northern Ghana (36.7%), the Guans (10.7%), Ewes (3.0%), and Ga-Adangbe (0.9%) (Asokore Mampong Municipal Assembly, 2014). However, despite existing ethnic diversity, the customary land decision-making is vested to the customary chiefs. Specifically, the chief of Asokore Mampong is considered the primary land custodian and the traditional head of the municipality. The traditional authorities and sub-chiefs manage other areas within the municipality in other communities except for lands in the Asawase community, which was acquired by the State Housing Company (Asokore Mampong Municipal Assembly, 2014).

Customary Land Tenure in Kwabre East District

In terms of ethnicity, 83.5% of the entire population belong to the Akan customary group. On the other hand, about 10% are from Northern Ghana, and the rest belong to other ethnic groups. The district can be considered ethnically homogenous compared to Asokore Mampong (Kwabre East Municipal Assembly, 2010).

Nevertheless, like Asokore Mampong, the chiefs or traditional authorities hold the management of customary lands. In Kwabre east, the district assembly has created a 'Chiefs and Queen mother's association to consolidate development efforts across the district (Kwabre East Municipal Assembly, 2010).

4.2 Data Preparation and Analysis

In line with Section 3.6, the research utilized Atlas.Ti to perform data preparation and analysis. The codes used were based on the operationalization table. Additional codes were created

based on regular reoccurrence during the coding process. The main codes are land-use changes of green spaces, perception of green spaces, and customary land governance. A total of 27 codes are presented in hierarchical order (see Annex 2.2). Notes created for the organization of data collected were also shown.

Further, the codes were grouped based on variables and sub-variables of the operationalization table. Each indicator was coded and linked to the sub-variables. The codes used for analysis with the corresponding number of quotations are presented in Table 6 below.

Code Group (Varible)	**Code**	**# of Quotations**
Land-use Change of Green Spaces	Rate of Land-use change	98
Perception of Green Spaces	Green Space Value	56
Customary Land Governance	Regulations	44
	Processes	46
	Institutions	42
	Practices	70
Total		356

Table 6. List of Codes and Quotations for Data Analysis (Author's construct).

Based on these codes, the co-occurrence was investigated in Atlas Ti. The result is presented in the co-occurrence table below (Table 7). The co-occurrence process allows researchers to examine the level of relationship between different codes from the research. In this case, the relationship between Rate of Land-use Change and Practices (49 co-occurrences), Green Spaces and Rate of Land-use Changes (24 co-occurrences), and Regulations with Rate of Land-use Change (22 co-occurrences) were found. These findings are found to be highly relevant in answering the research questions: "What are the existing customary regulations that affect land-use change of green spaces in peri-urban Kumasi, Ghana?" and How does customary land governance affect land-use change patterns of green spaces in peri-urban Kumasi, Ghana?".

To further examine and analyze these linkages between codes, the Query Tool was used (see Annex 2.3). The main findings are presented in sections (4.3.2, 4.4.2, 4.5.5) of each variable. Each variable is organized into chapters composed of sub-chapters with reference to the conceptual framework and operationalization table. Then, each sub-chapter contains data collected and data analysis per indicator of respective case studies. Finally, at the end of each chapter, a summary of data findings per variable on case study sites is discussed.

	Rate of Land-use change	Green Space Value	Regulations	Processes	Institutions	Practices
Rate of Land-use change		24	22	15	11	49
Green Space Value	24		8	3		7
Regulations	22	8		2	1	11
Processes	15	3	2		8	11
Institutions	11		1	8		19
Practices	49	7	11	11	19	

Table 7. Co-occurrence Table of Research based on Atlast Ti (Author's construct).

4.3 Land-use Changes of Green Spaces

Perceived Rate of Land-use changes of Green Spaces

Eleven out of twelve respondents from the customary chiefs, elders, customary members, and state actors interviewed in Asokore Mampong and Kwabre East have stated that green spaces within the peri-urban Kumasi, Ghana are depleting and were converted into other land-uses. Some respondents mentioned that the land-use conversion of green spaces could be attributed to population increase, peri-urbanization, and high land demand for residential, commercial, and industrial land-uses.

Asokore Mampong Elder: "These areas have drastically decreased due to high demand for land use for residential and commercial purposes, which is a result of population increase and urbanization."

Asokore Mampong Household Head: "It is decreasing due to the expansion of individual settlements and activities of real estate developers converting reserved farmlands for residential purposes."

Kwabre East Chief: "In my district, I feel that there are few such places, in the sense that you may see such [green spaces]. I think these places have been encroached by people due to population increase and high demand for land for residential, commercial, and industrial purposes."

However, one customary chief from Asokore Mampong has stated that green spaces exist in the district.

Asokore Mampong Chief: "There hasn't been any huge deterioration of some of these green spaces community because they are still in existence."

Land-use changes of Green Spaces Field Observations

Field observations in both districts were performed to validate the findings from interviews. Based on site observation, ongoing constructions of residential settlements within the case study areas can be seen along with grasslands, forests, and wetlands in both districts. These images depict a typical instance of the ongoing transition from green spaces to built-up areas in peri-urban Kumasi, Ghana, supporting the findings from semi-structured interviews.

Photo 3. Images of ongoing settlement construction within green spaces in Asokore Mampong.

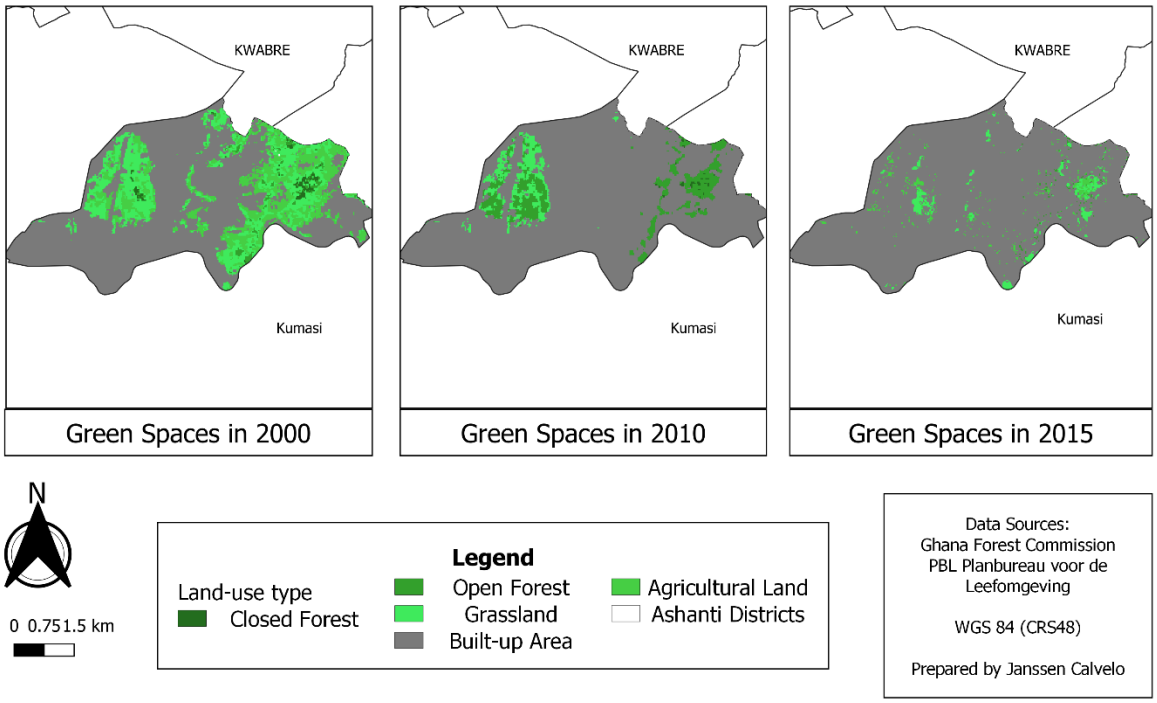
Photo 4. Images of ongoing settlement construction within green spaces in Kwabre East.

The decreasing area of green spaces and the increasing rate of land-use changes of green spaces have also been confirmed by two academic experts interviewed. Both academics have mentioned that land-use changes in green spaces in the case studies are rapidly occurring. Further, both academics have supported that proximity to the rapidly urbanizing KMA has caused peri-urbanization of adjacent districts, including the case study sites. As a result, green spaces within these adjacent peri-urban areas have been depleted.

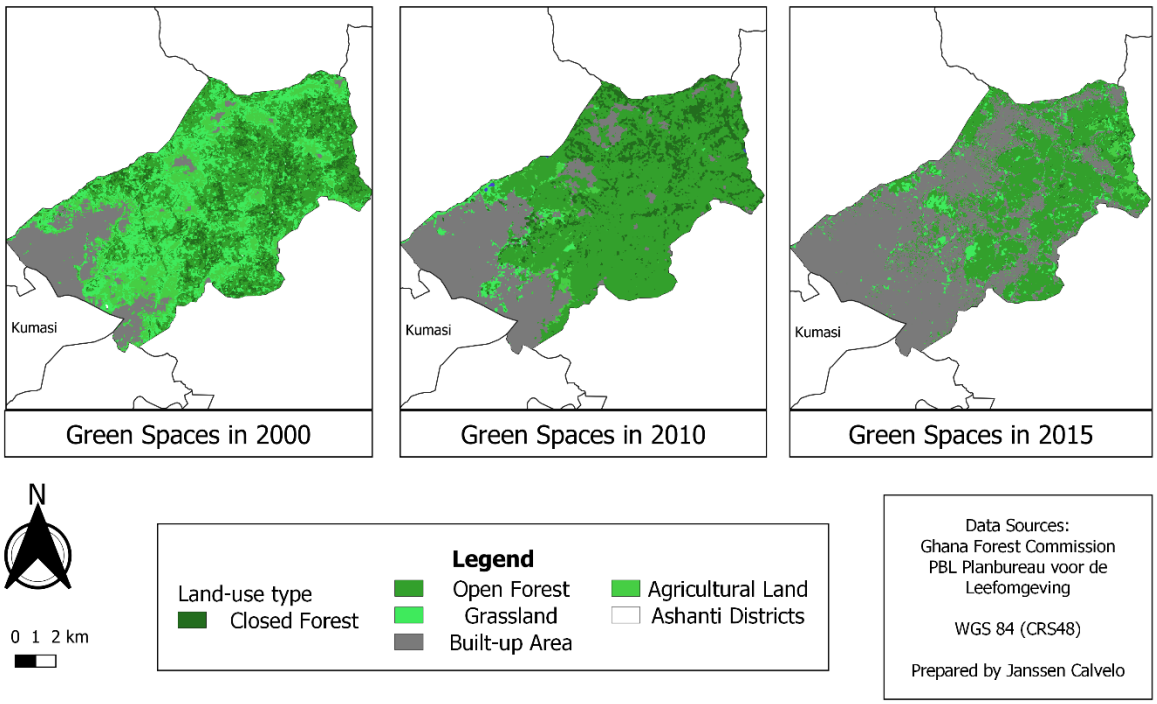
Academic: "I think green spaces are decreasing. For some time now, I think for the past 30 years the urbanization has really pushed back, so lands in Kumasi have been used up for urban developments and built-up expansion. [...] So completely built-up or development are moving into the peri-urban landscape, and completely they are losing their green spaces as well."

Land-use changes of Green Spaces GIS Analysis

GIS analysis was conducted to triangulate these findings from interviews and site observations. In the maps below, the green space trend of both districts in 2000, 2010, 2015 is presented. The datasets used for the maps were the latest data on green spaces and land-use changes collected from the Ghana Forest Commission and PBL Netherlands Environmental Assessment Agency. The datasets were processed to analyze land-use change of green spaces to built-up areas. The findings were presented in maps (Map 5 and Map 6) and percentages (Table 8) below.



Map 5. Asokore Mampong Land-use Change of Green Spaces Map (author's construct).



Map 6. Kwabre East Land-use Change of Green Spaces Map (author's construct).

Kwabre East			
Year	2000	2010	2015
Green Spaces	71%	61%	42%
Built-up Areas	12%	22%	55%
Other land-uses	17%	17%	3%
Asokore Mampong			
Year	2000	2010	2015
Green Spaces	36%	14%	4%
Built-up Areas	64%	86%	94%
Other land-uses	0%	0%	2%

Table 8. Rate of Green Space Land-use change in Kwabre East and Asokore Mampong in Year 2000, 2010, and 2015 (author's construct).

Results from GIS analysis show a significant amount of green spaces land-use change in both case studies. In both districts, more than 30% of green spaces were lost and converted to built-up areas. Moreover, in terms of green spaces, it is noticeable that Kwabre East (42% in 2015) has a higher percentage of green spaces than Asokore Mampong (4% in 2015). Moreover, the difference in the proportion of green spaces to built-up areas was found. Based on this, Asokore Mampong is highly urbanized, with 94% of the land converted to built-up areas. Kwabre East, on the other hand, has a 55% built-up area. Nonetheless, both districts can be considered as urbanizing with more than half of the land built with settlements. The GIS analysis results support the findings collected from semi-structured interviews that green spaces in both districts were rapidly decreasing.

Environmental Degradation due to Land-use Change

An interesting finding of the study is how some respondents perceive environmental degradation as an impact of the land-use change of green spaces. According to the respondents, land-use changes have caused environmental degradation: the decline of green spaces quality, land, and water pollution.

In Asokore Mampong, household respondents have cited residential, industrial, and commercial land-uses for polluting the surrounding environment in their districts. Another household head has mentioned that industrial and commercial establishments were discharging hazardous wastes to adjacent rivers and waterways.

Asokore Mampong Household Head 1: "The green spaces in Asoroke Mampong are decreasing as people continue to build in wetlands, waterways, and cutting down trees at farmlands for residential purposes. […] You just visit the area closer to the main river before you cross to the next town, you could see that there is a Washing Bay where the attitude of car washing is polluting the water bodies."

Asokore Mampong Household Head 2: "*For instance, some part of the wetlands at the Eastern part of town is occupied by a Gas Filling Station and Cement Block Factory. Even the location Gas Filling Station is hazardous and has a high risk of fire explosion due to the proximity of houses."*

Similarly, a household head in Kwabre East raised that wetlands and marshes was polluted due to increased housing settlements. He also added that a local electric company has been cutting down trees for electrical connections.

Kwabre East Household Head: "It is decreasing due to expansion of human settlements from Greater Kumasi. The quality of green spaces such as wetlands or marshy areas is now polluted and filled with waste or rubbish. And the trees along the main road in our community are trimmed by the Electricity Company of Ghana."

Lastly, an elder in Kwabre East claimed that the environmental quality of the district has been declining because designated land for waste management was sold for other land-uses by customary chiefs and district assembly members. The lack of waste management sites leads community members to dispose of their wastes in marshes and wetlands.

4.3.1 Summary: Land-use Changes of Green Spaces

Primary interviews, field observations, and GIS analyses were conducted to identify the land-use changes of green spaces in peri-urban Kumasi, Ghana. Findings show that more than 30% of green spaces in peri-urban Kumasi have been converted to built-up areas and other land-uses from the year 2000 to 2015; this supports the findings in the semi-structured interviews, area photos, and secondary data. The peri-urban area inhabitants were also well-aware of the pervasive conversion of green spaces to different residential, commercial, or industrial land-uses. Further, some respondents have highlighted that the remaining green spaces in the peri-urban Kumasi are also declining in quality due to the constant rate of land-use changes.

4.4 Perception of Green Spaces

4.4.1 Green Space Value

The green space value findings are organized into four discussion parts: a. perceived importance of green spaces, b. the perceived necessity of conserving green spaces, c. perception of green spaces as a priority of customary chiefs, and d. perceived definition of green spaces. The first three discussion parts were grounded on the indicators identified in Section 3.3. In contrast, the last discussion part was included due to the regular emergence of the perceived definition of respondents regarding green spaces. The researcher also intended to report the findings on "perceived green spaces definition" to triangulate the theoretical definition of green spaces (see Section 2.2).

Perceived Importance of Green Spaces

All interviewed respondents composed of eleven customary chiefs, elders, customary members, and state actors from Asokore Mampong and Kwabre East have specified that green spaces are important. For the respondents, green spaces provide food security (freshwater, crops, fruits, and vegetables), livelihood (farming and non-timber forest products), leisure and relaxation (family outings, social activities, hunting grounds), local herbs (for treating malaria and fever), and disaster risk reduction, specifically flooding.

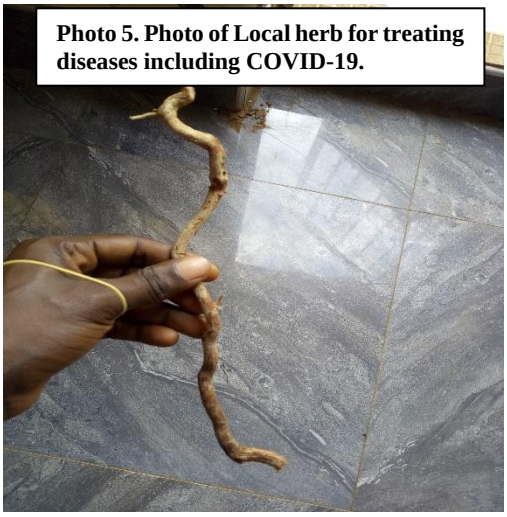
Asokore Mampong Chief: "Yes, these [green spaces] areas are so important in that the rivers and streams, for instance, serve as sources of water for other communities."

Asokore Mampong Household Head: "Yes. Places with trees and reserved farmlands for crop production are very important; they provide us with shade, fresh air, and foodstuff. For instance, my husband and I have converted our vacant and bare land for mango plantation and other crop farms. It is nice to see how green the farm is."

Kwabre East Elder: "Yes. The presence of trees provides fresh air and shade for people during hot seasons. Also, the conserved farmlands support the availability of food security as well as the availability of local herbs: bark of trees and tree leaves for treating malaria and fever."

Kwabre East State Actor: "Green is life as we know. So, the more green areas that you have, it would improve your health the more."

Photo 5. Photo of Local herb for treating diseases including COVID-19.



Interestingly, two respondents from Asokore Mampong, a state actor and a household head, have mentioned how green spaces were important during the ongoing pandemic. First, the state actor discussed how green spaces could serve as testing centers and quarantine sites during the pandemic. On the other hand, a household head pointed out that green spaces have been a recreation source for their family while there is an existing lockdown in the area.

Asokore Mampong Physical Planning: "Because recently something happened, and we had wished that we had all those spaces, including greens. Especially with the COVID centers where they would quarantine people, even if there have been places. We needed green space even to conduct mass testing while observing social distancing for COVID-19. The open spaces are good to be in a town, even for future development."

Asokore Mampong Household Head: […] during the lockdown period due to the outbreak of the COVID – 19, my family and I had our indoor games under the mango trees planted on our compound. So, I support the need for customary laws or regulations that will protect and manage our green spaces."

Perceived Necessity of Conserving Green Spaces

All respondents interviewed unanimously specified that green spaces should be conserved. Moreover, for the respondents, conserving green spaces is necessary to preserve the numerous services and benefits acquired from green spaces, as stated in the previous chapter.

Asokore Mampong Household Head: "Yes. There is a need to conserve our green spaces, especially reserve forests, parks, marshy areas, rivers, and wetlands."

Kwabre East State Actor: "Yes, we need to preserve these areas to curtail disaster."

Kwabre East Customary Chief: "Yes, at least the very few ones that exist, like the school compound to ensure that they continue to provide the many benefits that they provide."

Some respondents also mentioned that although it is necessary to conserve green spaces, the district also needs lands to address population increase and urbanization. One chief interviewed from the focus group discussion pointed out that the need for conservation is outweighed by the need for residential and commercial development in their district. Further, a household head in Kwabre East suggests an increase in population and employment opportunities necessitates green spaces conversion in their district. Lastly, one elder from Asokore Mampong maintained that, although green spaces should be conserved, urbanization in their district has made green spaces land-use changes usual and acceptable in the community.

Kwabre East Chief: They are good for every community, and they need to be conserved, but as a community, we also need development, so many times, we sell some of the lands for residential and commercial purposes.

Household Head Kwabre East: "Yes [green spaces should be conserved], But for now, we have to convert these green spaces such as reserved lands for houses and industrial purposes due to increasing in population and employment opportunities."

Asokore Mampong Elder: "Yes, I want to state again that due to an increase in population and urbanization, it has become sometimes normal or usual for green spaces to be converted to other land use forms."

Green Spaces as a Priority in the Decision-making of Customary Authorities

Respondents were asked about their perception of green spaces as a priority of customary chiefs in decision-making. Contrary to the two previous indicators, there were contrasting opinions from the respondents on each case study area.

In Asokore Mampong, two respondents, the chief and an elder, maintained that green spaces were prioritized in the decision making of customary chiefs. On the other hand, three respondents, composed of two household heads and a state actor, have stated that customary chiefs have not prioritized green spaces in decision-making.

Aspkore Mampong Chief – "Yes, in that the community is zoned into residential, commercial and industrial areas to include the green fields which are still intact and untouched."

Asokore Mampong Household Head – "I think policies should be put in place to prevent and restrict people from building their houses in waterways and wetlands."

In Kwabre East, only the chiefs, in the interview and focus group discussion, mentioned that green spaces are prioritized in decision-making. In contrast, five respondents (elders, household heads, and state actors) state that customary chiefs did not prioritize green spaces in their decision-making.

Kwabre East Chief: "Yes, I think it should be prioritized in our decisions and agenda about our district."

Kwabre East Elder: "[…] Preservation and protection of green spaces should be prioritized in the decisions and

agendas of customary chiefs and traditional leaders."

In both districts, state actors assert customary chiefs are selling the green spaces instead of prioritizing it.

Kwabre East State Actor:" Most of the chiefs think selling lands and taking the money up front is to be beneficial."

Asokore Mampong State Actor: "It is that now they [customary chiefs] are fishing for money, they are looking for money. They don't see why green spaces should be there."

Academics were interviewed to cross-check the findings. Both academics uphold the opinion of state actors, stating that customary authorities have not considered green spaces as a priority in decision-making. Further, they mentioned that there is little action being done to preserve and manage green spaces and, in some cases, it is the customary chiefs that hinder state actors from preserving green spaces efficiently as reported in Ghanian newspapers (Deininger et al., 2014; Ubink and Amanor, 2015).

Academic 1: "I don't think it is a priority to them. So, you even hear of reports where sacred greens are being converted, burial sites are being sold to developers, and therefore, I have doubts if they have any commitment at all to this."

Academic 2: "Whereby whenever there is land pressure for building purposes because the plots are expensive, the chiefs are motivated to convert these areas into building plots."

Perceived Definition of Green Spaces

During interviews, most respondents have defined their perceived definition of green spaces. From the data collected, a recurring description of green spaces has been found. Respondents have defined green spaces in the following categories:

a. Semi-private space such as gardens, lawns in residential or institutional areas;
b. Cultural or religious sites like cemeteries and sacred grounds,
c. Designated parks, street trees, and roadside trees,
d. Natural forest under the urban influence such as nature reserves, national parks;
f. Agricultural lands and farmlands,
g. Green spaces on vacant lots, green belts, and buffer zones,
h.Woodlands and peri-urban farming,
i. Public green areas such as green parks, recreational gardens, outdoor play areas, and
j. Water bodies such as wetlands, marshes, rivers, streams, and ponds

The perceived definition of green spaces supports the theoretical definition in the literature (see Section 2.4). However, according to seven respondents in the case studies, green spaces in peri-urban Kumasi includes water bodies such as wetlands, marshes, rivers, and ponds as green spaces. This means that in the context of peri-urban Ghana, the definition of green spaces covers both vegetation and water bodies.

The finding on the perceived definition of green spaces in peri-urban Kumasi is validated by the interviewed academic, stating the green spaces within the peri-urban landscape include waterways and wetlands.

Academic: "From my perspective as a natural resource person, we are looking at all green covers from waterways, buffer zones, agricultural lands, patches of forest lands within peri-urban landscape. That is what we are looking at as green spaces within the peri-urban landscape. So, it covers every vegetative cover and every

waterway, wetlands within these landscapes either for agricultural purposes or conservation purposes. We classify all of them as green spaces."

4.4.2 Summary: Perception of Green Spaces

In summary, the data collection findings show a high perception of green spaces value of customary members in peri-urban Kumasi. Also, a high perception of the importance and necessity of conserving green spaces was found among people in peri-urban Kumasi. Most respondents in the district were familiar with different benefits derived from green spaces. Food security, livelihood, leisure and recreation, medicinal, and disaster risk reduction were among the ecosystem services mentioned by respondents.

However, despite the high perception of the importance and necessity of conserving green spaces, there seems to be a difference in the value and need for green spaces. The mismatch on perspective is evident in how customary chiefs have not prioritized conservation of green spaces and how some customary members perceive green spaces as land for housing and urbanization. In contrast, other stakeholders: customary members, academics, and state actors have stated the need to prioritize conservation of green spaces in decision-making.

4.5 Customary Land Governance

4.5.1 Regulations

The first sub-variable of customary land governance investigates existing customary laws about the management or protection of green spaces within the case study areas. This aspect also explores how these customary regulations are relayed and enforced. Lastly, enforcement of customary laws in their respective districts was examined.

Number of Green Space Customary Laws

Respondents were asked about the presence of customary laws related to green spaces. In Asokore Mampong, one respondent, the elder, mentioned the existence of customary laws regarding green spaces in the district. On the other hand, four respondents, composed of the chief, household heads, and a state actor, have stated that customary laws related to green spaces were non-existent.

On the other hand, in Kwabre East, only the chief mentioned the presence of customary laws regarding green spaces in the district. Four respondents composed of an elder, household heads, and a state actor thought customary laws related to green spaces were absent. Another state actor mentioned having no idea about customary laws about green spaces in the district.

Asokore Mampong Household Head: "There are no customary rules that protect or preserve our green spaces."

Kwabre East Elder: "No. And I don't think there is a customary law on green spaces."

Kwabre East Household Head: "We do not have customary laws that protect green spaces in our district."

Another finding in customary laws is the recognition of some customary chiefs and an elder to the existence of green spaces yet also perceives such laws are archaic and irrelevant. For instance, an elder in Asokore Mampong considers a low volume of green spaces renders such customary laws irrelevant. Moreover, a state actor mentions that the customary laws regarding green spaces is ineffective in conserving green spaces.

Asokore Mampong Elder: "Yes, it used to be relevance in the past where these green areas exist in abundance, but currently due to the non-existence of these areas, I think that these laws are of no good use."

Kwabre East Chief: "Yes, that was for the then times that such places exist, but now, they're not relevant anymore."

According to the academic, the customary laws about green spaces exist as part of the culture of customary groups. Historically, these customary laws are about the protection of a sacred grove or a burial group. Thus, most customary laws about green spaces exist but only in areas with cultural importance.

Type of Green Space Customary Laws

Those who stated the presence of customary laws about green spaces were asked to specify the type of green spaces covered in these laws. In both districts, three types of green spaces were protected by customary laws; these are a. cultural sites such as cemeteries, sacred groves, or shrines; b. green spaces along waterways, rivers, and streams; and c. other green spaces designated by customary authorities, including wetlands, forests, nature reserves.

Kwabre East State Actor*: "They stop us from entering some places because of the shrines that they had there. […] they have some peers that they go there to pour libation that kind of thing. So, they don't want to be exposed so much, so we didn't go there."*

Asokore Mampong Elder: "In the past, there was a law that community members shouldn't cut trees along water bodies, and you do that, you will be made to replant in multiples to include other severe punishment."

Kwabre East Chief: "Cutting of tree along waterways is punishable."

Academics support the results from the semi-structured interview. According to academics, customary laws are usually for protecting sacred groves and forest areas designated by the customary chiefs.

Medium of Green Space Customary Laws

The medium of green space customary laws indicates the way customary laws are communicated and disseminated. Research assistants inquired about the medium of green space customary laws from the respondents who are familiar with the presence of customary laws. In Asokore Mampong, the elder mentioned that the customary laws in his district were not documented. Therefore, customary chiefs or traditional authorities only disseminate customary laws from word of mouth. Further, respondents stated that customary laws were passed from one generation to another. Similarly, for Kwabre East, a state actor maintains that customary laws are verbal.

Academics were interviewed to validate these findings. One academic asserts that customary laws are verbal ever since the formulation of such by the ancestors of customary members. Following this norm, customary laws have been verbally passed from one generation to another.

Academic Expert: "These are a culture that is inherited […] if you have a sacred area or sacred grove or a burial place or a place of historical importance and the chief or the custodians of the land declare that area as an area to be protected. And so, it is. They are mostly not written."

Enforcement of Green Space Customary Laws

When asked about the enforcement of customary laws, two respondents from Asokore Mampong, an elder and a state actor said that customary laws about green spaces were not

implemented in their district. The rest of the respondents from Asokore Mampong did not have a response about this. In Kwabre East, two respondents, customary chief, and state actor, have opposing views for the enforcement. For the chief, customary laws were implemented while the state actor claims that green spaces related to customary laws were not enforced at all.

Due to the sensitivity of the topic, it was challenging to acquire a concrete answer for most customary members in both districts. Thus, the limited findings were validated from academics and the focus-group discussion among customary chiefs.

Some respondents stated that enforcement of customary laws depends on the customary laws or traditional authorities in their district. Similarly, the academics mentioned that chiefs are the final decision maker of land-use changes. Therefore, the protection of green spaces from conversion relies on the commitment of the customary authorities in the districts.

AM Elder: "I think the concentration was on everything that the traditional leadership deems it green such as the cemetery, forest."

Academic Expert: "If the chief wants them to be enforced, they are enforced. Because the chiefs are the final decision maker of our land-use change, so, if they insist that they want this area to remain under vegetative cover, it will be so."

Lastly, results indicate that the protection and conservation of cultural sites such as cemeteries, sacred groves, or shrines were the most enforced in the case study sites. These cultural sites are covered in green vegetation and are considered green spaces. In fact, according to customary chiefs and state actors in Kwabre East, most of these green spaces have been protected from land-use changes and encroachment of settlements. In other words, in the case studies, green spaces with cultural significance are effectively conserved by customary laws.

Kwabre East Chief: We have a stream in this district where our traditional priest was situated. There were a lot of trees that were covering the stream, and the rule was that none of those trees should be cut down and the closers house was supposed to be 100 meters away from that place

Kwabre East State Actor: There are some ritual reservations where they were the shrines. They don't encourage people to go there. They want to keep the place as clean and as cool as they want it.

The interviewed academics confirm the results stating that customary laws protecting sacred groves and cemeteries are enforced by chiefs and adhered to by most inhabitants in peri-urban Kumasi. Further, they maintained that most of the remaining vegetation in the two case study sites were mostly green spaces with cultural significance.

Academic 1: Then, in communities where there are sacred groves, then those are also protected by customary laws. So, this time by the customary landowners. […] Also including peri-urban cemeteries. Because they are cemeteries, they are usually not encroached. So those are also some of the green spaces that are actually intact within those peri-urban zones. Aside from that, all other green spaces are being converted

4.5.2 Processes

For the processes, community representation was explored. Respondents were asked about community representation in the decision-making of green spaces land-use changes and the formulation of customary laws about green spaces. Finally, meetings and dialogues between customary chiefs and members about decisions on green spaces were examined.

A significant number of respondents have not provided concrete answers for some section of this sub-variable during the data collection. Some respondents in both districts found the topics of community members representation as controversial and sensitive. This finding is not explicitly mentioned by respondents but was observed during the transcription process. Further, the research team also cross-checked the sensitivity. Validation from academics and the focus-

group discussion among customary chiefs was employed to address these gaps in findings (see 3.2).

Community Representation in Formulation of Customary Laws about Green Spaces

In terms of formulating customary laws about green spaces, all five respondents from Asokore Mampong stated no involvement of customary members in the process. In Kwabre East, two respondents, composed of a chief and a household head, mentioned the absence of community involvement in customary laws regarding green spaces. Moreover, four respondents from Kwabre East, consisting of an elder, a household head, and two chiefs, claimed that they were not aware of representation in the formulation of customary laws about green spaces.

AM Elder: "The formulation of these laws will be decided by the customary authorities already before community members start to encroach on such lands."

KE Chief: "These laws are formulated when in the best senses of the traditional leaders deem it right to protect such areas for future generations, sometimes traditional council sit to elaborate on the need to do that."

Both customary chiefs and academics were interviewed to cross-validate these findings. They agreed that the formulation of customary laws about green spaces is discussed within customary authorities and does not include any form of community representation.

Academic: "These days, you hardly hear anyone formulating rules as such. These are traditions that have been inherited from past generations, and they have their own peculiar history. So, if something has happened in the past in an area and an area and because of that, a piece of land will be declared sacred. Then that tradition is passed from generation to generation."

Community Representation in Decision-making of Land-use Change of Green Spaces

Respondents were asked about the presence of community representation in the decision-making of land-use changes related to green spaces. In Asokore Mampong, respondents unanimously stated the absence of community representation in land-use decision-making in green spaces in the district.

On the other hand, in Kwabre East, the chief claimed efforts exist to involve the community in decision-making regarding green spaces land-use changes but only in few instances. However, four respondents, including an elder, have mentioned the absence of community representation in the land-use change of green spaces decision-making. Lastly, the two respondents, both state actors, did not respond to this question due to the sensitivity of the topic.

Asokore Mampong Elder: "No, because only the chief has the privilege to decide to communicate to other community members."

Kwabre East Chief: "They don't have any role to play."

Kwabre East Household Head: "The traditional authorities of this community take such decision without informing anyone."

Upon verifying with academics and discussing with customary chiefs in the FGD, the results were verified that unilateral decision-making in land-use changes of green spaces exists in peri-urban Kumasi. Whereas the customary authorities, including chiefs and sometimes with elders, discuss decisions in green spaces without the knowledge of customary members.

Academic: "If there is a need for them to convert, they just take that decision […]"

Number of Meetings or Dialogues Between Chiefs and Members LUC of Green Spaces

For the meetings or dialogues between chiefs and customary members, land-use changes of green spaces were part of the agenda based on two respondents, a chief and an elder in Asokore Mampong. On the contrary, according to three respondents, two households and a state actor, meetings or dialogues between customary chiefs and members about land-use changes of green spaces were non-existent.

AM State: "No. They don't at all. No, they don't say. Like I said, the place is developed, and there is nothing like meetings and informing."

AM Elder: "Yes, the chief and elders of this community used to relay information to the entire community, especially when it comes to using of community lands for developments by the government."

In Kwabre East, the chief and a state actor asserts that land-use changes of green spaces in the district were discussed in dialogues and meetings with community members. Nonetheless, two respondents, both household heads, state otherwise. There were two respondents, an elder and a state actor, who were uncertain about whether meetings or dialogues about LUC of green spaces are present.

KE Chief: "These laws are spoken laws that are announced to community members during a large gathering."

Finally, according to chiefs from the focus-group discussion, community members are summoned and informed regarding customary lands. On the other hand, the academic interviewed mentions that customary chiefs only engage with customary members or families that own the lands impacted by land transactions.

4.5.3 Institutions

Number of Disputes about Customary Land or Green Spaces

The respondents were interviewed about customary land or green space disputes in the district. In Asokore Mampong, a household head specified existing conflicts in the community adds that this occurred when customary chiefs were not around in the district. The dispute mentioned was about the selling of land to multiple parties or individuals. On the other hand, the rest of the respondents, including a chief, an elder, a household head, and two state actors, have mentioned the absence of disputes about LUC and green spaces in the district.

Asokore Mampong Household Head 1: "There are no disputes about green spaces in Asoroke Mampong here."

Asokore Mampong Household Head 2: "I think last year, the Customary Chief of Asokore Mamong was out of the country where customary land disputes arose due to selling the land to multiple parties or individuals."

Meanwhile, in Kwabre East, one household head stated existing disputes in their community about the right to sell and the right to use the reserved lands for future development. Four respondents, composed of the chief, an elder, one household head, and one state actor, stated that there were no disputes in the district. Lastly, one state actor was not able to confirm the absence or presence of disputes. It worth pointing out that, according to some respondents, most customary conflicts occur between families. Such disputes are highly unlikely to emerge from customary members within the same family. A state actor in Kwabre East also points out that community members are not interested in forwarding complaints about green spaces to

customary authorities. Thus, even if disputes exist, it remains unreported. The Kwabre East state actors adds that this situation is born out of the culture in peri-urban Ghana where actions of senior or older Ghanaians should are justified and to oppose them are considered a taboo.

Kwabre East Household Head: "Yes. For instance, the right to sell or right to use the reserves lands for future development between two family clans."

"Kwabre East State Actor: "Because it is like a taboo for somebody to come out victorious against his senior brother."

Academics were asked about the customary land disputes in green spaces to cross-check these findings. One academic mentioned that disputes in green spaces are minimal because green spaces in the districts have few. He also adds that these disputes about green spaces are between customary members residing in disaster-prone areas such as wetlands and state actors.

Academic 1: "These are isolated cases just happens once. Because we don't have areas within those landscapes. So, these are usually the wetlands, areas that are usually prone to flooding where state actors have problems with residential activities within those areas. […] It is not ever a common practice. Land related issues are not that common there."

Presence of Conflict-Resolution Mechanisms about Disputes in Green Spaces

Respondents were asked about existing conflict-resolution mechanisms that deal with customary land disputes in the districts. In Asokore Mampong, only two household heads were able to provide a concrete answer about the presence of conflict-resolution mechanisms in customary disputes. For the two household heads, it is the customary chief who resolves customary land ownership disputes and designates the bundle of rights of customary land to the rightful owner.

Asokore Mampong Household Head 1: "The traditional leaders and Customary Chief of this community ensure that ownership or right to lands is designated to the rightful persons."

Asokore Mampong Household Head 2: "He [the chief] ensures that ownership and use of lands as well as green spaces are in order."

Meanwhile, five respondents from Kwabre East mentioned the existence of customary conflict-resolution mechanisms. Among them, three respondents, the chief, an elder, and a state actor, mentioned that the customary chief ensures ownership and bundle of rights to be designated to the right owner. Further, three respondents, an elder, and two household heads, stated that some conflicts are also resolved by the Ashanti Kingdom Chief, Otumfuo Osei Tutu II. Incidentally, one state actor was uncertain in providing a clear answer for the inquiry.

Kwabre East Elder: "In terms, ownership, and use of green spaces, the customary chief and other traditional leaders or family clans ensure that everyone or individual is entitled to what he or she owns or can use. So, the lands in this community have been divided among the various families, and there are no ownership disputes among families."

However, according to the chiefs from focus-group discussion, no significant action has been made to resolve customary land disputes. They also mentioned that collaboration with chiefs to resolve conflicts in customary land or green spaces would require assistance with the district assemblies.

Kwabre East Chief: "There is nothing we are doing about it now. All that we want is for the assembly to collaborate with the customary elders and the chief."

On the other hand, academics have stated that instances of conflicts in customary lands have been uncommon. Recently, most disputes about customary lands and green spaces were between state actors and community members. In such cases, the conflicts were about non-

compliance with buildings being constructed along waterways and rivers. Thus, these conflicts were resolved by the state through legal processes.

Academics: "Usually, there are some conflicts with government actors, especially waterways, are being given out for construction and permits will not be issued."

Number of Collaborations of Customary Chiefs and Other Stakeholders

In terms of collaborations between customary chiefs and other stakeholders, all five respondents, the chief, an elder, two household heads, and a state actor, in Asokore Mampong, mentioned that there are collaborations in the community.

Asokore Mampong Chief: "Yes, the traditional authorities have partnered the Assembly."

However, in Kwabre East, the responses were varied. For three respondents, the chief, an elder, and a household head specified that there were collaborations between customary chiefs and other stakeholders. One household head claim that there were no collaborations between chiefs and other stakeholders. Two respondents, both state actors, were unable to provide a clear answer to the question.

Kwabre East Elder: "Yes. Even the District Assembly, Chiefs, and some churches in this community collaborated."

Kwabre East Household Heads: "Well, the coordination and collaboration are only between the Chiefs and Officials of the District Assembly."

Validating these findings, the academics have mentioned that there were few collaborations by the chiefs in each district. However, most of the collaborations were between religious groups and non-government organizations.

Types of Collaborations of Customary Chiefs and Other Stakeholders

Findings show different types of collaboration and partnerships from the respondents that stated existing collaborations between customary authorities and other stakeholders. In Asokore Mampong, respondents stated three types of collaborations of chiefs with other stakeholders: a. between traditional leaders and district assembly officers for public awareness campaigns of projects implemented within the district; b. customary authorities with state actors in coordinating with land developers for payment of development levy and building permit; and c. the partnership of state actors and customary members through a volunteer group, aiming to protect and manage environmental resources on Asokore Mampong.

Asokore Mampong Chief: "Yes, the traditional authorities have partnered the Assembly, […] that the Assembly only charges for development levy and building permits from individual land developers, once the individual holds the requisite documents from the traditional leadership."

Asokore Mampong Elder: "Yes, but the partnership is semi-formal, especially with individual stakeholders into the conservation of environmental resources."

In Kwabre East, respondents stated that partnerships that exist were: a. between the state and customary chiefs, about the management of green spaces, particularly, forests, wetlands, and marshlands; b. the partnership of district assembly and customary authorities in public awareness regarding projects for implementation within the district; and c. partnerships between chiefs, state actors, and religious groups in the planting of trees around the district.

Kwabre East Elder: "Yes. Even the District Assembly, Chiefs, and some churches in this community collaborated to undertake tree planting exercise."

The focus group discussion respondents and academics also supports that customary chiefs mostly collaborate with non-government organizations or religious groups to transfer ownership of land to or projects related to conservation of green spaces within the districts.

4.5.4 Practices

During the coding of data, an emerging trend of "practices of customary members influencing land-use changes of green spaces" was found. Because of this, a new indicator of practices was included in the findings. The respondents determine the main difference between "practices" of customary actors to the "collaboration" indicator between chiefs and other stakeholders. For the respondents, most of these actions were not "collaborations" but of individual efforts by customary chiefs and customary families that hold ownership of customary lands and green spaces. Since stakeholders that perform these practices are within customary land governance, the code 'practices' are included in the variable "customary land governance." The different practices in peri-urban Kumasi that affect land-use changes of green spaces are presented in the next sub-sections.

Practices of Customary Chiefs

Customary chiefs and authorities initiate the most common customary land governance practices that influence land-use changes. All respondents interviewed mentioned that customary chiefs and authorities in Asokore Mampong and Kwabre East dictate the ownership and land-use of customary lands in one way or another.

Academic: "All the powers lie in the hands of the customary owners of the land. And they decide what the land is used for. So, they actually dictate to the government actors what they want to put the land-use into."

The main finding of this section is how, as academics and state actors have mentioned, customary chiefs have deliberately sold the land without consulting state actors and disregarding land-use plans. Most of these sold lands, according to the respondents, are green spaces such as farmlands, forests, and sometimes sacred groves.

Academic: "The chief allocates the land for me to convert into the building to construct. These are lands distributed to new owners or individuals for residential use. Without the knowledge of state actors and institutions that are supposed to play active roles in that."

Kwabre East State Actor: "The fact of the matter is the chiefs […] are helping to disrupt our land-use plans. The chief will sell his portion, and the land is getting finished, the water areas are rezoned by force. Not by the right way of rezoning the land, but they go to sell that land. Before you realize they are building on school land before you realize they are building on waterways."

Academic 2: "You even hear of reports where sacred greens are being converted, burial sites are being sold to developers."

The practices of chiefs in selling land to developers and inhabitants have impacted land-use planning in peri-urban Kumasi. According to state actors and academics, planning in peri-urban Kumasi has been keeping up with the rapid conversion of customary land to built-up areas, especially residential settlements. Since residential land-use has been designated to customary lands, state actors are left with nothing but to approve these land-use changes.

Academic: "So what happens within the peri-urban landscape, usually instead of planning to preserve development, in our case, we have development running far beyond planning, so the planners only get in when the area is already converted which is usually being led by the landowners. […] Once the customary owners give them out for residential activities, government actors must just approve it and allow that happen.

Another finding, gathered from state actors, is that customary chiefs influence land-use plans in peri-urban Kumasi. As lands are sold, the state actors will try to draft a land-use plan which contains a considerable amount of green spaces on the land to be implemented., as a standard in their Legislative Instrument (L.I.) However, in practice, such land-use plans are not followed; instead of green spaces, the customary chiefs will construct residential areas. Furthermore, chiefs will even employ third-party surveyors to design their own land-use plans to be submitted to district assemblies. Or, in some cases, the customary chiefs employ state actors themselves to alter the land-use plans following the preference of the chief.

Kwabre East State Actor: "Sometimes they don't even come to the office. They have their own surveyors who help them allocate land we have reserved in the planning schemes to be used in future they will sell and change the land-use, we don't have a say."

Asokore Mampong State Actor: Whenever we prepare the planning schemes, we provide green spaces, but the land doesn't belong to the municipal assembly, it belongs to the stool, and the chiefs are the custodian. So, they just sell these places, and what was reserved for green spaces are being used for a different purpose.

Almost all respondents mentioned that customary chiefs were driven by the land pressure and land value increase in peri-urban Kumasi. State actors and academics emphasized that customary chiefs have considered the conversion of customary lands and green spaces to residential areas as a profitable venture.

Academic 1: "Whereby whenever there is land pressure for building purposes because the plots are expensive, the chiefs are motivated to convert these areas into building plots."

Academic 2: "Because of the demand for land, the chief for residential land-uses, the chief then all the customary landowners then go back to convert those allocated lands for urban parks into residential land-use."

Asokore Mampong State Actors: "The chiefs play a great role in the loss of the green areas because when they sell the land, for example, here in Asokore Mampong, the land here costs 90,000 and above."

Kwabre East State Actor: "Because the Nana [chiefs] wants to cash in those spaces.

Further, respondents also stated that traditional chiefs transfer customary lands to community members for agricultural or residential use. These lands vested into families and households for management. In a few cases, the chiefs designated lands to non-government organizations or civic groups in the districts for the conservation of green spaces.

Findings also show some customary families that received land from that chiefs sold lands to multiple parties. However, academics have stated that these are rare examples as the final approval on land ownership transfer resides on the customary chiefs.

Kwabre East Chief: "The chief has also set some lands aside for agricultural purposes, and it is being shared among his family members for farming, but they also end up selling those lands for commercial and residential purposes."

Finally, state actors and academics state that customary norms in peri-urban Kumasi prevent state actors from directly impeding the customary chiefs from their selling land practices. According to state actors, it is taboo to oppose the customary chiefs or the elderly openly. This culture, among other logistical and financial constraints, hinders state actors from managing green spaces and efficiently implementing land-use planning.

"Kwabre East State Actor: "In Ghana […] or in Africa, you can't tell your father to stop it. When you are in disagreement with your senior […], even if you are right, you will be declared the loser. Because it is like a taboo for somebody to come out victorious against his senior brother."

4.5.5 Summary: Customary Land Governance

Data analysis of customary land governance shows four critical findings. Firstly, three types of green spaces customary laws exist in case studies; these are customary laws for a. cultural sites;

b. green spaces along waterways, and c. other green spaces designated by customary authorities. Moreover, according to respondents, green spaces with cultural importance have been the most protected by customary laws. Findings also show that most customary laws are verbal. Moreover, there are no explicit customary laws regarding land-use change of green spaces in the peri-urban area. Based on the interviews, the implementation of these customary laws relies on the commitment of the customary authorities in the districts.

Secondly, results show no community representation in both formulations of customary laws and decisions on customary lands of the districts. Also, there seems to be limited and inconsistent engagement by the chiefs to inform the community members about land-use decisions and transactions. These results raise some questions on the accountability and transparency of customary land governance.

Thirdly, in terms of disputes in customary lands and green spaces, both districts have a limited number of conflicts between customary members. Such disputes are mostly between customary families or state and customary members. These disputes were usually settled by customary chiefs or through the King of Ashanti.

Finally, evidence from state actors, academics, and some customary members, suggests that customary chiefs and authorities have been dictating land-use changes of green spaces. Practices of customary chiefs identified are a) directly selling the lands to developers or other parties for residential land-uses, and b) by indirectly employing third-party planners or government planners to formulate land-use plans.

Chapter 5: Conclusions and recommendations

5.1 Introduction and Research Objective

Marfo (2012) highlighted that much of the studies in customary land governance are skewed on social impacts and economic effects of customary land tenure schemes to land-use planning and land-use change. Moreover, the literature on the environmental impacts of customary land governance in the land-use change of green spaces and vegetation has been limited. Cobbinah et al. (2019) have called for further study on environmental degradation posed by urbanization, specifically in the global south. The research aims to address the literature gaps on customary land governance impact on the environment and simultaneously to contribute to the call for research on peri-urbanization in the global south, as suggested by La Rosa et al. (2017).

Based on the results of data findings on primary interviews, secondary data, field visits, and GIS analysis, the research questions are answered in section 5. 2. The research is completed with recommendations for research and PBL in section 5.3.

5.2 Conclusions: Answering the Research Questions

To be able to understand the link between customary land governance and land-use changes of green spaces in peri-urban Kumasi, the following research questions were raised:

How does customary land governance affect land-use change patterns of green spaces in peri-urban Kumasi, Ghana?

- What is the land-use change pattern of green spaces in peri-urban Kumasi, Ghana?
- What is the relationship between perceptions of principal customary land actors to green space land-use changes in peri-urban Kumasi, Ghana?
- What are the existing customary regulations that affect the land-use change of green spaces in peri-urban Kumasi, Ghana?
- What are the customary processes in customary land governance that affect the land-use change of green spaces in peri-urban Kumasi, Ghana?
- What are the customary land institutions that affect the land-use change of green spaces in peri-urban Kumasi, Ghana?
-

5.2.1. What is the land-use change pattern of green spaces in peri-urban Kumasi, Ghana?

The first sub-question is answered by analyzing the pattern of land-use change of green spaces of the case study sites through comparison of land–use maps in 2000, 2010, 2015 (see Maps 5 and 6). Land–use maps were generated through GIS software based on the latest datasets on green spaces and land-use changes collected from the Ghana Forest Commission and PBL Netherlands Environmental Assessment Agency. The limitation of the dataset is that it does not consider the land-use changes from 2016 to 2020. GIS analysis was conducted to measure the pattern of green spaces land-use change in percentage. To triangulate the findings, primary interviews and site observations were utilized.

Results indicate that more than 30% of green spaces in peri-urban Kumasi have been converted to built-up areas and other land-uses from the year 2000 to 2015. Further, findings in the primary interviews, area photos, and secondary data have indicated the same decline of green spaces and conversion to another land - uses. The resulting trend is similar to the data collected from case study state authorities (Asokore Mampong Municipal Assembly, 2014; Kwabre East

Municipal Assembly, 2010). Interestingly, primary interviews have suggested that the land-use change of green spaces in peri-urban Kumasi has been driven by population increase and rapid urbanization. However, the relationship between population increase and rapid urbanization with the land-use change of green spaces is inconclusive with the data at hand since other land-use change drivers were not considered. This represents one of the limitations of the study. Further, there might be no direct relationship between the land area, population, and population density with the effect of customary land governance to land-use change of green spaces. This finding is based on both case studies having exhibited similar green spaces loss pattern despite having different populations and land areas. However, this research also has a limitation that statistical analysis of quantitative data about the decline of green spaces has not been conducted. It can be concluded that green spaces in peri – urban Kumasi is declining and converted to residential, industrial, commercial, and other land – uses.

5.2.2. What are the existing customary regulations that affect the land-use change of green spaces in peri-urban Kumasi, Ghana

As an answer to the second sub-question, the perception of green spaces was analyzed based on the findings of Fongar et al. (2019), who describe the perception of green spaces as a personal impression on the quality of green spaces. The research utilized primary interviews with principal customary land actors. The semi-structured interviews collected the perception of land-use changes in peri-urban areas from principal customary land actors. The research team selected the principal customary land actors, including customary chiefs, elders, customary members, and state actors. The researcher intended to triangulate the primary data collected with academic experts from BIRD - KNUST.

Findings show that principal customary land stakeholders perceive green spaces and the necessity of preserving it as important. Results also indicated that perception of the value of green spaces is high in peri-urban areas where different ecosystem services such as food security, livelihood, leisure and relaxation, local herbs (for treating malaria and fever), and disaster risk reduction were identified. This result is consistent with the definition of ecosystem services of The Millennium Ecosystem Assessment (Reid et al., 2005) and the U.S. Department of Agriculture (2014), which highlights the benefits: provisioning services, regulating services, supporting services and cultural services, acquired from ecosystems. Another finding emerged where green spaces are perceived as essential during the COVID – 19 pandemic as testing centers, quarantine sites, and recreational areas during the lockdown. Therefore, findings show that the principal customary land actors specified that green spaces should be conserved to preserve the numerous services and benefits acquired from green spaces.

Also, findings indicate that the perceived definition of green spaces supports the theoretical definition of Fuwape and Onyekwelu (2011), who identified an African definition of green spaces as areas with a significant amount of vegetation such as parks, plantations, gardens, green belts, woodlands, rangeland, and forests close to urban areas. Nevertheless, the result shows that green spaces in peri-urban Kumasi include water bodies such as wetlands, marshes, rivers, and ponds as green spaces. This means that in the context of peri-urban Ghana, the definition of green spaces is different from the European description, which rejects the definition of green belts, green fingers, and greenways stated by Adjei Mensah (2014). Thus, results not only confirm the green space definition reported by Fuwape and Onyekwelu (2011) but also extend to water bodies.

However, findings also show that despite the high perception of the importance and necessity of conserving green spaces, there seems to be a contrast in the value and need for green spaces.

The difference in perspective is between those who have stated the need to include conservation of green spaces in decision-making and the other stakeholders perceive differently. The results have shown that little is done by customary leaders, despite the high perception of importance to preserve and manage green spaces. The finding rejects the conclusion of Vargas-Hernandez et al. (2018), where the higher perception of green spaces would cause responsible customary land governance on green spaces. In fact, in some cases, the customary chiefs, who have shown high perception of the importance of green spaces conservation, hinder the preservation of green spaces.

5.2.3. What are the customary processes in customary land governance that affect the land-use change of green spaces in peri-urban Kumasi, Ghana?

Data on existing green spaces customary law related to land-use change were gathered from primary interviews to answer the third sub-question. This section presents rules and norms governing decision-making, hierarchal status, and resource allocation, as declared by Arko – Adjei (2010). Further, The researcher intended to investigate the presence of customary regulations based on the type of green spaces covered in these laws, the medium of dissemination, and the level of enforcement of the customary regulations that affect the land-use change of green spaces in peri-urban Kumasi. Since the results are primarily based on interviews, the quality of the results depends on the responses from interviews. However, given the sensitivity of the topic, some respondents did not provide a concrete answer to the question of enforcement of customary laws. Thus, the partial findings were validated from academics and the focus-group discussion among customary chiefs. This limits the accuracy of the findings, especially on the enforcement of customary regulations.

Findings also show that most customary laws are verbally disseminated and not documented. This medium of customary laws has been the norm since the creation of customary laws in peri-urban Kumasi. Also, results show no explicit customary laws regarding land-use change of green spaces in the peri-urban area. This is supported by the work of Hughes et al. (2019), stating that customary laws have been unclear in the role of customary authorities in the management of customary lands. The lack of documentation also restricts the accountability of customary authorities, as Arko -Adjei (2011) suggested, where documentation is essential in information sharing and transparency to stakeholders.

Findings indicate three types of customary laws on green spaces that exist in peri-urban Kumasi; these are customary laws for cultural sites, green spaces along waterways, and other green spaces designated by customary authorities. Findings show that these green spaces are preserved due to its cultural significance and not because of its vegetation and green space cover.

5.2.4. What are the customary land institutions that affect the land-use change of green spaces in peri-urban Kumasi, Ghana?

Similar to section 5.2.3, data about existing customary processes that affect green spaces land-use change were gathered from primary interviews. Customary processes relate to the delivery of activities and actions that consist of reporting and explaining decisions by authorities as cited from FAO (2007). Based on this definition, the researcher intended to examine customary processes into community representation in customary law formulation, decision making of customary lands, and the presence of consultations of customary decision-makers to constituents. The researcher also explored the effect of these customary processes on the land-use change of green spaces in peri-urban Kumasi. As explained in section 5.2.3, the primary interviews utilized by the researcher were limited by the sensitivity of the topic; some

respondents did not answer questions on the community involvement in customary law formulation and decision-making. The limited findings were triangulated academics and the focus-group discussion among customary chiefs. This may affect the accuracy of the results for this section.

Findings indicate that there is no community representation in both formulations of customary laws and decisions on customary lands of the districts. Also, results show that chiefs are not required by customary law to inform the community members about land-use decisions and transactions. In other words, chiefs would reach out to the community and conduct consultations on decision-making based on their preference. This is in line with the findings of Obeng-Odom (2014), who reported that customary chiefs in Ghana had sold customary land for personal economic gain without consent and consultation from the community members.

5.2.5 What are the customary land institutions that affect the land-use change of green spaces in peri-urban Kumasi, Ghana?

The answer to the fifth sub-question is built on the data collection method of section 5.2.3 and 5.2.4. Data about customary land institutions are conceptualized based on the report of Kjaer (2004), where institutions are collective guidance, control, and collaborative land management. It also includes "patterns of interaction" among stakeholders (Bruce, 2013 p. 2). Based on the literature, the study investigates disputes, conflict – resolution mechanisms, and collaborations in peri-urban Kumasi. The study result shows that disputes on customary lands and green spaces were uncommon in the case study sites. Also, findings show that these disputes are frequently between customary families of a community or between state and customary members. This confirms the findings of Ubink (2010) and Arko – Adjei (2011), who reported that customary disputes between landholding families have persisted in peri-urban Kumasi, Tamale, and Japekrom stool lands. Findings also indicate that land disputes were settled by customary chiefs or the King of Ashanti. These customary actors also decide to designate ownership and bundle of rights after the conflict has been settled. Another finding emerged, which are instances where disputes with customary chiefs or senior community members remain unreported. There seems to be a culture in peri-urban Ghana where it is considered taboo to oppose the aged or older Ghanaian.

In addition, findings indicate existing collaboration indeed affects the land-use change of green spaces in peri-urban. Specifically, collaborations involving greens spaces are partnerships on processing building permits, planting, protection, and management of environmental resources, particularly forests, wetlands, and marshlands around the district. Results show that these collaborations require the presence and participation of customary chiefs to be feasible.

5.2.6 The Main Research Question: How does customary land governance affect land-use change patterns of green spaces in peri-urban Kumasi, Ghana?

Building on the findings in the five sub-questions, the main research question is answered. Findings in both cases studies have shown how customary land governance affecting land-use change patterns of green spaces in peri-urban Kumasi. Results indicate that customary laws on green spaces have been sufficient to only green spaces with cultural significance. Furthermore, findings suggest that customary land governance affects land-use change patterns through the (lack of) customary processes. Results show that customary authorities directly influence driving or allowing the land-use change of green spaces in peri-urban Kumasi. Findings also emerge on how customary institutions allow partnerships and collaborations that potentially aim to preserve green spaces and settle disputes through the authority of the customary chiefs.

The findings are consistent with the postulations of Arko-Adjei (2010), Kleeman (2017), Ubink (2010), Obeng – Odom (2014), Boamah and Amoako (2020), Yeboah and Shaw (2013), and Wily (2012).

The main finding of the research shows that customary processes and institutions have situated customary chiefs in a position without checks and balances to influence land-use change of green spaces directly. Customary chiefs and authorities have been found to practice deliberately selling green spaces in peri-urban Kumasi without consulting state actors and disregarding land-use plans. This finding confirms the conclusion of Ubink (2010) and Obeng – Odom (2014) that chiefs have sold the land to developers and have taken the front-seat in land-use planning in peri-urban Kumasi. Another finding indicates customary chiefs commonly practice commissioning state actors and third – party surveyors to draft land – use plans to initiate land-use changes of green spaces and customary land. These findings are consistent with the postulations of Ubink and Amanor (2015) and Yeboah and Shaw (2013), where similar instances in peri-urban Ghana were present.

To conclude, the study unpacks customary land governance through regulations, processes, and institutions to show how these aspects are being "misruled" by customary authorities, echoing Boamah and Amoako (2020). Through the practices of customary chiefs, customary land governance has been affecting the decline of green spaces and conversion to other land – uses. It was also established that the perception of green spaces has not directly affected the decisions of customary authorities in their practice of land - use conversion. Furthermore, the existence of collaborations and partnerships shows the potential that customary authorities can perform the preservation and management of green spaces. These findings from the peri-urban Kumasi contributes to the existing literature on customary land governance and land-use changes of green spaces.

5.3 Research Recommendations and Suggestions

The research focused on the relationship of customary land governance to land-use changes in green spaces of case studies in peri-urban Kumasi. Substantial qualitative data was acquired and analyzed from the study. It would be interesting to develop the research on this topic and apply quantitative analysis on the same research to examine if the results can be generalized to the broader peri-urban landscape. Similarly, it would be interesting to develop the same analysis on other peri – urban municipalities in Kumasi to validate if results will be similar, especially with the perception of principal customary land actors which may vary in different contexts and areas. Moreover, a study on the statutory land governance adopting the research strategy is also encouraged to acquire a full picture of the dual land tenure system in Ghana. Building on this study, the researcher encourages further work examining other drivers of green spaces land-use changes on peri-urban Kumasi and how customary land governance interacts with these drivers.

A similar research analysis can be done on a larger scale in other African countries, particularly in countries where the state legally recognizes customary land tenure. It would be interesting to see how other customary authorities are dealing with land-use changes in green spaces driven by rapid urbanization.

5.4 Policy and PBL Recommendations

The study is part of a PBL research project to explore strategies and scenarios for inclusive green growth in the Kumasi peri-urban landscape. Findings from the research suggest that

customary land governance actors, particularly customary chiefs, directly influence and almost unrestrained authority in land-use changes of green spaces. The research also indicates a need to empower state actors that implement land–use plans and strategies to manage green spaces in peri-urban Kumasi. Study findings also show that customary authorities have collaborated with third-party groups in the past to pursue the management of green spaces; this can be a potential intervention point for policymakers and PBL.

In the broader view, policy intervention on the dual land tenure system is encouraged to harmonize customary and statutory land laws in Ghana. The research suggests the importance of further research on customary land governance to ensure the feasibility and implementation of inclusive green growth in peri-urban Kumasi.

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Annex 1: Research Instruments

Annex 1.1 Interview Guide A: Customary Actors

Greetings! I am Janssen Andrew S. Calvelo, an Urban Management and Development master's student at the Institute for Housing and Urban Development Studies (IHS), Erasmus University Rotterdam, Netherlands. Currently, I am conducting my thesis about the link between customary land governance and land-use change of green spaces in peri-urban Kumasi.

In line with this, I would like to request for your time for an interview which would take at least an hour. Rest assured that all information and personal details collected from this interview will remain confidential and used exclusively for this research. Moreover, I would also like to ask for your approval to record this interview for transcription.

Should you have questions regarding this interview, please do not hesitate to contact me through email at jascalvelo@gmail.com or 552044js@eur.nl.

Thank you very much!

Interview Guide A **(For Customary actors)** **Interview will take 1 hour**	
PROFILE	
Position **(please spell-out):**	
Territory/Location **(please spell-out):**	
Contact #:	E-mail address (if available):
Time started:	Time ended:
Questionnaire number	
Part. I Perception of Green Spaces and Land-use	
*Note: Briefly explain the perception to the respondents which deals with the **personal impression** of quality green spaces and importance of green spaces in decision-making (Fongar et.al. 2019). Answers for this part should be based on their experiences and opinions.* What is your opinion about green spaces in your district? *Follow-up: do you think green spaces are important? Why/Why not? (If not discussed)* Do you think green spaces in your district should be conserved? Why/Why not? Do you think green spaces should be prioritized in your decisions and agenda in your district? What is the rate of land-use changes of green spaces in your community? *Follow-up: What do you think is the quality of green spaces in your district? (If not discussed)*	
Part. II. Customary Land Governance	
Regulations	
Are there customary laws about green spaces in your district? **(If no, skip to 10.)** Can you describe the customary laws you mentioned?	

What kind of green spaces are included in these laws?

Please clarify if customary laws are about forest, gardens, parks, wetland, agricultural areas, etc. if necessary.

Are these laws written or spoken laws?

Kindly ask for the method or way these laws are communicated to household members.

Processes

How are customary laws/regulations about green spaces formulated?

Do you inform your community about your decisions in customary land?
(If yes, how? If no, why?)

What is the role of the customary members in deciding the use or change of use of green spaces?

What is the role of the customary members in transfer of green spaces use to individuals or families?

Do you convene with your customary members to discuss about decisions on green spaces?

(If yes, how often? If no, skip to 13.)

Institutions

Do you have disputes about green spaces in your district/community?

Green space disputes consist of disputes about ownership, use, or other disagreements about green spaces in customary land.

If no, skip to 18

How do you resolve these disputes?

How long does resolving disputes regarding land-use change of green spaces usually take?

How many customary land or green spaces related disputes are there in your district/community per year? (*you can ask them for an estimate if they are not documenting the disputes)*

Are you in coordination or partnership with the other stakeholders regarding land-use changes of green spaces? *Note: this question intends to look at past or existing transaction/coordination/collaboration with customary leaders and stakeholders below.* **If yes, what kind of partnership or interaction do you have with them?**

Final Note: Is there anything else you would like to add?

Can I contact you in case of some clarification during my analysis?

Can I ask for your consent in using your name for the data analysis of my research?
[ ] Yes, Name:

[ ] No

Thank you for your time and participation. Once more, I would like to ensure you that this interview is confidential and purely for academic purposes.

Annex 1.2 Interview Guide B: Household Members

Greetings! I am Janssen Andrew S. Calvelo, an Urban Management and Development master's student at the Institute for Housing and Urban Development Studies (IHS), Erasmus University Rotterdam, Netherlands. Currently, I am conducting my thesis about the link between customary land governance and land-use change of green spaces in peri-urban Kumasi.

In line with this, I would like to request for your time for an interview which would take at least an hour. Rest assured that all information and personal details collected from this interview will remain confidential and used exclusively for this research. Moreover, I would also like to ask for your approval to record this interview for transcription.

Should you have questions regarding this interview, please do not hesitate to contact me through email at jascalvelo@gmail.com or 552044js@eur.nl.

Thank you very much!

<table>
<tr><td colspan="2">Interview Guide B (For Customary Household Heads/Members)
Interview will take 1 hour</td></tr>
<tr><td colspan="2">PROFILE</td></tr>
<tr><td colspan="2">Household Position:</td></tr>
<tr><td colspan="2">Territory/Location (please spell-out):</td></tr>
<tr><td>Contact #:</td><td>E-mail address (if available):</td></tr>
<tr><td>Time started:</td><td>Time ended:</td></tr>
<tr><td colspan="2">Questionnaire number</td></tr>
<tr><td colspan="2">Part. I Perception of Green Spaces and Land-use</td></tr>
<tr><td colspan="2">Note: Briefly explain the perception to the respondents which deals with the personal impression of quality green spaces and importance of green spaces in decision-making (Fongar et.al. 2019). Answers for this part should be based on their experiences and opinions.

What is your opinion about green spaces in your district?

Follow-up: do you think green spaces are important? Why/Why not? (If not discussed)

Do you think green spaces in your district should be conserved? Why/Why not?

Do you think green spaces should be prioritized in decisions and agenda of your customary chiefs in your district?

What do you think is the rate of land-use changes of green spaces in your community (decreasing or increasing)?
Follow-up: What do you think is the quality of green spaces in your district? (If not discussed)</td></tr>
<tr><td colspan="2">Part. II. Customary Land Governance</td></tr>
<tr><td colspan="2">Regulations</td></tr>
<tr><td colspan="2">Are there customary laws about green spaces in your district?
(If no, skip to 10.)

Can you describe the customary laws you mentioned?</td></tr>
</table>

What kind of green spaces are included in these laws? *Please clarify if customary laws are about forest, gardens, parks, wetland, agricultural areas, etc. if necessary.* Do you think these laws are enforced? **If yes, how?** Are these laws written or spoken laws?
Processes
How are customary laws/regulations about green spaces formulated? Are you informed about any decision in use or transfer of customary land? **(If yes, how?)** Are you informed about decisions in use or transfer of green spaces to families or individuals? **(If yes, how?)** Does your customary chief convene with you to discuss about decisions on green spaces or customary land? **(If yes, how often? If no, skip to 14.)**
Institutions
Do you have disputes about green spaces in your district/community? *Green space disputes consist of disputes about ownership, use, or other disagreements about green spaces in customary land.* **If no, skip to 18** How are these disputes resolved? How long does resolving disputes regarding land-use change of green spaces usually take? How many customary land or green spaces related disputes are there in your district/community per year? (*you can ask them for an estimate if disputes are not documented)* Are you aware in coordination or partnership of customary chiefs with the other stakeholders regarding land-use changes of green spaces? *Note: this question intends to look at past or existing transaction/coordination/collaboration with customary leaders and stakeholders below*. **If yes, what kind of partnership or interaction is it?**
Final Note: Is there anything else you would like to add? Can I contact you in case of some clarification during my analysis? Can I ask for your consent in using your name for the data analysis of my research? [ ] Yes, Name: [ ] No Thank you for your time and participation. Once more, I would like to ensure you that this interview is confidential and purely for academic purposes.

Annex 1.3 Interview Guide C: State Actors

Greetings! I am Janssen Andrew S. Calvelo, an Urban Management and Development master's student at the Institute for Housing and Urban Development Studies (IHS), Erasmus University Rotterdam, Netherlands. Currently, I am conducting my thesis about the link between customary land governance and land-use change of green spaces in peri-urban Kumasi.

In line with this, I would like to request for your time for an interview which would take at least an hour. Rest assured that all information and personal details collected from this interview will remain confidential and used exclusively for this research. Moreover, I would also like to ask for your approval to record this interview for transcription.

Should you have questions regarding this interview, please do not hesitate to contact me through email at jascalvelo@gmail.com or 552044js@eur.nl.

Thank you very much!

Interview Guide C **(For State Actors)** **Interview will take 1 hour**	
PROFILE	
Position **(please spell-out):**	
Office and Branch **(please spell-out):**	
Contact #:	E-mail address (if available):
Time started:	Time ended:
Questionnaire number	
Part. I Perception of Green Spaces and Land-use	
*Note: Briefly explain the perception to the respondents which deals with the **personal impression** of quality green spaces and importance of green spaces in decision-making (Fongar et.al. 2019). Answers for this part should be based on their experiences and opinions.* What is your opinion about green spaces in your district? *Follow-up: do you think green spaces are important? Why/Why not? (If not discussed)* Do you think green spaces in your district should be conserved? Why/Why not? Are green spaces prioritized in decisions and agenda of customary chiefs in your district? What do you think is the rate of land-use changes of green spaces in your community (decreasing or increasing)? *Follow-up: What do you think is the quality of green spaces in your district? (If not discussed)*	
Part. II. Customary Land Governance	
Regulations	
Are there customary laws about green spaces in your district? **(If no, skip to 10.)** Can you describe the customary laws you mentioned?	

What kind of green spaces are included in these laws?

Please clarify if customary laws are about forest, gardens, parks, wetland, agricultural areas, etc. if necessary.

Do you think these laws are enforced? **If yes, how?**

Are these laws written or spoken laws?

Processes

How are customary laws/regulations about green spaces formulated?

Are state actors informed about any decision in use or transfer of customary land?
(If yes, how?)

Are state actors informed about decisions in use or transfer of green spaces to families or individuals?
(If yes, how?)

Do customary chiefs convene with you to discuss about decisions on green spaces or customary land?

(If yes, how often? If no, skip to 14.)

Institutions

Do you have disputes about green spaces in customary lands in your district/community?

Green space disputes consist of disputes about ownership, use, or other disagreements about green spaces in customary land.

If no, skip to 18

How are these disputes resolved?

How long does resolving disputes regarding land-use change of green spaces usually take?

How many customary land or green spaces related disputes are there in your district/community per year? (*you can ask them for an estimate if disputes are not documented)*

Are you aware in coordination or partnership of customary chiefs with state actors regarding land-use changes of green spaces? *Note: this question intends to look at past or existing transaction/coordination/collaboration with customary leaders and stakeholders below.* **If yes, what kind of partnership or interaction is it?**

Are you aware in coordination or partnership of customary chiefs with other stakeholders regarding land-use changes of green spaces? **If yes, what kind of partnership or interaction is it?**

Final Note: Is there anything else you would like to add?

Can I contact you in case of some clarification during my analysis?

Can I ask for your consent in using your name for the data analysis of my research?
[ ] Yes, Name:

[ ] No

Thank you for your time and participation. Once more, I would like to ensure you that this interview is confidential and purely for academic purposes.

Annex 1.4 Interview Guide D: Academic Experts

Greetings! I am Janssen Andrew S. Calvelo, an Urban Management and Development master's student at the Institute for Housing and Urban Development Studies (IHS), Erasmus University Rotterdam, Netherlands. Currently, I am conducting my thesis about the link between customary land governance and land-use change of green spaces in peri-urban Kumasi.

In line with this, I would like to request for your time for an interview which would take at least an hour. Rest assured that all information and personal details collected from this interview will remain confidential and used exclusively for this research. Moreover, I would also like to ask for your approval to record this interview for transcription.

Should you have questions regarding this interview, please do not hesitate to contact me through email at jascalvelo@gmail.com or 552044js@eur.nl.

Thank you very much!

<table>
<tr><td colspan="2">Interview Guide D (Academic Experts)
Interview will take 1 hour</td></tr>
<tr><td colspan="2">PROFILE</td></tr>
<tr><td colspan="2">Position (please spell-out): Research Fellow and Lecturer</td></tr>
<tr><td colspan="2">University/Department (please spell-out): Faculty of Renewable and Natural Resources
Expertise: Remote Sensing, GIS Application, Natural Resources and Land-use management, Forest and forest ecology</td></tr>
<tr><td>Contact #: +233 242406090</td><td>E-mail address (if available):</td></tr>
<tr><td>Time started: 1:06</td><td>Time ended: 1:46</td></tr>
<tr><td colspan="2">Questionnaire number</td></tr>
<tr><td colspan="2">Part. I Perception of Green Spaces and Land-use</td></tr>
<tr><td colspan="2">Note: Briefly explain the perception to the respondents which deals with the personal impression of quality green spaces and importance of green spaces in decision-making (Fongar et.al. 2019). Answers for this part should be based on their experiences and opinions.

What is your opinion about green spaces in peri-urban Kumasi (e.g. Kwabre East and Asokare Mampong)?

Follow-up: do you think green spaces are important for customary chiefs? Why/Why not? (If not discussed)

I think green spaces are decreasing. For some time now, I think for the past 30 years the urbanization has really pushed back so lands in Kumasi has been used up for urban developments and built-up expansion. So now the scale of it is moving on to the peri-urban landscape. So, a lot of forest lands and agricultural lands are being converted into built-up areas. So completely built-up or development are moving into the peri-urban landscape and completely they are losing their green spaces as well. Recently, just to talk about the peri-urban landscape with you where we did some land-use transition probably for you to get the quantitative information about the transitions within the peri-urban landscape of Kumasi.

<u>How about customary members (chiefs and indigenes)</u></td></tr>
</table>

It's the same, they also think they are losing a lot of green spaces. They are losing a lot of their forest cover, their crop lands to built-up construction. So it's the same trend, we are losing green spaces within those peri-urban landscape.

Do you customary chiefs are taking any step or actions to conserve green spaces?

Actually, in my honest opinion, there is nothing being done to conserve or manage these green spaces. The forces driving the conversions of these green spaces are far bigger than the need to conserve or manage them.

Are green spaces prioritized in decisions and agenda of customary chiefs in your district?

Not at all. Green spaces are not the priority of customary chiefs. It is the priority of development actors but because the lands belongs to the customary land owners its very difficult for them to impose their actions on the land owners.

What do you think is the rate of land-use changes of green spaces in peri-urban Kumasi (e.g. Kwabre East and Asokare Mampong)? Is it decreasing or increasing?

It is depleting.

Which areas do you define as green spaces?

We have two definitions we are looking at here. From the ecological perspective, from my perspective as a natural resource person, we are looking at all green covers from waterways, buffer zones, agricultural lands, patches of forest lands within peri-urban landscape. That is what we are looking at as green spaces within the peri-urban landscape. So, it covers every vegetative cover and every waterways, wetlands within these landscapes either for agricultural purposes or conservation purposes. We classify all of them as green spaces.

What land-use types are they converted to?

Mainly for residential. They are not much industrial activities within these landscapes. So, they are mainly being converted into residential land-uses.

Part. II. Customary Land Governance

Regulations

Are there customary laws about green spaces in Kwabre East and Asokare Mampong?
(If no, skip to 11.)

Not much. I am not abreast in those customary laws in those landscape. So I will not be able to speak much about them.

Can you describe the customary laws you mentioned?

Then in communities where there are sacred groves, then those are also protected by

customary laws. So, this time by the customary landowners.

What kind of green spaces are included in these laws?

Please clarify if customary laws are about forest, gardens, parks, wetland, agricultural areas, etc. if necessary.

In some communities they have their sacred groves that they protect. Such areas are usually not encroached.

Do you think these laws are enforced? **If yes, how?**

Are these laws written or spoken laws?

Processes

How are customary laws/regulations about green spaces in these districts formulated?

None. I am not familiar.

Are customary leaders informing stakeholders about any decision in use or transfer of customary land?
(If yes, how?)

So what happens within the peri-urban landscape, usually instead of planning to preserve development, in our case we are having development running far beyond planning, so the planners only get in when the area is already converted which is usually being led by the landowners. For instance, when I need a land, I just have to see the chief, the chief allocates the land for me to convert into building to construct. Then once that has been done before I go back to the local authorities to get the necessary permits done. So, it looks like the development is far going ahead of planning so its very difficult for the local authorities to really manage this land. Although they have clear cut plans for these green spaces within these peri=urban landscapes, they find it very difficult to catch up with this.

What are the measures or actions being done by state actors to rectify the inconsistencies done by customary actors on their formulated plans?

There has been a lot of efforts. There have been some management schemes that have been put in place. But especially that Kumasi is one of the most urbanized cities in Ghana and socioeconomic activites are driving a lot of development it's very difficult to have control over peri-urban landscape because the quest to convert for built-up expansion is high, the demand for land for construction is very high. So it's very difficult managing these peri-urban landscapes. Especially that they are very close to the central business districts. So, they find it very difficult to manage these lands. You always get in there just to realize the all the area have been converted so then they have to manage with the conversions and try to put things in place.

Are customary leaders informing stakeholders about decisions in use or transfer of green spaces to families or individuals?
(If yes, how?)

I think that is the responsibility of the chief but I don't think they engage. If there is a need for them to convert, they just take that decision then they inform government actors for their appropriate plans to put in place for them to do that.

In some of these lands, we have families owning some of these lands, so then the chiefs will have to engage with these families before the lands are put into residential land-use. Before the lands have been planned for residential land-use. Usually they engage the family heads. Before those decisions are taken.

Do customary chiefs meet with his customary members about decisions on green spaces or customary land?

(If yes, how often? If no, skip to 14.)

Institutions

Are you familiar with any disputes about green spaces in customary lands in Kwabre East and Asokare Mampong?

Green space disputes consist of disputes about ownership, use, or other disagreements about green spaces in customary land.

If no, skip to 18

None that I am familiar with, with regards to disputes around green spaces, no. All these decision lies within the customary heads, so once the chief decides to convert then they give out their lands. Usually there are some conflicts with government actors especially waterways are being given out for construction and permits will not be issued. So you need permits to access these landscapes so there are these conflicts between the government and then the new owners of the land. But that has nothing to do with the customary owners because they have already given out those parcels of land for construction. It then becomes between the new owners of the land and the government actors. Whether they will be given permits to construct those parcels of land or they will not be granted the permits to do so.

How are these disputes resolved? By customary body or state?

It is supposed to be resolved by the state authorities. But usually these things happens on the blind side of the state actors. Before they get in, its already been done, like the land has already been converted. So its up to the state actors to agree what has been done to rezone the area and just permit residential activities to happen here. Although there are clear laws governing such green spaces are supposed to be managed but usually it happens at the blind side of most

of these government actors.

These are lands distributed to new owners or individuals for residential use. Without the knowledge of state actors and institutions that are supposed to play active roles in that.

How long does resolving disputes regarding land-use change of green spaces usually take?

Some can go on for years, there are lots of factors. Yeah, usually years.

Do you have an idea, how many customary land or green spaces related disputes are there in Kwabre East and Asokare Mampong? (*you can ask them for an estimate if disputes are not documented)*

These are isolated cases just happens once. Because we don't have areas within those landscapes. So these are usually the wetlands, areas that are usually prone to flooding where state actors have problems with residential activities within those areas. Else, other green spaces they don't have really much to see about. Once the customary owners give them out for residential activities, government actors must just approve it and allow that happen.

Are you aware in coordination or partnership of customary chiefs with other stakeholders regarding land-use changes of green spaces? *Note: this question intends to look at past or existing transaction/coordination/collaboration with customary leaders and stakeholders below*. **If yes, what kind of partnership or interaction is it?**

No. All the powers lie in the hands of the customary owners of the land. And they decide what the land is used for. So, they actually dictate to the government actors what they want to put the land-use into. Then they have to comply with that. Unless they are moving into other green spaces like I said, like wetlands that are actually protected within these landscapes for a lot of reasons. Then, the government actors will not have to agree or give the permits on that. But for other green spaces or agricultural land-uses and forest land parts with those areas, they are easily given out by the customary landowners for residential land-use.

Can you expound more on the state actors' protection of wetlands?

There are laws that governs the actors will have to implement on the ground. So there are specific laws that guide construction activities within these enclaves. So when tehre are waterways, there are specific buffer zones that have to be specific for construction purposes also in wetlands there are specific laws that governs how they are managed. So in such instances, if it falls within customary land, the chief will have to consult before those lands are given out. Usually permits are not granted for residential activities within these state protected areas. But aside from those green spaces, all other green spaces are within the customary powers of the landowners.

Can you mention what these laws are that mandates the protection of wetlands, waterways etc.?

I will share that document with you but there are laws from the water resource which give specific buffer zones to which that are supposed to be allowed on wetland areas then also in

water ways where we have streams or rivers you have to give some specific buffer zones before you allow residential activities within those zones. And also, human related activities so I will share with you some of these laws probably after these interview. They are well-documented laws.

In terms of precedence, green space laws are usually waterways and buffer zones?

And wetlands, yes. Also including peri-urban cemeteries. Because they are cemeteries, they are usually not encroached. So those are also some of the green spaces that are actually intact within those peri-urban zones. Aside that all other green spaces are being converted.

What are the existing practices by customary actors (chiefs, members) that affect land-use changes of green spaces in peri-urban Kumasi?

I think aside giving those areas for residential activities, there's not much that they do. Most usually the forces come from individual's need for space to convert to residential land-use. There is a lot for land within these peri-urban landscapes , so those landscapes.

Are these conversion by customary landowners consistent to land-use plans of state actors?

then the customary land owners will have to comply and give those land areas for construction. All those activities are driven by demand for land for urban explansion. So it's the demand from population increase that is driving all these conversions within

Do you think this is present in Asokore Mampong and Kwabre East?

On Asokore Mampong:

I don't know of any sacred groves in Asokore Mampong. I know that are some wetlands in Asokore Mampong that are being protected. I don't see any residential activities within those wetlands yet. Asokore Mampong has a lot of wetlands that have been protected by the state. But I don't know if there are sacred groups within Asokore Mampong, none that I know of.

On Kwabre East:

None that I know of. I am not so familiar with their landscape. But I'm sure there sacred groves within those landscapes.

Final Note: Is there anything else you would like to add?

Can I contact you in case of some clarification during my analysis?

Can I ask for your consent in using your name for the data analysis of my research?
[ ] Yes, Name:

[ ] No

Thank you for your time and participation. Once more, I would like to ensure you that this interview is confidential and purely for academic purposes.

Annex 1.5 Field Work Guide (Individual)

NAME OF RESEARCHER: Janssen Calvelo

THESIS TOPIC: Understanding the Link Between Customary Land Governance and Land-use Change of Green Spaces in Peri-urban Kumasi, Ghana

FOCUS DISTRICTS:

1. Asakore Mampong
2. Kwabre East

DATA COLLECTION OVERVIEW:

Interviews		
District	Respondent	Sample size
Asakore Mampong	Customary Chiefs	3
	Household Heads	2
	Elders	1
	Representative of Traditional Council to District Assembly	1
	District Physical Planning Officer	1
Kwabre East	Customary Chiefs	3
	Household Heads	2
	Elders	1
	Representative of Traditional Council to District Assembly	1
	District Physical Planning Officer	1
Other respondents	Customary Land Tenure experts	1
	Green Spaces/Environmental Management Expert	1
TOTAL		18

Photos
Please take photos of the following aspects PER DISTRICT: • Photos of existing of green spaces (gardens, forests, wetlands, agricultural areas, parks) • Areas in transition (built-area vis a vis green spaces)

INTERVIEW GUIDES AND RESPONDENT OVERVIEW:

Interview guide no. and type	Respondents	Sample
A. Customary actors	Customary Chiefs	6
B. Customary Household Heads	Household Heads or Elders	6
C. State actors (2 each from each district)	Representative of Traditional Council to District Assembly	2
	District Physical Planning Officer	2
D. Academic Experts	Customary Land Tenure experts	1
	Green Spaces/Environmental Management Expert	1
Total		18

Annex 1.6 Field Work Guide (Team)

Field Work Guide

PBL _ IHS research Kumasi, Ghana

Table of Contents

Data Collection Protocol

The purpose of the data collection protocol is to guide the researcher in conducting the data collection phase of the research.

Pre-interview

- ➔ Book an appointment to respondents whenever necessary
- ➔ Site surveying for case study area familiarization
- ➔ Review and translate questionnaires
- ➔ Clarification of doubts with IHS researchers

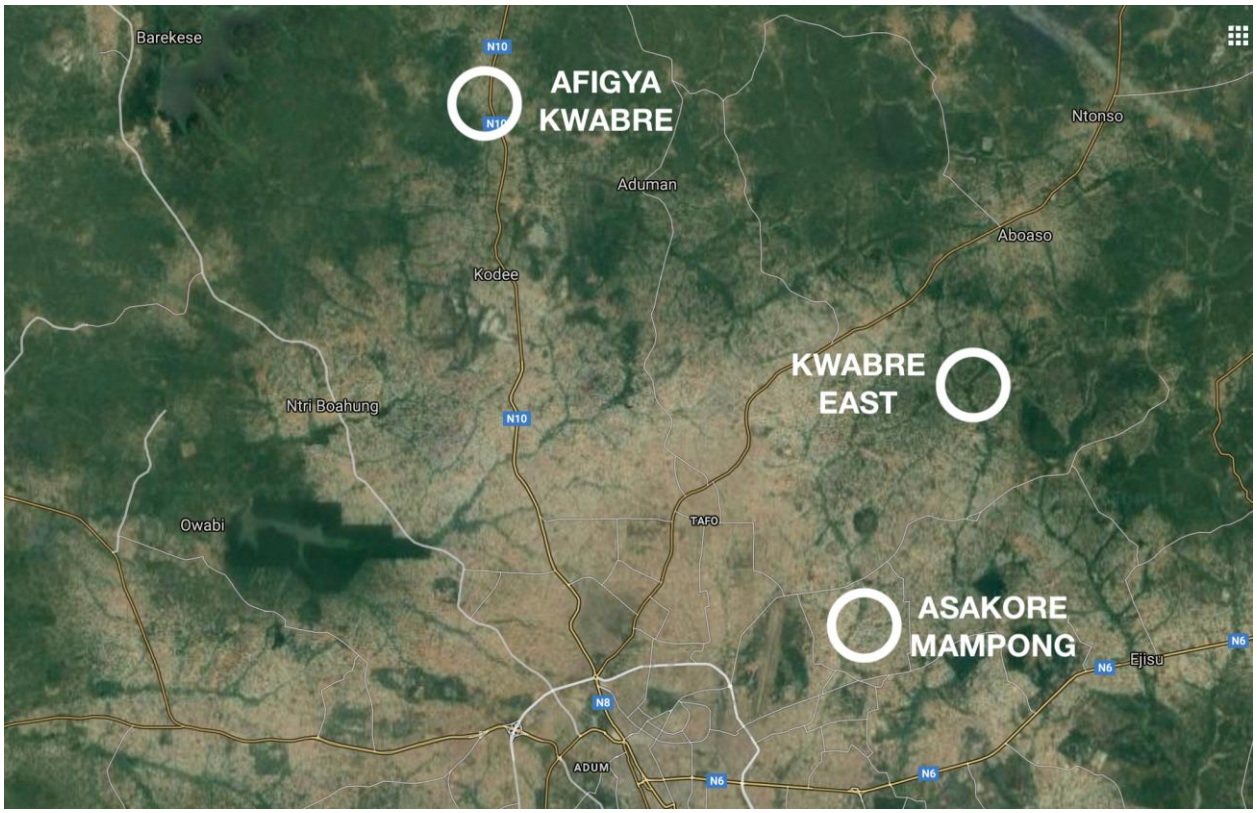
During interview

- ➔ Briefing of respondents about research purposes and rationale
- ➔ All interviews are to be recorded with audio devices with consent of the respondent.
- ➔ Site documentation is to be geotagged (if possible)
- ➔ Photo documentation of case study areas should be done (refer to IHS individual interview guides)
- ➔ Consent from all respondents should be ensured by informing them about the case study.
- ➔ Assure respondents on confidentiality of information given
- ➔ Research assistants should communicate with IHS researchers during the conduct of interview in Whatsapp groups whenever necessary

Post-interview

- ➔ Briefing and Debriefing before and after each day of data collection, discussion of highlights and challenges during data collection.
- ➔ All interviews done in the local language should be transcribed in English by research assistants.
- ➔ Audio recordings, photos, and transcriptions should be sent to IHS researchers.

Case Study Districts



DISTRICTS	RESEARCHERS
Afigya Kwabre (Kodie, Buoho & Ntribuho)	Fahmida Muhil Vida
Asokore Mampong (Asokore Mampong)	Alice Muhil Janssen
Kwabre East (Mamponteng)	Edward Janssen Alice

Primary Data Collection Overview

Researcher	Data Collection Instrument	Sample Size	Respondent Type	District	Research Topics
Janssen	Semi-structured interview	18	Chiefs, State Actors, Customary Household Heads, Elders, Academic Experts	Asokore Mampong, Kwabre East	Green Spaces Perception, Land Use Change, Customary Land Governance
Fahmida	Survey Semi-structured interviews Observation (photo documentation)	60 7	Household heads Chiefs, stool land officers, academics	Afigya Kwabre	Willingness to invest in perceived land use balance
Alice	Semi-structured interviews	17	-Physical planning department -National land commission , valuation department at regional office -Real estate agents/broker	Asokore Mampong, Kwabre East	Land value capture for preservation of green landscapes

			-Academia from KNUST (expertise research on land use change and real estate) -Chiefs -Family heads, -Opinion leaders (conveners /chairpersons of works sub-committees		
Researcher	**Data Collection Instrument**	**Sample Size**	**Respondent Type**	**Site**	**Research Topics**
Edward	Semi-structured interview Observation	13	TCPD Development Planning Unit Traditional Authority Lands Commission, Forestry Commission Opinion Leaders EPA KNUST	Kwabre East	Revealing the Role of Urban Planning Practices on Spatial Depletion of Green Spaces in Peri-Urban Kumasi, Ghana.
Vida	Semi-structured Interviews Documentation/Site Observation	30	Chiefs Opinion Leaders Queen Mothers Male & Female Household heads Religious heads Male and Female Teachers Male and Female students Service Providers, Professionals	Afigya Kwabre	Sociocultural factors and its influence on perceived value of green areas.

Muhil	Semi-structured interviews Site observation	18	Chiefs, state actors, academics, real estate agents, NGOs, land evaluation experts, planning officers	Asokore Mampong, Afigya Kwabre	Access to water and its influence on land-use dynamics.

NOTE: For a more detailed break-up of respondents, please refer to individual data collection instruments.

Secondary Data Collection

Secondary data Source	Document/type of data required	Researcher
Water Resources Commission	Actors applying for formal water rights in Kumasi and types of water sources in demand	Muhil
Forest Commission	Satellite images of Afigya Kwabre, Asakore Mampong from 2000-2019	Muhil
District water and sanitation department	Data about registered boreholes: Depth, number, quality of water Reports about groundwater and surface water pollution Data about government serviced areas within each district (areas with government piped water)	Muhil
Land-use and Spatial Planning Authority	GIS Datasets of Land-use Changes for Kwabre East and Asokare Mampong from 2009 - 2019 GIS Datasets of Land-use Changes for Asokare Mampong and Afigya Kwabre from 2000 - 2019	Janssen Alice Muhil
Traditional Authority	Excerpts or documents showing customary laws or regulations related to green space protection, conservation and management (within 10 years))	Janssen

	Documented reports, attendance sheets or invites on customary land-use change decision-making or conflict resolution meetings (within 10 years)	
National Land Commission, valuation department (regional office)	Land values of Asokore Mampong and Kwabre East in 2009 and 2019 Land values of specific neighbourhoods in Asokore Mampong and Afigya Kwabre in 2019 as per valuation roll	Alice, Muhil Muhil
Real estate agents / brokers	Land selling prices in in peri-urban area of Asokore Mampong and Kwabre East in 2009 and 2019 Land selling prices in Afigya Kwabre in 2019 (specific areas)	Alice, Muhil Muhil
KNUST (BIRD/Center for Settlement Planning and Development) Afigya Kwabre District Assembly	Related study report on sociocultural factors and its influence on green areas, protection, preservation and management of green areas Relevant reports on protection and management of green areas	Vida
Secondary data Source	**Document/type of data required**	**Researcher**
District finance officers in Asokore Mampong and Kwabre East	Estimated revenues from betterment charge in 2009 and 2019 Actual revenues from betterment charge in 2009 and 2019	Alice
Physical planning department	Expenditure on enforcement of plans in 2009 and 2019	Alice
District Assemblies (Local Government) Asokore Mampong Kwabre East	District Spatial Development Frameworks 1. Structure plans 2. . Local Plans (Layouts) and various updates in the past 30 or 20 years	Edward Alice Vida

(INFORMATION LIMITED TO AREAS OR PAGES THAT ADDRESSES GREEN SPACES)	And integrated structure plans with other adjoining districts if available 3. GIS maps if available in in the past 30 or 20 years and current 4. Building Regulations 1. Green Spaces Policies 2. Municipal Medium Term Development Plan (2018-2021) 3. Composite Annual Action Plans 2017, 2018, 2019, 2020 4. Composite Annual Budget 2018.2019, 2020 5. Annual Monitoring and Evaluation Report 2017, 2018, 2019, 6. Annual Progress Reports 2017, 2018, 2019, 7. List of DPCU Membership 8. District Planning Coordinating Unit Minutes on preparation of preparation of structure plans 9. List of Statutory Committee Membership 10. Regulations on preservation of agricultural land and natural areas 11. Expenditure on enforcement of physical development plans and zoning regulations 12. Estimated annual revenues from betterment charge between 2009-2019 13. Actual revenues from betterment charges between 2009-2019 14. Indenture of open spaces and undeveloped lands 15. Gazette of structure Plans	
Lands Commission Forestry Commission EPA	1. GIS Images showing trends of change of land uses of Greater Kumasi Asokore Mampong and Kwabre East over the past 30 or 20 year 2. District's spatial Development Framework (Greater Kumasi and study areas) 3. Green Spaces Policies 4. Green Spaces Regulations (Legal Frameworks, laws) 5. Evidence of Gazette of plans 6. Medium Term Development Plans	Edward

	(2018-2021) 7. Annual Budgets , 2018, 2019, 2020 8. Annual Action Plans, 2018, 2019, 2020 9. Annual Monitoring and Evaluation Reports 2017, 2018, 2019 10. Annual Performance Report or Progress Report 11. Samples of Sermons Letters to people who flout on Green spaces regulations 12. Minutes of conflicts resolution between actors on green spaces 13. Samples of sermon letters to people who flout on green spaces regulations (receipts of fines etc) 14. Public Sensitization Reports on green spaces preservation and protection with pictures 15. Receipts from Radio programs on sensitization	
Traditional Authority	1. Structure plans and Layouts (Greater Kumasi and communities) 2. List of membership Green Spaces /District Monitoring Team 3. Monitoring Report 4. Samples of sermon letters to people who flout on green spaces regulations (receipts of fines etc)	Edward Edward and Janssen Edward Edward and Janssen

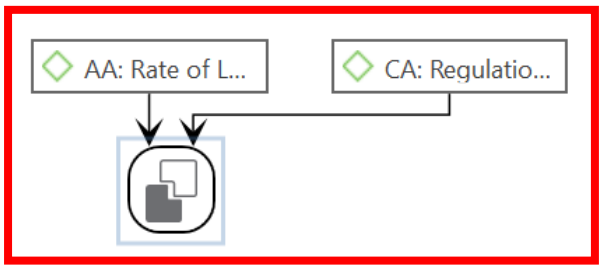
Annex 2: Respondent Codes, Coding Scheme and Query Tool

Annex 2.1 Respondent Codes

Code	Respondent
Asokore Mampong	
AM_Chief	Customary Chief
AM_Elder	Elder
AM_HH1	Household Head 1
AM_HH2	Household Head 2
AM_Physical_Planning	Physical Planning Officer
Kwabre East	
KE_Chief1	Customary Chief 1
KE_Chief2_FGD	Customary Chief 2 (from Focus-group discussion
KE_Elder	Elder
KE_HH1	Household Head 1
KE_HH2	Household Head 2
KE_Physical_Planning	Physical Planning Officer
KE_Works Department	Works Department Officer
Academic Experts	
Academic1	Academic, Environmental expert
Academic2_DrGeorge	Academic, Land – use Expert

Annex 2.2 Coding Scheme of Data Analysis

Annex 2.3 Query Tool Process Sample



Search Quotations

Quotations

2:2 Yes, I believe that the existing ones such as the cemetery, the school...

Yes, I believe that the existing ones such as the cemetery, the school compound and a nature reserve specially left for existence by the King of Ashanti should be protected since it enables the community to continually derived its existing benefits such as hunting in the reserve, collection of non-timber for...

2:6 Yes, it used to be relevance in the past where these green areas exist...

Yes, it used to be relevance in the past where these green areas exist in abundance, but currently due to the non-existence of these areas, I think that these laws are of no good use.

2:11 Yes, these laws were fully operational during the past, but nowadays i...

Yes, these laws were fully operational during the past, but nowadays it's not due to the conversion into other land use forms.

Annex 3. Frequency Tables

Annex 3.1 Asokore Mampong Frequency Table

Frequency Table: Asokore Mampong								
Variable	**Sub-Variable**	**Indicator**	**Summary of interview responses**	**Frequency (Atlas codes)**				
				Chief (1)	**Elder (2)**	**Household Head (3, 5)**	**State Actor (25)**	**Total**
Land-use change of Green Spaces	Perceived rate of Land-use changes of Green Spaces	Perceived rate of Land-use changes of Green Spaces	The land-use changes of green spaces are decreasing.		1	2	1	4
			The land-use changes of green spaces are not decreasing.	1				1
Perceived rate of Land-use changes of Green Spaces	Perceived Green Space Value	Perceived importance of green spaces	Green spaces are important.	1	1	2	1	5
			Green spaces are not important.					0
		Perceived necessity of conserving green spaces	Green spaces must be conserved.	1	1	2	1	5
			Green spaces must not be conserved.					0
		Perception of green spaces as a priority in decision making of customary leaders	Green spaces are prioritized in decision-making of customary leaders	1	1			2
			Green spaces are not prioritized in decision-making of customary leaders			2	1	3
Customary Land Governance	Regulations	Number of customary laws related to green spaces/conservation/management	There were customary laws in my district		1			1
			There were no customary laws in my district	1		2	1	4
		Type of customary laws related to green spaces (type of green space conserved or protected)	Cemetery		1			
			Forest/nature reserve		1			1
			Trees along water bodies		1			1

		Medium of customary law (documented or oral)	Customary laws about green spaces were spoken in nature		1			1
			Customary laws about green spaces were documented	0	0	0	0	0
		Implementation of customary law	Customary laws about green spaces are implemented in my district	0	0	0	0	0
			Customary laws about green spaces are not implemented in my district		1		1	1
	Processes	Community seats/representation in decision-making in land-use change of green spaces	Community members have seats/representation in decision-making in land-use change of green spaces					0
			Community members don't have seats/representation in decision-making in land-use change of green spaces	1	1	2	1	5
		Community seats/representation of community members in formulation of regulations about green spaces	Community members have seats/representation of community members in formulation of regulations about green spaces					0
			Community members don't have seats/representation of community members in formulation of regulations about green spaces	1	1	2	1	5
		Number of meetings/dialogues about land-use of green spaces between customary leaders with community	Customary leaders inform members about land-use of green spaces	1	1			2

			Customary leaders do not inform members about land-use of green spaces			2	1	3
	Institutions	Presence of conflict-resolution mechanism	The chief ensures that ownership or rights to lands is designated to the rightful owner			2		2
			No					
		Number of customary land/green space related disputes	Yes			1		1
			None	1	1	1	1	4
		Number of collaborations with other stakeholders (state, private developers, academe) in decision-making regarding green spaces	Yes	1	1	2	1	5
			No					
		Types of collaboration with other stakeholders (state, private developers, academe) in decision-making regarding green spaces	Yes, the traditional authorities have partnered the Assembly, which is semi-formal in the sense that the Assembly only charges for development levy and building permit from individual land developers, once the individual holds the requisite documents from the traditional leadership.	1				5
		Types of collaboration with other stakeholders (state, private developers, academe) in decision-making regarding green spaces	traditional authorities collaborate with the Assembly to embark on public awareness, especially when there is a project to be established within the community.			1	1	2
			Yes, but partnership is semi-formal, especially with individual stakeholders into the conservation of environmental resources.		1			1
			Yes. Under the supervision of the Customary Chief, the town has formed a Volunteering Group that ensures green spaces: reserved place full of trees, wetlands and marshy are managed and protected. He has documented			1		1

			everything and brought on board the Ghana Police, Environmental Protection Agency, Physical Planning Department, and Judicial Service.					

Annex 3.2 Kwabre East Frequency Table

Frequency Table: Kwabre East								
Variable	**Sub-Variable**	**Indicator**	**Summary of interview responses**	**Frequency (Atlas codes)**				
				Chief (9)	**Elder (11)**	**Household Head (13, 14)**	**State Actor (26, 28)**	**Total**
Land-use change of Green Spaces	Perceived rate of Land-use changes of Green Spaces	Perceived rate of Land-use changes of Green Spaces	The land-use changes of green spaces are decreasing.	1	1	2	2	6
			The land-use changes of green spaces are not decreasing.					0
Perceived rate of Land-use changes of Green Spaces	Perceived Green Space Value	Perceived importance of green spaces	Green spaces are important.	1	1	2	2	6
			Green spaces are not important.					0
		Perceived necessity of conserving green spaces	Green spaces must be conserved.	1	1	2	2	6
			Green spaces must not be conserved.					0
		Perception of green spaces as a priority in decision making of customary leaders	Green spaces are prioritized in decision-making of customary leaders	1				1
			Green spaces are not prioritized in decision-making of customary leaders		1	2	2	5
Customary Land Governance	Regulations	Number of customary laws related to green spaces/conservation/management	There were customary laws in my district	1				1
			There were no customary laws in my district		1	2	2	4
		Type of customary laws related to green spaces (type of green space conserved or protected)	Cemetery					
			Forest/nature reserve	1			1	
			Trees along water bodies	1				1
			Gardens	1				1

			Playgrounds	1				1
			Sacred grounds				1	1
		Medium of customary law (documented or oral)	Customary laws about green spaces were spoken in nature				2	2
			Customary laws about green spaces were documented					0
		Implementation of customary law	Customary laws about green spaces are implemented in my district				1	1
			Customary laws about green spaces are not implemented in my district	1				1
	Processes	Community seats/representation in decision-making in land-use change of green spaces	Community members have seats/representation in decision-making in land-use change of green spaces					0
			Community members don't have seats/representation in decision-making in land-use change of green spaces	1	1	2		4
		Community seats/representation of community members in formulation of regulations about green spaces	Community members have seats/representation of community members in formulation of regulations about green spaces					
			Community members don't have seats/representation of community members in formulation of regulations about green spaces	1		1		2
		Number of meetings/dialogues about land-use of green spaces	Customary chiefs meet members about decisions in GS LUC	1			1	2

		between customary leaders with community						
			Customary chiefs don't meet members about decisions in GS LUC			2		2
	Institutions	Presence of conflict-resolution mechanism	The chief ensures that ownership or rights to lands is designated to the rightful owner	1	1		1	3
			The conflict is resolved by Otumfuo Osei Tutu II (The King of Ashanti Kingdom)		1	2		3
			No					0
		Number of customary land/green space related disputes	Yes			1		1
			No	1	1	1	1	4
		Number of collaborations with other stakeholders (state, private developers, academe) in decision-making regarding green spaces	Yes	1	1	1		3
			No			1		1
		Types of collaboration with other stakeholders (state, private developers, academe) in decision-making regarding green spaces	Yes, the traditional authorities have partnered the Assembly, which is semi-formal in the sense that the Assembly only charges for development levy and building permit from individual land developers, once the individual holds the requisite documents from the traditional leadership.					
			traditional authorities collaborate with the Assembly to embark on public awareness, especially when there is a project to be established within the community.				1	1

			Yes, but partnership is semi-formal, especially with individual stakeholders into the conservation of environmental resources.					
			Yes. Under the chief and state ensures green spaces: reserved place full of trees, wetlands and marshy are managed and protected	1		1		2
			Yes. Even the District Assembly, Chiefs, and some churches in this community collaborated to undertake tree planting exercise.		1			1
			None			1		1

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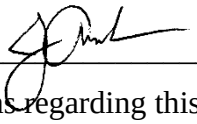
Your Signature(s) : 

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