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URBAN SPRAWL AND ITS IMPACT ON LIVELIHOODS AND ECOLOGY IN PERI-URBAN AREAS: A CASE STUDY OF GREATER ACCRA METROPOLITAN AREA

BY

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DECLARATION

I, Sarah Afriyie Agyeman, hereby declare that this is my own original work and has not been presented for a degree in any other University, and all sources of material used for this work have been duly acknowledged.

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DEDICATION

This piece is dedicated to Almighty God, Mr. Michael Owusu Ansah, my loving mother and father for their never ending financial support and encouragement throughout my studies.

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ABSTRACT

Rapid population growth and urban growth are phenomena happening in many developing countries and Ghana is not an exception. The rapid increase in population and urbanization has exerted serious pressure on most cities. Accra is the capital city of Ghana and has attracted migrants from all over the country to seek greener pastures but the resultant effects are congestion and housing shortage in the inner cities. The resultant effect of this phenomena is the sprawl of human settlement in to the peri-urban areas. Natural reserves and farmlands have been converted to other land use such as residential development and non-residential developments in the urban fringe and this serve as threat to livelihoods sustainability. This study focuses on urban sprawl and its impact on livelihoods sustainability in the peri-urban areas of Greater Accra Metropolitan Area.

The study adapted a conceptual framework from Fang and Pal (2016) on drivers of urban sprawl in urbanizing China- a political ecology analysis. The political ecology of actors involved in land conversion in Ghana was discussed in the conceptual framework.

The study employed different research methodologies which include primary and secondary sources of data. The study used stratified sampling in the selection of the road corridors where sprawling was massive. Multi-temporal set of Remote Sensing data was used to classify Landsat images of GAMA for the years 1986, 1991, 2008 and 2016 to know the extent of land use change. ENVI 5.1 was used to process, analyse and integrate the spatial data The findings revealed that there have been changes in land use like the conversion of farmlands to residential use in the peri-urban areas and traditional leaders were the main agents driving the sprawl. The study also revealed that the land market was lucrative and the resultant implications are on livelihood sustainability and the ecology.

The study recommends vertical housing development and affordable housing in the inner cities. It also recommends proper planning policies so as to curb urban sprawl.

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LIST OF ACRONYMS

AMA	Accra Metropolitan Area
BIA	Bureau for International Affairs
CBD	Central Business District
ENVI	Environment for Visualizing Images
EPA	Environmental Protection Agency
FGD	Focus Group Discussion
GAMA	Greater Accra Metropolitan Area
GIS	Geographic Information Systems
GNA	Ghana News Agency
GSS	Ghana Statistical Service
MOFA	Ministry of Food and Agriculture
PNDCL	Provisional National Defence Council Law
RS/GIS	Remote Sensing/ Geographic Information Systems
SPSS	Statistical Package for Social Sciences
UNFPA	United Nations Population Fund
UN-HABITAT	United Nations Human Settlement Program
LULC	Land Use and Land Cover Change

CHAPTER ONE

GENERAL INTRODUCTION

1.1. Introduction

Cities and towns in many parts of the world have been spreading for decades and the construction of houses, offices, shopping centres and other infrastructural facilities have led to multiple increase in the physical extension of many agglomerations. This development inevitably goes hand in hand with rapid conversion of natural, agricultural and forestry landscapes, wetlands and wildlife habitats into urban and industrial areas. Numerous studies have shown that, this kind of land "consumption" has a severe impact on the natural environment, on socio- spatial structures and on sustainability of infrastructure altogether, and deserves therefore to be labelled urban sprawl (Benfield et al., 1999; Johnson, Ewing et al., 2003; Goetz et al., 2005). Urban sprawl is considered to be responsible, for instance, for the endangerment (Price et al., 2006), the overuse and deterioration of soils and water resources (Haase and Nuissl, 2007), the rise of infrastructure maintenance cost (to intolerable level), air pollution (Yang and Lo, 2002) and the worsening of public health. Urban sprawl sometimes caused by rapid population growth is loosely defined as low – density residential and sometimes commercial development that is outside the borders of higher density urban centres.

The common definition of urban sprawl was given by Ewing (1994), who defined it as a form of low-density spatial development, always characterized by scattered and discontinuous leapfrog expansion of land uses. Planners, scholars, community activist and public officials all offer numerous possibilities as to the causes of urban sprawl and this poses a great challenge to livelihoods of the area affected by the sprawl of human settlement. This research will deal with urban sprawl and its impact on livelihoods and ecology in peri-urban areas of Greater Accra Metropolitan Area. Today, the peri-urban areas of Accra have been replaced with an

enormous concrete buildings. Accra grew rapidly after independence as a result of Nkrumah's industrial development strategy which led to the expansion of residential areas around indigenous communities (Larbi, 1996). Greater Accra Metropolitan Area's spatial growth is spreading in an irregular form and at a staggering rate. The evidence of sprawl is there for all to see. Greater Accra Metropolitan Area (GAMA) consists of Ga South, Ga West, Ashiaman, Ga East, Accra Metropolis, Tema Metropolis and Ledzokuku Krowor and Adenta.

1.2. The Problem

The unprecedented increase in the size of the population of cities in the world especially in Sub – Saharan Africa generates serious challenges for urban planning and management.

In Ghana, this situation is very pervasive as many residential houses in the inner cities of Accra are gradually transforming and gentrifying as modern business houses accommodating several business activities. The infrastructural expansion and reconstruction of transportation networks with modern by-passes, foot-bridges, roundabouts, development of hospitals, recreational sites, museums, industries and other facilities by city managers, government and planners also remove many residential houses from the inner cities.

This form of transformation of the internal structure of GAMA coupled with the scarcity of land and the multiple effects of rapid population growth and urbanization is creating urban sprawl extending urban settlements into adjoining peri-urban areas. The sprawl of human settlements, around existing cities is a major driving force of land use and land cover change (Gonzalez-Abraham et al., 2007; Hawker et al 2007). Urban sprawl, therefore, is a phenomenon associated with many unwanted negativities. It is accompanied by serious implications and it is evident that the peri-urban areas of GAMA are experiencing such serious challenges. As a result urban sprawl has serious impacts on livelihoods in peri-urban areas. Farmers are affected by such a phenomenon. This is because large tracts of arable lands

designated for farming are now converted into the construction of concrete and residential buildings. Farmers source of livelihoods are affected. Unrestricted and uncontrolled population growth which leads to urban sprawl has destroyed large tracts of arable lands designated for the production of food. This phenomenon raises the cost of farm produce as farms are consequently displaced from the peri- urban areas and away from the cities. Real estate developers are gaining at the expense of the people in the peri- urban areas.

Also, increase in the sprawl of human settlements can affect wildlife by threatening their survival. The quality of life and the local ecosystem are the first to suffer due to the consumption of space and misuse of natural resources. Species of plants and animals are endangered, their feeding grounds are destroyed and migratory paths are blocked. Most of these species are found in the areas that are being aggressively developed. For instance the space between Tema and Accra that stretches from the Sakumono Lagoon (Ramsar site), northwards to motorway has been reserved for sea-shore birds, vegetable gardens and golf courses but the area is being encroached for the construction of buildings (Plan Consult, 1989).

Urban sprawl has been viewed as a means where money is being spent on infrastructure outside of the cities at the cost of neglecting the infrastructure in the cities that is either not utilized or underutilized. Urban sprawl is sometimes associated with a lack of comprehensive planning and has an impact on climate change.

The sprawl of human settlement affects water supply and water resources. The loss of forest, wetland due to construction of building, roads and other developmental projects in sprawl areas has many negative impacts on the supply of water to these areas. Much of the rain that used to be caught and held by these small streams now run off and is lost to rivers and lakes in urbanized areas. People have to travel long distances in order to get access to water resource. GAMA is expanding outwards along the west corridor through McCarthy Hill area, Malam-

Gbawe area, Weija and all the way to Kasoa in the Central Region. Along the north-western axis lies Accra-Nsawam. Accra- Dodowa to Aburi is about experiencing the sprawl of human settlement which causes land use change (Plan Consult, 1986).

The growth of cities in the developing world is dynamic, diverse and disordered (UNFPA, 2007). This rapid urbanization process will involve large tracts of land which are mostly agricultural land to be converted to urban land use (e.g. residential construction) especially in the peri-urban areas (Owusu, 2013).

Gebregziabher et al., (2014) argued that the city is quickly expanding and if land control measures are not put in place settlements will continue to expand haphazardly, into the rural farmlands and rural communities. This is a clear indication of how land use change as a result of urban sprawl has impacts on livelihoods of farmers and has impacted the ecology negatively in the peri-urban areas of GAMA.

In spite of these undesirable implications of urban sprawl, it provides the means of accommodating not only migrants and large proportion of urban dwellers but also the inner city dwellers as a result of gentrification. A lot of people want to be separated from the inner cities of Accra for many reasons. For example, some people want their peace of mind and do not want to be exposed to noise pollution and other negativities in the inner city of Accra. But most inhabitants in the sprawl areas are constantly segregated and marginalized with respect to the provision of social services by city planners and governments.

The situation of urban sprawl in Greater Accra Metropolitan Area is a clear indication of how changes in the internal structure of Accra influence its peri-urban livelihoods and the ecosystems around it.

Planners have lost control in enforcing laws and order in the city in an efficient manner and therefore other people's livelihoods are affected. This has led to the construction of unwanted structures that harbour criminals which is a threat to many lives in the sprawling areas.

Urban growth of Accra is very rapid and has generated land use disorder as a result of urban sprawl and institutions such as Town and Country Planning Department, Environmental Protection Agency among others responsible for regulating and managing land use have not performed their responsibilities up to the mark.

The trend of development in GAMA is at a faster rate which is ahead of city planners and managers which affect them in a negative way because they are not able to plan well to meet the growing population. Urban sprawl if left unchecked will erode some livelihoods and ecosystems completely. Some work has been done on urban sprawl by Owusu (2013) on the urban containment strategies to meet urban sprawl in GAMA. Some of the concepts he mentioned were urban consolidation which involve freezing urban development in the peri-urban zones of Accra by utilizing land within the city boundaries for development. Multi-city structure which means metropolitan areas should have several cities within it with several central business districts (CBD) to serve the population. This idea is to release the pressure in the city centres and create strategic location within GAMA. Another strategy is the concept of satellite towns which will absorb additional people from Accra to curtail the physical growth of Accra.

Kufogbe (1996) also looked at how land resources in the peri-urban zones of Accra have been subjected to misuse and unplanned due to urban sprawl with agricultural lands converted to residential uses along the Airport-Ayimensah transect of Accra.

Bertrand and Yankson (2003) studied how residential developments in the peri-urban areas of Accra have been rapid and unplanned with serious consequences on the land markets and speculative purposes.

In view of the works done on urban sprawl by these different authors, this research will throw more light into the impact of urban sprawl on livelihoods in the peri-urban zones of Accra and the ecological footprints of urban sprawl which provides a justification of this study.

1.3. Literature Review

1.3.1 Introduction

This section of the chapter deals with a careful examination of the body of literature pointing towards the answer to a research work. It includes scholarly journals, authoritative databases, scholarly books, newspapers, magazines and other books. Also literature review aims at making a detailed survey of the topic under study. In as much as the literature review helps researchers to identify research gaps in order to come out with a research problem, it also helps to underpin the research work against existing body of knowledge to come out with their strengths and weaknesses.

1.3.2 General Overview of Urban Sprawl

Urban sprawl is often discussed without a permanent definition but describes undesirable patterns of development. Urban sprawl has become a common phenomenon in Ghana after independence as a result of population growth and urbanization on the edge of cities. There are many definitions pertaining to urban sprawl, however, a study conducted by Bin et al., (2008) indicates that "urban sprawl will refer to low-density, excessive spatial growth of cities". The key words of this definition are low-density and excessive. It is often associated with excessive spatial growth of cities according to Brueckner (2000). Burchell and Mukherji

(2003) view urban sprawl as a low density, leapfrog development that is associated with a strip form along the major thoroughfares at the periphery of cities.

A study conducted by Bhatta (2010) indicates that many people in the core cities in developing countries lack enough space and therefore prefer to purchase more living space in the peri-urban areas than in the inner cities since the lands in the peri-urban areas are affordable leading to urban sprawl. Changes in the physical environment and spatial structure of cities come as a result of urban sprawl.

1.3.3 Drivers of Urban Sprawl

Urban sprawl is a phenomenon that occurs globally both in developed and developing countries (Adaku, 2014). The United States has experienced urban sprawl due to population growth and immigration into the country in many years as stated by Adaku (2014). Hennigs et al., (2016) added that racial segregation in the United States drives urban sprawl as the blacks (ethnic minorities) tend to live in the city centres whiles the whites locate to the suburbs to prevent living with the ethnic minorities in the city centres. The whites relocated to the suburbs to avoid inner-city problems.

Cowell (2011) added that after the World War II, to own a home with big yards and garages that could occupy multiple cars was the dream of many Americans. As a result of that many people move from the city centres where there is pressure on land sizes to the peripheries. It is further stated that the movement of people to the peripheries has resulted in "low density residential development, planned communities on the city outskirts and more individual houses on previously rural land" (Cowell, 2011, p. 3). The demand for land in the United States is on the increase resulting in the area growing more than the respective growth in population leading to urban sprawl as there is increased expansion of developed land in contrast with fall in population density.

According to European Environmental Agency (2006) in recent times, about 75% of the population are located in the urban centres resulting in an increased demand for land in the city and beyond. The attractiveness in the core of the city has declined while living in the peripheries which is closer to nature has risen. In addition to that sprawl is mostly visible in countries with high population density and high economic growth typical of Belgium, the Netherlands and northern Italy. Countries that have gained from the European Union Policies show manifestations of sprawl and along the coastal regions of Europe massive population growth is resulting in the continuous development of sprawl. Development along the coast demands legal measures.

However economic growth and tourism in Spain has attracted many people to settle along the Mediterranean coast such as the 'Costa del sol' and 'Costa Brava' which were developed in the 1950s and 1960s as a result of increase demand for quality holidays. Recently the development of infrastructure, leisure facilities, housing facilities such as golf courses and marinas along the coast has led to the sprawl of human settlements (EEA, 2006)

A recent study by Hennig et al., (2016) indicated that, urban sprawl is one of the most crucial land use changes affecting European countries. The study further indicated that many European countries were particular about reshaping their cities in the 1950s and most cities such as Berlin, Birmingham, Glasgow and Vienna lost population and suffered destruction after the post war period. Asiatic states are also experiencing urban sprawl in dynamic ways which contribute to land use change. Unlike United States and Europe that have experienced urban sprawl for longer period of time, for Asiatic countries like China, urban sprawl began only a few years ago (Qi & Lu, 2008).

Qi and Lu (2008) added that urban sprawl in China was driven by low-density urbanization caused mainly by industrialization and population growth not excessive suburbanization like

what was happening in western countries. Excessive urban expansion in the United States leads to decay of the central cities thereby limiting the incentives to redevelop the land closer to the centres. This situation is different in China due to the inner cities developing well with the emergence of urban sprawl. The study indicated that the rich people in China prefer to live in the central cities to enjoy better environment and excellent public services. Meanwhile those who cannot afford to live in the central cities move to the suburbs and sacrifice access to better environment and much more perfect public services as one is compelled to live in the periphery. This makes the drivers of urban sprawl in China different from Europe. Institutional factors and policies play key role towards urban sprawl in China. For instance land use system, capitalization of housing distribution, industrial policy orientation, reform of land markets, reforms of household systems, investment in real estate development and other factors drive spatial expansion of cities in China.

The western countries practice privatization of land whiles China adopts the socialist national and collective ownership of land. Zhao (2010) asserted that land use changes in the urban fringe of Beijing resulting in urban sprawl can be attributed to growing local autonomy and fiscal responsibilities. Pal and Fang (2016) added that China's local government leasing out more lands willingly which is estimated between 30 and 70 percent of the city's revenue is another driving force of urban sprawl.

Urban sprawl has become a major phenomenon in developing countries with urban population growth increasing. Africa is least urbanized but experiencing the highest rate of urbanization. Some people in the urban centres are denied land rights which push them into the peri-urban zones resulting in urban sprawl in developing countries as noted by Brueckner (2000). Most African cities are faced with challenges of deteriorating physical and living environment which shows itself in the form of urban sprawl (Nnaemeka-Okeke, 2016). In a developing country like Nigeria, "the governance and management of their towns and cities are most discouraging

as cities appear to be growing beyond the control of planners, beyond management capacities and beyond available resources" (Nnaemeka-Okeke, 2016, p. 2).

Uncontrolled urbanization, one major hallmark of Nigerian cities has resulted in urban sprawl which is characterized by uncoordinated housing development in the urban peripheries where many structures do not have building permits and proper layouts. Most of these structures are erected by squatters that settle in the suburbs due to their inability to rent accommodation in the inner cities. The study added that uncontrolled population growth in Nigerian cities still puts pressure on existing housing facilities and the use of land in the city centres for commercial purposes pushes a lot of people to the suburbs for residential property development.

Ghana as a nation has experienced movement of people to the urban centres and Accra is receiving the majority of the migrants since it is the capital city of Ghana.

Urban sprawl happens when land resources are changed to accommodate new urbanization and cities sprawl when there is uncontrolled and uncoordinated expansion of housing (Preprah, 2014). In Ghana, cities such as Tamale, Sekondi-Takoradi, Kumasi and Accra are undergoing urban sprawl due to industrial development and population growth.

Preprah (2014) stated that Wa Municipality is experiencing massive urban sprawl and this has increased the activities of sand winners due to the development of housing infrastructure in the Municipality. Farmers and sand winners compete for space on the same piece of land as a result of urban sprawl with some farmers abandoning farming to participate in sand winning which is easier and lucrative. The study indicated that communities like Bamahu and Kpongpalaa have experienced urban sprawl very fast because they are sandwiched between Wa Township and the University Campus. Their land market is on the boom since many

entrepreneurs aim to develop hostel and staff accommodation for students and lecturers who do not reside on campus. These trends of development lead to urban sprawl.

Land values in Accra are higher than in Kumasi, thereby contributing to rapid urban growth in Accra. According to Owusu (2013) Accra is the most developed region in Ghana due to massive investments in the public and private infrastructure. This has increased population growth in Accra, a major driver of urban sprawl. The massive growth in urban population has resulted in uncontrolled and uncoordinated urban expansion leading to sprawl.

The decision made by the British government then in 1877 to relocate the administrative capital of Ghana (then Gold Coast) from Cape Coast to Accra was the main reason for the development of Greater Accra Metropolitan Area (GAMA) (MLG/DTCP, 1993a). This was because GAMA had received massive investments from the private and public section including foreign investors. It is the headquarters of government institutions, quality educational institutions and this encouraged many people to relocate into GAMA making it the largest and densest urban agglomeration in Ghana (Owusu, 2013). The study pointed out that the development of dual road corridors is one of the drivers of urban sprawl in GAMA namely the Kwame Nkrumah Circle –Nsawam corridor (linking north of Accra); CBD-Mallam-Kasoa corridor (linking the west of the city); and CBD-Madina-Aburi corridor (linking the north-east of Accra). These roads had led to massive growth of GAMA in recent times.

Doan and Oduro (2011) added that rapid urbanization has resulted in dynamics of land use change of cities which causes peri-urban areas to change from rural to urban. Urbanization in GAMA has created land use disorder which results in urban sprawl causing degenerative impacts on livelihoods.

A study conducted by European Environmental Agency (2006) indicated that areas where decentralized development dominates, sprawl usually occur in an uncontrolled way.

Bhatta (2010) pointed out that, rapid increase in urban population as a result of natural population increase (excesses death over birth), migration (rural-urban migration) has resulted in urban sprawl in cities. Better living conditions and job opportunities present in the urban centres facilitate the movement of people from the rural areas to the urban centres to seek greener pastures. It is evident that urban population will increase rapidly (UNFPA 2007).

Nnaemeka-Okeke (2016) pointed out that urban sprawl is associated with haphazard housing development in the peri-urban zones where most of the structures lack proper planning layout. Most often these structures are as a result of squatters who are unable to afford residential accommodation in the urban centres and therefore choose to live in the peri-urban zones. It is evident that affordability of housing is one of the drivers of urban sprawl in the peri-urban zones of GAMA.

According to Larbi (1996), the failure of Accra spatial planning is as a result of its planning system not taking a strategic view of urban land development process and has transformed into physical development called urban sprawl that is difficult to contain.

Another driver of urban sprawl is land speculation. A study conducted by Bhatta (2010) indicated that land speculation leads to urban sprawl in that withholding of lands from development is one of the reasons for discontinuous development. Most politicians encourage people to speculate without proper planning and future growth.

Again, Bhatta (2010) further noted that, the preference for living space encourages many people to move to the peri-urban zones as in many developing countries, people in the inner cities do not have adequate spacing. Properties in the peri-urban zones are not costly which

encourages rapid low-density development. The above drivers of urban sprawl show how the peri-urban zones of Greater Accra Metropolitan Area have been encroached.

1.3.4 Urban sprawl and livelihoods sustainability

Urban sprawl has generated series of debates about its costs and benefits. Land use change is a phenomenon that cannot be avoided in areas inhabited by people. However, urban sprawl has serious effects on livelihood sustainability of inhabitants in the sprawl areas which are typical of both developed and developing countries.

Oueslati et al., (2015) indicated that over 75% of Europe's population lives in the urban area making it one of the world's highest densities of urban settlement. Relatively, Europe has low rate of population growth together with uneven growth of urban centres across the continent. This is as a result of their cities growing very fast as compared to their population. However, urban sprawl has resulted in high demand of land around cities which has become problematic due to its negative impact on social cost in the distribution of public infrastructure and such a situation affects the quality of lives of many people living in European cities.

Again, European Environmental Agency (2006) added that many Europeans see a new house or detached house in the suburban areas as a big investment as land prices are not costly compared to the urban centres. The high cost of lands throughout Western Europe as a result of urban sprawl and speculation creates huge investment opportunities for real estate developers in the European markets. The study indicated that as many people relocate to the peripheries, social segregation begins to increase; tax revenue in the municipalities is lowered. This has a great impact on maintenance of services such as hospitals and schools. Parents want quality education for the children therefore the quality of schools plays a significant role for them. In the urban core a downward cycle of deprivation become a challenge as many people move out of the cities to the peripheries.

Additionally, the study noted that urban sprawl creates a challenge for household spending from moving from their homes to work over longer distances. Traffic congestion is another feature in the peri-urban areas which impact on livelihoods in the area. Public transport development and mass transit system are hindered due to the use of private cars by most inhabitants in the suburban zones. In Munich and Stockholm urban sprawl has been managed efficiently and so the use of public transport has increased. Adaku (2014) pointed out that urban sprawl has led to poor accessibility of services to people in United States.

A study by Cowell (2011) asserted that urban sprawl was viewed as positive phenomenon as many people in the United States propose that low-density development enhances higher standard of living due to the preference for household privacy in homes allocated away from the inner cities.

According to Qi and Lu (2008) urban sprawl has resulted in the decay of the downtown area and a series of many social problems such as crime, excessive encroachment of farmlands and open spaces which is against the principle of sustainable development.

Furthermore, Frumkin (2002) noted that urban sprawl has generated motor vehicle crashes. Many people spend more hours driving and therefore are exposed to the dangers on the road which affect livelihoods in the suburban zones in the United States.

In China, urban sprawl is also a critical land use problem as it contributes to traffic congestion, long commuting and high consumption of fuels which affect the sustainability of livelihoods in the suburban zones (Qi and Lu, 2008). Zhao (2010) added that the fringe of Beijing has experienced urban sprawl due to excessive urban expansion. Sustainable transportation is key to sustainable development but urban sprawl leads to long distance travel which generates environmental problems such as air pollution affecting many livelihoods in the fringes of Beijing.

Brunner (2013) added that urban sprawl has implications on human health and air quality which affect the sustainability of livelihoods in the peri-urban zones. This is because of high emission levels by vehicles commuting for long distances on roads to the urban centres. When air is polluted, people with asthma, heart and lung disease suffer more.

A study by Adaku (2014) indicated that urban sprawl in developing countries differ from developed countries. Therefore a better understanding of the nature of urban sprawl in developing countries would inform better mechanisms to curb the sprawl in the region.

Hove et al., (2013) indicated that most African countries have their populations concentrated in large cities. The study showed that Sub-Saharan African countries have undergone massive urban growth recently and this transformation could be attributed to post independence macro-economic policies by African governments which led to urbanization. The United Nations Population Fund (UNFPA) projected that Sub-Saharan Africa's urban population will double between 2000 and 2030 (UNFPA, 2007).

In Nigeria, cities have encroached surrounding rural lands leading to a continuous belt of settlement due to urban sprawl. This has an effect on service delivery, security and government management and a notable example is Lagos which is experiencing urban sprawl (Hove et al., 2013). A recent study by Nnaemeka-Okeke (2016) added that most Nigerian cities are noted for the stigmatization of urban sprawl which has led to most areas lacking quality social and welfare infrastructure like water, electricity, health care facilities and educational facilities and lastly poor sanitary conditions which pose a threat to livelihoods in the urban fringes.

In addition to that, Kassa (2013) indicated that the city of Addis Ababa in Ethiopia has experienced urban sprawl which has an effect on livelihoods. Stefan et al., (2010) also indicated that Nyahururu in Kenya is a peri-urban area affected by the dynamics of urban sprawl. The area has high agricultural potential and therefore competing with urban

development. Despite the competition between land uses, the peri-urban inhabitants have access to better infrastructure.

The outward expansion of cities into the peripheries is a phenomenon present in Ghana as a result of urban growth. According to Owusu (2013) the debate on urban sprawl has two schools of thought. Opponents of urban sprawl indicated that the situation has negative effects on livelihoods in the peri-urban areas. Increase in automobile travel and congestion, high levels of pollution, loss of farmlands, limited employment opportunities and concentrated poverty in peri-urban zones have an impact on livelihoods sustainability. On the other hand, proponents of urban sprawl have argued that, the phenomenon has a positive impact on livelihoods in the peri- urban zones. The positive results include quality and serene environment, low crime rates, affordable housing, improved housing preferences and better schools.

Owusu (2013) further pointed out that, Accra the largest metropolis in Ghana has attracted massive investments, better educational opportunities, infrastructural and service development over the years which have motivated people to migrate to the city. Urban growth of Accra has resulted in land use change. Increasingly much of the population has relocated to the peri-urban areas of Accra due to urban sprawl. There is pressure on land resources at the peripheries of the city due to the country's open door policy within the Economic Community of West Africa States protocol on free movement of people in some West African countries. Migrants from Nigeria, Sierra Leone, Liberia and Cote d'Ivoire have moved to Accra contributing to the spatial growth and expansion of Accra. The massive pressures on land resources in the peri-urban zones have negative impacts on livelihoods depending on these resources.

Greater Accra Metropolitan Area (GAMA) is made up of three administrative districts namely; Accra Metropolitan Area (AMA), Ga District and Tema District. A study by Gough and Yankson (2000) noted that the Ga District consists of most of the peri-urban zones of Accra

and has experienced population growth over the years. The areas of Ga District such as Ga West, Ga East and Ga South used to be dispersed rural settlements where agriculture was widely practised but now the local settlements have been engulfed by housing developments. Some of these developments are unplanned and uncoordinated affecting livelihoods in peri-urban areas.

According to Peprah (2014) conflicts of land use emanate when cities begin to sprawl hence the encroachment of agricultural and rural lands within the periphery thereby reducing farmlands. Sand winners scoop the surface of the soil causing land degradation and all these factors have socio-economic implications on farmers. This is because farmers' sources of income get affected and decreases their standard of living. The study made mention of Wa Municipality which is undergoing massive urban sprawl.

Again a study conducted by Eko (2012) indicated that more agricultural lands in the peri-urban areas of Nigeria are turned to sprawl development with the remaining lands worked extensively to feed the population in the urban centres causing loss and degradation of farm space. The study further pointed out that due to urban sprawl, agricultural adaptation has been altered, farm practices vis a vis the type of crops grown and management of farms have also changed and these practices have negative impact on the agro diversity of farm areas.

Stefan et al., (2010) indicated in their study that most people are willing to buy lands due to land speculation making land market accessible. The people who sold their lands indicated that, they sold lands at a higher price and this was a last resort for them. Real estate developers are gaining more profits at the expense of inhabitants in the sprawling areas due to the use of lands for both commercial and residential developments for sale.

Abass et al., (2013) asserted that peri-urban inhabitants resort to all forms of livelihood strategies including migration, involvement in non-farm activities in order to adjust with the

new development in the area as a result of urbanization which leads to the sprawl of human settlements. This makes many people vulnerable as a result of the land use change in the peri-urban zones especially women who are in agriculture and other related activities.

Urban sprawl has created opportunities for some people to engage in business activities along roads highways. According to Briggs and Mwamfupe (2000) sprawl development along highways usually create an avenue for residents to set up home-based and road side business to generate income. This income generation activities impact positively on the livelihoods in the peri-urban zones.

According to Barnes et al., (2001) sprawl has emanated in conflicts of values and land use between farm and non- farm residents. Farmers are sometimes harassed legally and socially as new residents in the peri-urban areas are opposed to farm odours, noises, dust and movement of farm equipment thereby creating environment which is not conducive for farmers and this has negative effects on their livelihoods sustainability.

Again urban sprawl poses significant threat to inhabitants in the peri-urban zones since surface and groundwater supplies, watershed and aquifers as sources of potable water are altered as a result of encroachment on wetlands which caused land use change. These practices contribute to water borne diseases, high water treatment cost and poor water quality which affect livelihoods sustainability in peri-urban zones (Barnes et al., 2001).

Urban sprawl has led to a number of people exposed to natural hazards such as flooding, earthquake, landslides and wildfires due to uncoordinated balance between land uses and natural processes occurring in the area and this poses a challenge to the sustainability of livelihoods in the peri-urban areas (Barnes et al., 2001).

Public health is another aspect that can be affected as a result of peri-urban development. Gurin (2003) asserted that carbon monoxide, nitrogen oxides, sulphur oxide and unburned hydro-

carbons are emitted into the atmosphere as many people need vehicles to make life in the peri-urban areas possible. When air pollutants are emitted into the atmosphere due to long hours of driving to major cities, air pollution is generated which serves as a threat to many lives. Diseases such as lung cancer, respiratory disorder, and asthma are associated with air pollution which affects livelihoods sustainability in the area.

Gebregziabher et al., (2014) added that some farmers are compensated as a result of these land markets and in the end, their livelihoods have still not improved. The reason being that the compensation as compared to the income generated from their farming activities is not enough to meet livelihood sustainability. Sometimes they are not able to invest the compensation money into value adding activities.

A study by Peprah (2014) showed that urban sprawl is a threat to food security and increases the cost of food production. Many people's livelihoods are affected as a result of land use change in the peri-urban zones. When food security is under threat, many lives are also under threat because it may lead to hunger and high cost of food produce.

Finally, Thuo (2013) pointed out that unplanned residential land use development has eliminated the neighbourhood concept in housing developments as these new development often lacks facilities such as sport fields, markets and community centres where residents can meet and socialize.

1.3.5 Ecological footprints of urban sprawl

Organisms relate with one another in their physical environment and the study of this process is termed as ecology. Population growth and urban growth have resulted in urban sprawl which has an impact on the ecology in different ways in areas affected. Urban sprawl is a global challenge occurring across different countries. The ecology is vital and needs to be protected from land use change due to its negative impacts on it.

Europe has experienced the manifestations of urban sprawl on their ecology. According to European Environment Agency (2006) the nature of sprawl in European cities is very critical because of the footprints left on the ecology. The impacts include a rise in energy use, land and soil consumption which have negative effects on the environment, raising greenhouse gas emissions which leads to climate change, air and noise pollution. All these affect the ecology.

Also, Frumkin (2002) noted that automobile traffic is a major contributor to climate change due to the emissions of greenhouse gases such as methane, nitrogen oxides and volatile compounds from motor vehicles. This situation is very common in the United States where sprawl is massive and serves as a threat to human health including direct effects of heat and prevalence of infectious diseases. Stone et al., (2010) added that United States cities undergoing urban sprawl are experiencing extreme heat events which result in a greater number of climate-related fatalities such as an increase in surface temperature. Extreme heat events have impacts on plants, wildlife species, wetlands and other organism in the ecosystem. Trees play key roles in reducing floods and storm water runoff in the cities therefore with the prevalence of urban sprawl many trees are cut to get space for the construction of buildings which have an impact on the ecology.

Qi and Lu (2008) pointed out that China has experienced urbanization at a higher rate which has ignited low-density urbanization leading to urban sprawl and therefore the ecological environment has been greatly affected. Some of the ecological footprints include loss of natural resources like sources of water, nature reserves, forests, farmlands, wetlands and other valuable resources. Shenzhen Municipality in China has undergone massive sprawl hence it is essential to protect the ecological environment.

The ecological impact of urban sprawl has manifested itself in developing countries environment. Peri-urban Nyahururu in Kenya has seen the massive conversion of agricultural

lands to non-agricultural land use which is a threat to future food security and food production (Stefan et al., 2010). A study conducted by Bruegmann and Robert (2005) pointed out that land use and urban sprawl posed a great challenge to the environment and as a result of that, wildlife species, wild forests, meadows and wetlands are all disappearing and this has a negative impact on the environment.

In Ghana, urban sprawl also poses a threat to the ecology as demonstrated in other countries. A workshop on managing wetlands in Accra (2006) indicated that wetlands in Accra are under threat as a result of high population growth and urbanization. Rapid conversion of wetlands into the development of houses due to urban sprawl has impacted on the environment since most floods that occur in the city are as a result of encroachment of wetlands. This causes destruction to many lives and properties. The Sakumono Ramsar site along Accra to Tema road provides a clear indication of how wetlands have been encroached. Many endangered species also depend on wetlands for survival (Urban and Meets, 1992). Additionally, the study indicated that the ecological impact of urban sprawl affect wildlife as urban development spreads from the inner cities to the peri-urban centres. Urban and Meets (1992) pointed out that "the shift in the human population to rural areas has a dramatic effect on wildlife population" (Urban and Meets, 1992, p. 2). They further pointed out that natural resources are lost when natural landscapes are encroached for building purposes. Wildlife populations are under threat since many species of wildlife need large natural places to increase their population numbers. Urban sprawl sometimes generates conflicts between wildlife and humans as car-animal collision normally occur and this poses a threat to inhabitants in the sprawling areas.

Stone et al., (2010) asserted that climate-related fatalities result from sprawling patterns in urban development which cause extreme rise in temperatures in urban areas. A heat wave has

implications on human health and climate change and becomes dangerous for the ecosystems around.

Additionally, a study by Wise (1952) pointed out that when farmlands and natural areas are destroyed for construction purposes, the delicate water balance between rain and groundwater aquifers, rivers and streams tend to malfunction. Also, Thuo (2013) added that residential development into the peri-urban areas sometimes causes water pollution, soil erosion, waste generation and changes in vegetation cover in the environment which is problematic.

According to Gurin (2013) urban sprawl is a major contributor to climate change and air pollution. Inhabitants in sprawling communities travel long distances to the major cities by automotive transportation which requires energy consumption using fossil fuels, a big source of greenhouse gases. He added that sprawling communities use long distances to pump water in and waste out, deliver natural gas, provide solid waste recycling pick- up over wider areas and these services involve the production of more greenhouses gases contributing to air pollution and climate change which leave an ecological footprint. Sustainable development requires proper checking of encroachment into peri-urban lands which will provide a sustainable environment for ecosystems.

Aesthetics value is lost due to land use change in peri-urban zones. This is because the charm of the area is lost to construction of buildings and the negative aspect is a social loss for example when wetlands and wildlife habitats are converted to the construction of buildings; they lose their attraction and cause a threat to nature (Gurin, 2013).

The United Nations World Commission on Environment and Development defines sustainable development as “Development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (World Commission on Environment

and Development, 1987, p. 8). This means that resources, nature and infrastructure become unsustainable if urban sprawl continues unabated.

1.4.Conceptual Framework

This shows the framework within which the study is organized. The components in the framework are interconnected. There are many actors that drive urban sprawl in Ghana with respect to the peri-urban areas of Accra and they include state institutions, market forces and civil society. These institutions play key roles in the land use change in urban areas.

The original conceptual framework on which this thesis framework adapted was derived from the "Drivers of Urban Sprawl in Urbanizing China- A political Ecology Analysis" (Fang and Pal, 2016). The actors active in land conversion in China are not the same in Ghana. In China the state plays major role in management of its lands especially urban lands as shown in Fig. 1.1.

Urbanization in China was a means by which the national government acquire economic rebalancing. Some of the state actors that were involve in China's land conversion and management included; State Council, National Development and Reform Commission, Ministry of Land Resources and Ministry of Housing and Urban Rural Development as indicated in Fig. 1.1.

Additionally, the market actors involved in land conversion in China included Industrial entrepreneurs and Real estate developers. Market actors' aim in the land market was to maximise profit. For example real –estate developers' pay high leasing fees to convert lands to other use such as residential and commercial developments. The civil society actors involved villagers who collectively own rural lands without interference of the state as shown in Fig. 1.1.

Figure 1.1 shows the ecology of actors involved in land conversion in China

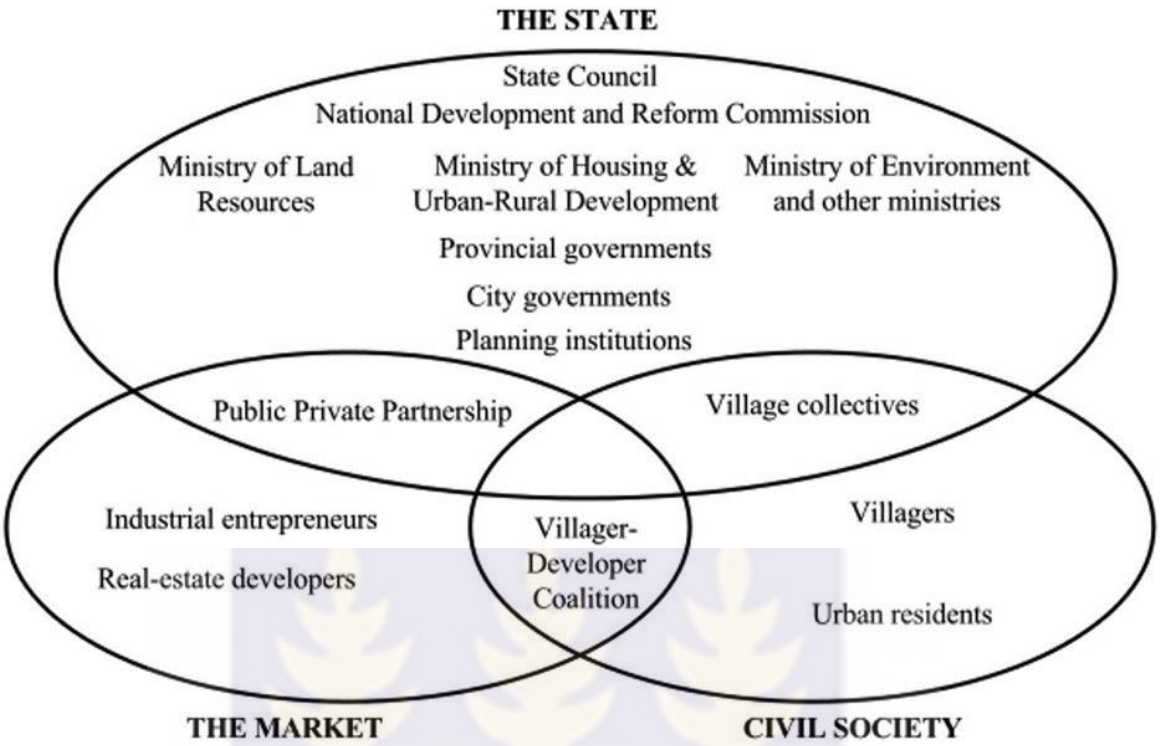

Figure 1. 1. A political ecology of actors involved in land conversion in China

Source: Fang & Pal, 2016

In Ghana, traditional authorities are custodians of lands whiles the state play keys roles in land management in China. Figure 1.2 represents the drivers of urban sprawl in the political ecology of Ghana.

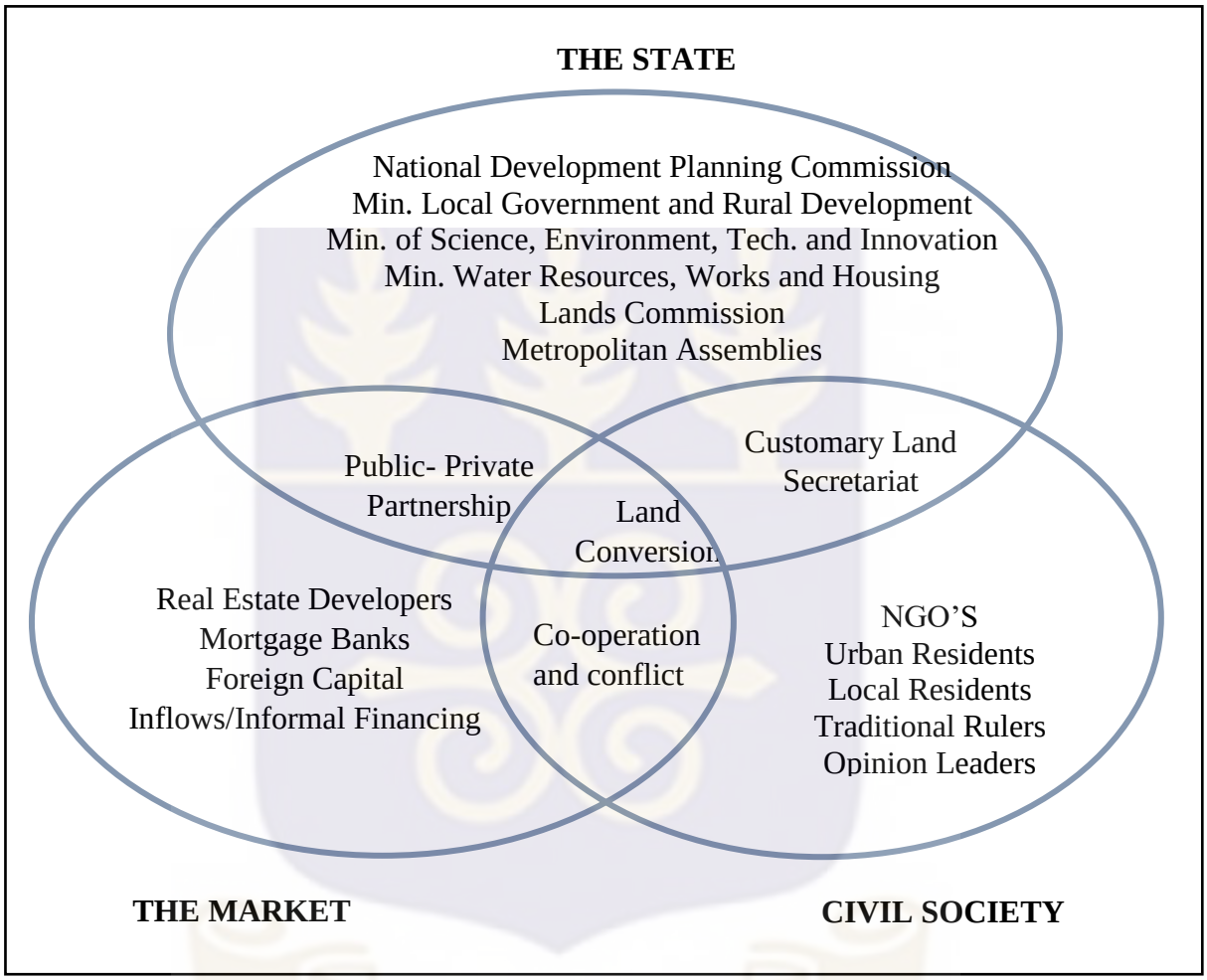

Figure 1. 2. A Political Ecology of Actors Involved in Land Conversion in Ghana

Source: Adapted from Fang and Pal, 2016

From Figure 1.2, the state, the market and the civil society in Ghana are key actors in the land conversion process. The effectiveness of these actors or otherwise determine the extent of the land conversion process.

In Ghana, the state plays an important role in the land conversion process. There are a number of institutions that are involved in land management and some of them include; National Development Planning Commission, Ministry of Water Resources, Works and Housing, Ministry of Local Government and Rural Development which have some institutions such as Town and Country Planning Departments and the Lands Commission. It should be noted that failure of these institutions in the planning processes in land use in the urban centres result in uncoordinated and uncontrolled expansion of urban settlements which lead to changes in land use in the urban centres. The role of government is relatively passive with regard to land allocation (Kasanga & Kotey, 2001). The state land management institutions over the years have failed to manage land holdings in the city for residential, commercial and industrial purposes and mostly favour government bureaucracies and well to do individuals with the poorer groups mostly relegated to the background. The state institutions involved in the land conversion in the city are unjust, unsustainable and inefficient in their dealings and hence the unplanned nature of land use change in the peri-urban zones of the city.

Also, the Lands Commission which was established under Article 258-265 of the 1992 constitution with the core mandate to be the hub for excellent land delivery services have failed to a large extent.

According to Kasanga and Kotey (2001) the Commission is charged with the duty of managing public lands and lands that are acquired for government use on behalf of the president or the Commission on behalf of the government. Lands Commission also sees to the registration of land titles throughout Ghana and formulate, summit to government recommendations on national policy with regard to land use.

The Commission has however failed in the provision of their services due to political influence, inadequate funding, and weak management capacity which influence land use

change in the city. The negative implication is uncontrolled and haphazard expansion of cities into the urban fringe leading to urban sprawl.

Again the Metropolitan Assemblies are responsible for making planning schemes for land use and legislative powers to make bye-laws for building regulations has also failed in the performance of their duties due to shortage of vehicles for field work, government interference and lack of adequate base maps for planning and all these constraints lead to urban sprawl. In a nut shell, the states institutions involved in land management are subject to corruption.

Another paramount institution in the land conversion process is the civil society. The civil society involves traditional leaders, opinion leaders, Non-Governmental Organizations and others shown in Figure 1.2. Housing developments account for the greatest land use in the land conversion process. The traditional or customary sector holds about 80 to 90 percent of lands that are not developed in Ghana with different tenure and management systems (Kasanga & Kotey, 2001). The chiefs, queen-mothers and elders in the civil society are active agents in the land conversion process. In the peri-urban zones, lands are major natural resource which comes under pressure due to the conversion of lands into residential purposes which often result in land disputes. In Ghana, the traditional authorities are in charge of lands and the state acquires lands from the traditional authorities. They have not acquired new mechanisms to address challenges that confront them hence land disputes in the peri-urban zones are common. Most chiefs are under pressure due to population growth and rapid urbanization and lease out lands indiscriminately to developers which lead to urban sprawl in the peri-urban zones. The Customary Land Secretariat aids in land administrative services for owners and seekers of customary land rights.

Finally, the market also plays vital roles in the land conversion process. Real estate developers nowadays are in the limelight in the land conversion process which drives urban sprawl. They

develop properties and either sell them or put them on lease or rent. Mostly they buy lands and do not develop properties on their own but in collaboration with a builder at a fixed cost. Most of them develop estates and gated communities in the peri-urban zones which lead to land conversion. Real estate developers speculate in the lands at the peri-urban zones which are cheaply priced and they develop the lands to get profit from it.

To add to that, mortgage banks play key roles in the land conversion. They are banks that deal in servicing mortgage loans or offer loans to its clients to buy real estates, buildings and lands and either collect the loan back with interest.

Additionally, foreign capital inflows promote land conversion in Ghana. This is because, foreign or external sources provide an amount of money to buy local capital assets such as buildings and lands. Informal financing also serves as a means where individuals or group of people get money to purchase assets such as lands and buildings. These institutions lie outside the country's formalized systems and regulations in the financial forms of administration and examples of these institutions include credit unions, urban credit cooperatives and special development fund.

Private-public partnership also serves as links between the market and the state. Individuals and entrepreneurs who are able to acquire lands from the state develop the lands for projects that are beneficial to the government. There is co-operation and conflicts between the market and the civil society. The issues of land guards emanate when lands are protected from the people for the owner and this situations sometimes create conflict between lots of people. Those who benefit from the issues of land use change (winners) tend to cooperate with the market and the civil society. This collaboration between the market and the state are drivers of urban sprawl in the peri-urban zones. The actors involved in land conversion in Fig. 1.2

show a clear indication of how the peri-urban zones of Greater Accra Metropolitan Area have been affected by urban sprawl.

1.5. Objectives and Propositions

The research therefore aims to examine urban sprawl and its impact on livelihoods and ecology in peri-urban areas of GAMA. Specifically the study seeks to

1. Explore the origin, growth and development of Accra.
2. Examine the dynamics of land use change from 1924 to the present.
3. Assess the drivers of urban sprawl.
4. Highlight the effects of urban sprawl on livelihoods sustainability in peri-urban areas.
5. Discuss the ecological footprints of urban sprawl.

Propositions

1. GAMA is sprawling due to the speculative activities of real estate developers
2. Peri-urban development in GAMA is triggered by some traditional leaders who have authority over lands.

1.6. Research Questions

The study tries to answer a number of unresolved questions among which are

1. To what extend has the city sprawled from 1924 to present?
2. What livelihoods are mostly affected?
3. How does that affect the sustainability of the city?
4. What are the drivers of urban sprawl?
5. To what extend has urban sprawl affected the ecology?

1.7. Research Design

1.7.1. Introduction

This study employed a case study approach. According to Murphy (2014), it is an effective conduit for a broad range of research methods; in that sense they are non-prejudicial against any particular kind of research. A study may deal with single or multiple cases and according to Yin (2013) a multiple case design in a case study is better than single case because observation from multiple cases is more compelling. In all, data was collected from some selected peri-urban areas in the Greater Accra Metropolitan Area. This decision to employ multiple case approaches was informed by reasons proposed by Yin (2013) and Murphy (2014) above. The study also adopted mixed method approach by integrating both qualitative and quantitative methods. According to Creswell (2013), mixed methods cancel or neutralize the biases inherent in the other methods. Therefore the shortfall in one single method is taken care of by other methods in the mixed methods approach. The adoption of this method provided a good avenue for understanding the impact of urban sprawl on livelihoods in peri-urban zones. The study also used data from both primary and secondary sources. The primary data include questionnaire administration, interviews. Remote sensing technique was employed to delineate the actual areas in peri-urban zones of GAMA affected by the sprawl and to analyse trends of the rate of land use and land cover change for some periods.

1.7.2 Sampling Design for Questionnaire Survey

Sampling Technique

Stratified sampling was used in the distribution of the questionnaire in the selected peri-urban zones of GAMA. There were four levels in the stratification. The first level involved the stratification of development corridors and the corridors included; Western corridor (Accra to Winneba axis), Northern corridor (Accra to Nsawam axis), North-Eastern corridor (Accra to Aburi axis) and Eastern corridor (Accra to Tema and beyond).

The second level was the selection of residential communities within corridors. Two communities were selected within each corridor. Gbawe and Weija were selected for the Western corridor, Pokuase and Amasaman were selected for the Northern corridor. Oyarifa and Abokobi were selected communities in the North-Eastern Corridor and finally Afienya and Dawhyenya were finally selected from the Eastern Corridor. The justification for the selection of these communities in the four corridors was as a result of the massive residential developments ongoing in the area. For instance, the location of Central University College at Dawhwenya in the Eastern Corridor axis has attracted massive hostel developments by private individuals for students and other staff of the university. Again the area has attracted people who work as commercial car drivers to convey residents and students to their homes and hostel and this provides them their source of income. Afienya which is closer to Dawhyenya has attracted residential developments by real estate developers and individuals who want to own their own homes.

Amasaman and Pokuase on the Northern Corridor is along a highway and have massive residential developments. This has created income generation activities such as home-based and road side businesses for many people especially women.

To add to that, communities like Gbawe on the Western Corridor has experienced massive sprawl especially places like Gbawe Top-Base. Many people want to settle on hilly areas to enjoy the serene environment over there. The presence of West Hills Mall closer to Weija has attracted massive residential developments around Weija since many people will get access to shop at any time. Oyarifa and Abokobi on the North-Eastern Corridor have also experienced urban sprawl due to large vast of lands available.

The third level was the selection of households within communities at the corridors. In all 50 households were selected from each of the four corridors with 25 households each from a

community with a corridor. The justification of selection of 25 households from each community was as a result of time constraints.

The fourth level and the final level involved gender disaggregation of households. At this level gender was mainstreamed as both males and females were given equal opportunities to be interviewed as shown as Table 1.1.

Non-residential developments such as banks, shopping malls and other activities were sampled purposively for the survey as shown in Table 1.3.

Table 1. 1. Sampling Techniques for Household Questionnaire Survey

Level 1 **Sample areas/Corridors**	Stratification by Development Corridor Corridors 1. Western corridor (Accra to Winneba axis) 2. Northern corridor (Accra to Nsawam axis) 3. North-Eastern corridor (Accra to Aburi axis) 4. Eastern corridor (Accra to Tema and beyond)
Level 2 Communities within Corridors	Selection of Residential Communities within Corridor Corridor — Communities Corridor 1 — Gbawe and Weija Corridor 2 — Amasaman and Pokuase Corridor 3 — Oyarifa and Abokobi Corridor 4 — Afienya and Dawhyenya
Level 3 **Households within Communities**	The households selected within the communities at the corridors (Communities and Sample size) Gbawe 25 + Weija 25 = 50 Amasaman 25 + Pokuase 25 = 50 Oyarifa 25 + Abokobi 25 = 50 Afienya 25 + Dawhyenya 25 = 50 Total Households selected = 200
Level 4	Gender was mainstreamed in the household survey in the sense that men and women were given equal representation and when a woman was interviewed in first household, the next household was a man and vice versa leading to 13 males and 12 females. Communities Males Females Males Females Total Gbawe 12 + 13 = 25 Weija 13 + 12 =25 50 Amasaman 13 + 12 = 25 Pokuase 12 + 13 = 25 50

Gender Disaggregation of Households	Oyarifa	12	+	13 = 25	Abokobi	12 + 13 = 25		50
	Afienya	13	+	12 = 25	Dawhyenya	13 + 12 = 25		50

Source: Field Survey, 2017

Figure 1.2 shows map of the study area.

 # Note Corridor 1 (Accra to Winneba axis)

Corridor 2 (Accra to Nsawam axis)

Corridor 3 (Accra to Aburi axis)

Corridor 4 (Accra to Tema axis and beyond)

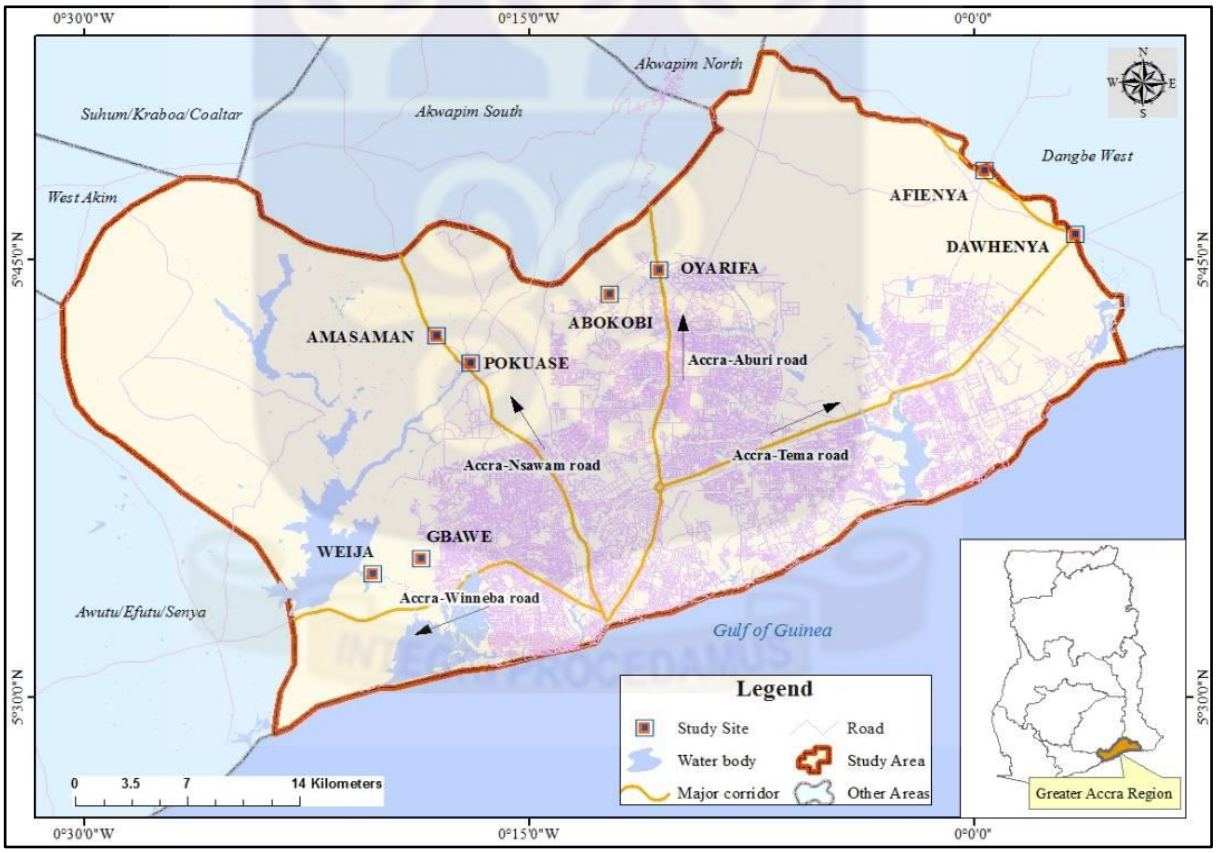

Figure 1. 3. Map of the Study Area

Source: RS/GIS LAB, 2017

1.7.3 Commercial Activities Survey

Apart from the household survey, there was other survey with reference to non–residential developments or commercial activities, educational establishment, malls, shops, banks and agri-businesses selected for the survey from each corridor depending on those that were dominant in the corridor. Apart from the recent commercial activities present at the corridors, there were pre-existing commercial activities that were dominant at each corridor before the phenomena of urban sprawl. The pre-existing commercial activities selected from each corridor before urban sprawl were as follows:

Table 1. 2. Pre-existing Commercial Activities at the Corridors

Corridors	Pre-existing Commercial Activities
Accra to Winneba axis	Vegetable Farming, Fish Farming
Accra to Nsawam axis	Crop Farming
Accra to Aburi axis	Stone Quarrying
Accra to Tema and beyond axis	Rice Farming, Cattle Rearing, Crop Farming

Source: Field Survey, 2017

Focus Group Discussions were conducted with major interest groups such as Rice Growers Association and Cattle Rearing Association at Dawhyenya.

Also, unstructured interviews were conducted with Farmers at the corridors who were involved in various forms of farming before urban sprawl. On the Accra to Winneba axis, some fish farmers around the Weija dam indicated that they were involved in fish farming on a large scale for both domestic and commercial use but with the emergence of urban sprawl, residential developments around the Weija dam has forced them to resort to other livelihood strategies.

To add to that, informal interviews were conducted with some residents at the Oyarifa and Abokobi on the Accra to Aburi axis. They indicated that, they were involved in stone quarrying for commercial use and sold gravels for as their source of livelihood but with the emergence of residential developments as a result of urban sprawl, many people are now settling on the hilly areas and this affected their source of income. Table 1.3 indicates the recent dominant commercial activities at the corridors.

Table 1. 3. Commercial Activities Sampled at the Corridors

Corridor	Commercial Activities
Accra to Winneba axis	West Hills Mall
Accra to Nsawam axis	Ga Rural Bank
Accra to Aburi axis	University of Ghana
Accra to Tema and beyond axis	Central University College

Source: Field Survey, 2017

Purposive sampling was used in the selection of the non- residential developments and the key issues relating to the commercial/services activities and agri-businesses were noted. The non-residential developments were in competition with residential developments in the peri-urban area.

Unstructured discussions or interviews were conducted with one customer at the West Hills Mall, who indicated that accessibility to goods and services motivated her to relocate to the area. Some residents at Dawhyeyna on the Accra to Tema and beyond axis who were commercial drivers were interviewed and they indicated that the presence of Central University College in the community has helped them to improve their livelihoods strategies by conveying students and staff to the University Campus and their various hostels for a fee.

Again, on the Accra to Nsawam axis, Management of Ga Rural Bank at Amasaman were interviewed and they indicated that the community used to be rural area but urban sprawl has motivated many people especially residents in the community to open account with the bank.

Finally, on the Accra to Aburi axis informal discussions were conducted with a junior staff of the University of Ghana, who indicated that the presence of the school attracted many people to relocate to the area to have access and gain profit especially with private hostels developers.

1.7.3 Qualitative Research Methods

Focus groups discussion (primary stakeholders) was conducted in the selected peri-urban areas of GAMA due to their specialized knowledge on the issue.

In-depth interviews were conducted in the selected sprawl areas in the peri-urban areas to inquire about the extent of the impact of the sprawl on their livelihoods. Direct observation was employed. According to Boyce (2006) in-depth interviews give more detailed information than a survey. Direct Observation provides researchers the opportunity to get information which may be uneasy for participants to discuss (Creswell, 2013).

1.7.4 Key informant interviews

Also key informant interviews among traditional leaders at Amasaman, Director of Environmental Protection Agency in Accra Metro, Municipal authorities at GAMA, youth groups (Dawhwenya, Amasaman) and Real estate developers at Castle Gate Estate Company Limited were conducted. According to Creswell, (2013) key informants are able to give historical account of information to researchers. Issues that related to the drivers of urban sprawl and its impact on their livelihoods formed part of the discussions

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1.7.5 Remote Sensing Data Application and Analysis

1.7.5.1 Data

The study presents the trend analysis of land use and land cover change in GAMA for the period 1986, 1991, 2008 and 2016. 1986 was Landsat TM image captured by Landsat 4 satellite, 1991 was Landsat ETM by Landsat 5. Datasets were obtained from the United States Geological Survey (USGS) Earth Resources Observation Systems data centre.

1.7.5.2 Image Pre-processing

Landsat Thematic Mapper images were geo-referenced to the Enhanced Thematic Mapper images to allow for accurate pixel by pixel comparison during the change detection analysis. Cloud free images were atmospherically corrected by converting them to top of atmosphere reflectance to reduce the effect of atmospheric conditions on the data recorded.

1.7.5.3 Image Classification

The study employed land use classes such as dense vegetation, settlement, water body, grassland/shrubs and open areas. The images for each period were independently classified using a supervised technique based on the maximum likelihood algorithm which used a probability density function to assign a pixel to a specific class.

1.7.5.4 Post-classification analysis

Change detection analysis using pixel by pixel comparison was used to identify and quantify the transitions between the classified time series images. Classified images for year 1986 were compared first against 1991 and then 1991 against that of 2008. Finally 2008 classified image was compared with 2016. This comparison was done first by considering the rate of LULC changes in GAMA. The change detection statistics showing the transition in land use between the images were derived and noted.

1.7.5.5 Accuracy Assessment

Accuracy assessment was done to compare the classified image to another source of data considered to be accurate or ground truth.

1.7.6 Secondary Source of Data

The secondary data sources comprised information from journals, articles, books, newspapers, publications on urban sprawl that are considered relevant to the study, satellite images, aerial photographs, Government publications, organizations' database and websites were employed in the study. According to Creswell (2013) secondary source of data saves the effort of the researcher from transcribing.

1.8. Analysis of Data

Statistical procedures and methods were used for the data analysis. The data was analysed using Statistical Package for Social Sciences (SPSS) version 20 and Microsoft Excel 2013. The SPSS was used to generate percentages and frequencies for the various variables in the questionnaire line up. These included sex of respondents, primary and secondary occupation, land use changes, extent of urban sprawl among others. The Excel was used to generate charts and graph for interpretation of the survey. It also helped to generate the results and findings for the research.

Additionally, a multi- temporal set for Remote Sensing data for the study area was used to know the trend analysis of land use change of GAMA by classifying Landsat images for the years (1986, 1991, 2008 and 2016). ENVI 5.1 which is digital image processing software was used to process, analyse and integrate the spatial data. The study area map output was generated using GIS software ArcGIS.

1.9. Limitations of the Study

The study was constrained by both time and finances. One of the major challenges that the study encountered was that all the inhabitants in the peri-urban areas of GAMA were not inquired about their perception of urban sprawl. However based on the classified Landsat image for GAMA in 2016, some selected areas where sprawling has occurred most were used for the survey. In most cases due to the construction of new residential buildings, there were several visits in order to meet the inhabitants in the peri-urban areas. This delayed the administration of the questionnaire.

CHAPTER TWO

ORIGIN, GROWTH AND DEVELOPMENT OF ACCRA

2.1 Introduction

This chapter introduces readers to the study area which gives background details of the area. Firstly, it talks about the genesis or origin of Accra and this throws more light on the historical factors that contributed to the origin of Accra. Secondly, the chapter examines trends and dynamics of growth of Accra. Again, the demographic dynamics of the study area are further discussed. Finally the drivers that lead to the development of Accra are also highlighted.

2.2 The origin of Accra

The capital city of Ghana, Accra has been growing very fast both physically and economically. The origin of Accra has a long history and most experts attribute the genesis of Accra to its development as a coastal fishing port during the late 16th Century (Grant & Yankson, 2003). The Kpesi people were the earliest known settlers on the stretch of the coastline now called Accra. They absorbed the Ga-speaking migrants from Niger into their communities. Also on the east of the fishing village was the east of Korle Lagoon but later expanded to include places such as Jamestown and Ussher Town in the present day Accra.

The latter part of the Fifteen Century saw the arrival of the Europeans along the coast of Gold Coast and most of them built their forts and castles along the coast including Accra. The Europeans had authority over areas with forts and castles and fought among themselves (Ghana National Council, 1883). The emergence of slave trade in the pre-colonial period led to the development of coastal trade centres which enhanced the building of many forts and castles. For example the Ussher Fort was built by the Dutch in 1605, Christianborg Castle by the Swedes in 1657 and James Fort by the British in 1673. These forts became foreign commercial enterprises in the pre-colonial periods. Trade in gold and slaves were dominant in Accra than any other place along the coast in the 1680's (Acquah, 1956).

2.3 Growth and Development of Accra

Cities in developing world are experiencing massive urban growth and development, therefore a number of reasons accounts for that. Growth and development involve expansion and improvement in various sectors of the economy in the city.

During the pre-colonial times, growth of Accra dated back in the nineteenth century. The growth of Accra as an urban centre started in 1877 when the seat of the colonial government was relocated from Cape Coast to Accra (Grant & Yankson, 2003). Accra was selected as the site for colonial administration due to the fact that the Europeans wanted to protect themselves from native-borne diseases hence wanted a new area to solve the health related issues and also to reorganize and rebuild Accra after the earthquake in 1862. In 1877, the colonial government relocated the seat of government from Cape Coast to Christianborg, Accra. The reasons for the British colonial government to relocate to Accra were due to drier climate in Accra, proximity to Aburi which was congenial to them, malaria free and low prevalence of sleeping sickness which was comfortable for their horses (Bertrand & Yankson, 2003).

Accra served importantly as commercial and administrative centre due to the presence of missions, firms and headquarters of the seat of Government. There were few secondary industries though there were many ware houses and stores (Acquah, 1956).

However, Grant and Yankson, (2003) added that political and economic power was largely focused in Accra with lot of merchants due to the colonial administration located there. Massive investment capital and trading was seen in Accra due to the developments. Accra became the busiest port in 1899, had the largest number of warehouses and the major terminal point of the colonial economy with sources of exportable commodities, transport links pushed directly inwards by early 1920's. Commerce replaced government as a primary activity due to the fact that cocoa was among Accra's most important export commodities. The period of 1924

to 1938 experienced the growth in cocoa production which supplied tax revenue for the development of Accra under Governor Frederick Gordon Guggisberg and areas like Korle Gonno, Mamprobi expanded in Accra to the west of the Korle Lagoon. Accra continued to receive large number of migrants after the World War II and the headquarters for allied West African Military operations was established in the city. The city of Accra in the colonial times saw the development of the city in a concentric form around the central business district and (CBD) served as a commercial centre for trade, distribution and storage, banking and transportation centre which favoured many foreign firms (Grant & Yankson, 2003).

Accra growth was very quick to the extent that it rose from a small uniform fishing village to a heterogeneous modern township as there was increasing demand for medical and educational facilities (Acquah, 1956).

However, in the Nkrumah's period, Ghana gained independence in 1957 and Accra's economy was mainly occupied by export-oriented foreign firms and lacked manufacturing tradition which led to its status as a warehouse city rather than a factory city (Grant & Yankson, 2003). Bertrand and Yankson (2003) added that during independence, in the Central Business District (CBD) of Accra, the construction of banks, department stores, cinemas, government offices and private residential development took place. Also, Accra became a pivot for political activities, had many educational facilities which attracted a lot of migrants into the city and coastal settlements such as Labadi, Teshi and Nungua experienced gradual absorption due to the spatial expansion of central Accra. The city's rapid growth was at the expense of physical planning and this led to haphazard development of buildings. Accra became a focus of road systems in the east maintaining its position as a port and transforming into an international port. Growth was stimulated due to accessibility in Accra thereby increasing its sphere of influence and major roads such as Accra-Winneba, Accra-Nsawam-Kumasi, Accra-Aburi-Dodowa and Accra- Tema-Aflao roads stimulated the urban growth of Accra.

Furthermore, after independence, growth and development of Accra reached its highest level. Kwame Nkrumah's government adopted the city as a growth pole and capital of the national economy and reduced foreign involvement in the economy to promote industrialization. Administrative functions were mostly concentrated in Accra at the expense of other cities in different regions of the country. The construction of the Tema port in 1967, the Makola market in the CBD attracted small domestic businesses in the area and the expansion of housing developments such as the construction of bungalows for senior public and civil servants led to the development of Accra (Grant & Yankson, 2003). These housing developments were inadequate for the growing population and led to increased pressures on the facilities. Bertrand and Yankson (2003) added that there were increased employment opportunities within Accra-Tema due to the establishment of a new port and a new township at Tema.

Accra's rapid expansion after independence led to increased demand of land which followed the colonial pattern in terms of planning and development. Although barriers of segregation were eliminated, the basic principles, laws and procedures of planning remained unchanged. Planning was mostly concentrated on state lands at the expense of customary lands (Larbi, 1996).

The country experienced economic recession in the early 1970's and mid 1980's which had negative impacts on Accra's development, employment opportunities in the formal sector and also the growth rate as many people migrated from the country to neighbouring countries particularly Nigeria to seek greener pastures (Yankson & Bertrand, 2003). This affected employment opportunities particularly in the formal sector of the economy.

Larbi (1996) added that mismanagement and inefficiency in socio-economic development, centralization of planning and administration caused by the socialist ideology, decline in per capita income and high inflation led to Ghana's economic recession after independence.

Active informal sector advanced during this period. Land use planning and development was not strictly enforced as many buildings sprang up in vacant land sites, open spaces and road reservations were encroached. Most residential developments sprang up around areas liable to floods and along drainage ways and this became a challenge to urban development. Some of the areas include Dzorwulu, Airport West Residential Area and Alajo. These practices accounted for the absence of parks and open spaces in Accra

Larbi (1996) indicated that Structural Adjustment Programme (SAP)/Economic Recovery Programme (ERP), embarked on by Ghana under International Monetary Fund (IMF) and World Bank sought to stabilize the economy, enhance trade liberalization, promote an economy where hard work pays, removal of subsidies in health and education, tax controls, realistic exchange rates and reform the financial sector. In addition to that, there were policies such as licensing the informal foreign exchange market into 'forex bureau', and improvement in the management and decentralization in the public sector. It was evident that the economy at that time was geared towards development and therefore restructured. The spatial planning of Accra was beset with numerous challenges with haphazard developments of buildings which led to urban sprawl and slum developments.

The population of GAMA continued to grow due to rapid urbanization (Ghana Statistical Service, 2005). GAMA comprises of Ga West Municipality, Ga East Municipality, Ga South Municipality, Accra Metropolitan, Ledzokuku Krowor Municipal, Adentan Municipal, Ashiaman Municipal and Tema Municipal Area. Many people settled or put up residential buildings in the Ga Municipal (Ga South, Ga West and Ga East Municipal Areas) which was a decade ago declared Ga rural leaving housing developments in the Accra Metropolitan Area declining (Owusu, 2013).

Owusu (2010) pointed out that Accra's population grew from 20,000 in 1891 to 135,800 in 1945 and this was a clear indication of Accra's expansion. Accra attracted migrants from regions surrounding it especially Volta, Eastern and Central Regions (Yankson & Bertrand 2003) due to massive development in Accra at that time

Statistics indicated that the population of Ga Municipalities grew from over 66,300 in 1970 to 908,000 in 2010 which showed massive population growth in these areas and contained large tracts of empty lands to be changed into residential land use. In 1960, Greater Accra had the highest urban proportion of its population at 72.6 percent as compared to the other regions of Ghana. The region is most urbanized with the urban population increasing from 72.6 percent in 1960 to 87.7 percent in 2000 and this contributed to the population growth in Accra (GSS, 2005). Additionally, the total population of Greater Accra in 2010 was 4,010,054 (Ghana Statistical Service, 2012) which indicates an increase in the urban population.

However, the Ga Municipalities still have large tracts of empty lands waiting to be transformed into urban residential and other urban land uses and there is the likelihood that in the future, a large number of people will relocate to the Ga Municipalities hence urban sprawl. The population of Greater Accra Metropolitan Area expanded from almost 828,000 in 1970 to over 2.5 million in 2000 and over 3.6 million in 2010 and as a matter of fact Accra began to sprawl outside the metropolis (Owusu, 2013).

2.4 Dynamics of land use change from 1924 to present in the city

Most cities in both developed and developing countries are growing very fast as a result of population growth and this has led to land use change in these areas. Land use change is a phenomenon that cannot be prevented due to rapid urbanization in places inhabited by people. Human uses of land resources provide avenue for land use change whether for the production of food, provision of shelter and so on. The pattern of land use is manifested by decisions made

by different land users and managers and the processes of land use change involve different organizations in a dynamic manner to produce complex patterns (Braimoh & Onishi, 2007).

Kufogbe (1996) indicated that the peri-urban zones of Accra have an active land resources space and therefore subjected to misuse of land use from what used to be rural lands to urban land use. He continued that the metropolitan area of Accra-Tema has undergone urban sprawl over the years and it was evident that population growth and expansion of built up areas led to the sprawl in these areas. The establishment of Accra as the capital city of Ghana by the British colonial government in 1887 and the creation of Tema after Ghana's independence in 1957 as a major harbour and industrial settlement in the early 1960's resulted in the massive growth of most settlements in the peri-urban zones of Accra.

Population pressure, rapid urbanization, shelter, industrial, commercial and infrastructural needs of the rapid growing city have resulted in extreme land use change in Accra (Kasanga and Kotey, 2001).

Furthermore, Kufogbe (1996) pointed out that improved communication links led to expansion in the built-up area of Accra-Tema Metropolitan Area between 1930 and 1956. There was a serious earthquake in Accra in 1939 which caused serious damage to properties and so the Government built housing estates at Korle Gonno, Christiansborg, South Labadi and Abossey Okai to accommodate affected households (Aquah, 1956). The expansion of Accra and Tema led to the legal demarcation of the twin cities between 1924 and 1987 due to the increase in demand by private and public land developers to use lands for residential, industrial, agricultural and other mixed purposes. Due to the uncoordinated land use patterns in the peri-urban zones of Accra, changes in land use still prevail. The study also noted that information from the Lands Commission and the Town and Country Planning Department indicated that

government and public agencies acquired large tracts of lands for institutional and residential purposes which stimulated land use changes.

Plan Consult (1989) added that Accra city demarcation was revised in 1943 when areas such as Airport areas, Mamprobi and Labadi were formally added to Accra as indicated in Figure 2.1. The study further pointed out that in 1953, the best known boundary of Accra was demarcated which was the basis of Accra Master Plan in 1958 and there were few minor adjustments specifically on the eastern side of the 1953 boundary when the definition of Tema acquisition boundary was created in 1963. Acquah (1956) indicated that by means of modern communication, the coastline stretch of Accra was linked with the world and the entire parts of the country and no longer isolated.

In 1963 the present boundaries of Accra and Tema municipalities were established and still form the area of jurisdiction of the two municipalities as shown in Figure 2.1.

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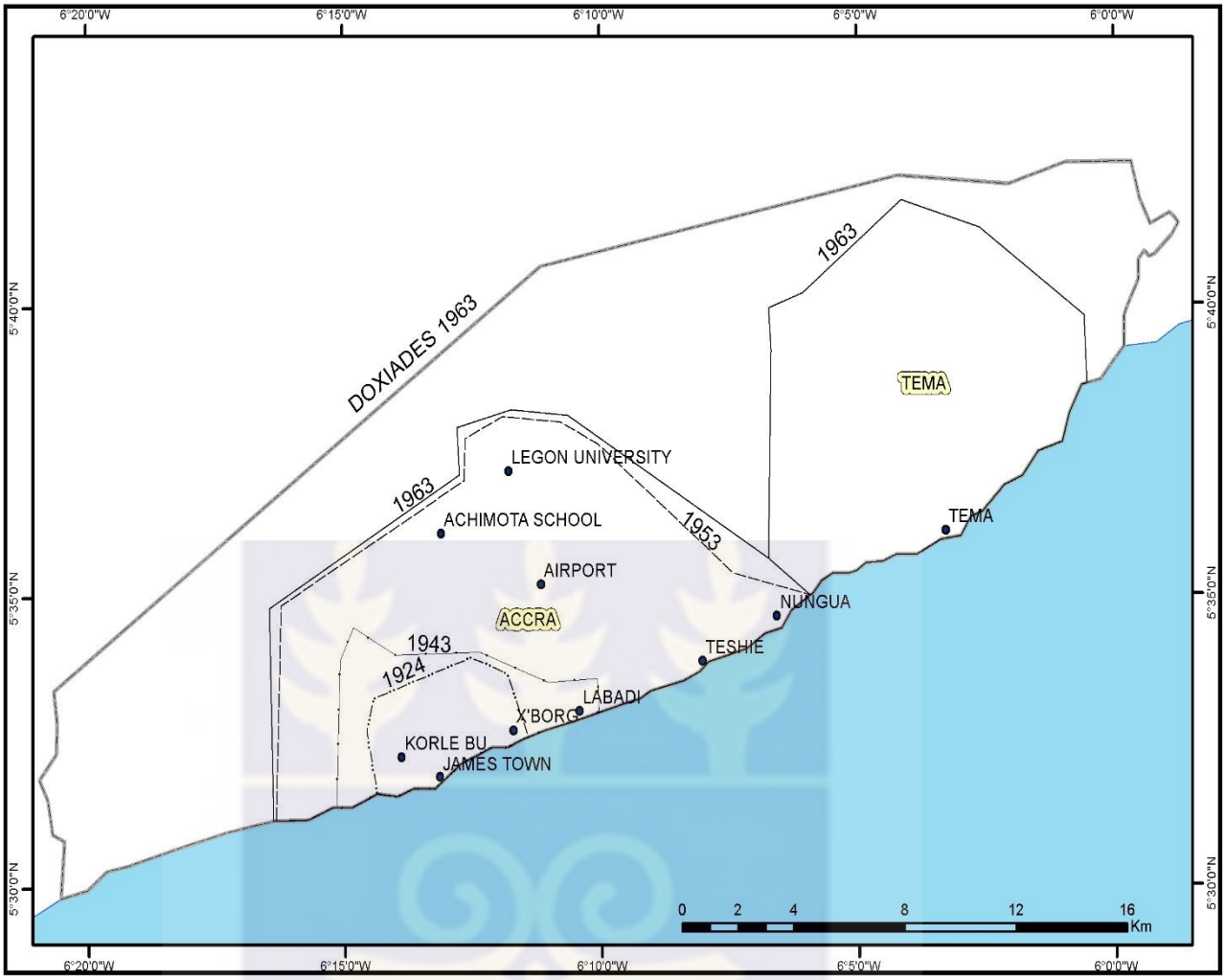

Figure 2.1. Changing Municipal Boundaries of Accra-Tema Metropolitan Area from 1924-1963
Source: Plan Consult, 1989

Note: Map not drawn to scale.

In recent times, the dynamics of land use change in GAMA has increased due to a number of factors. Most lands in the peri-urban zones designated for agriculture have been converted to residential purposes. Yankson and Bertrand (2003) added that there was rapid growth of the land market in the peri-urban areas due to the fact that lands were changed from agricultural to residential and other urban land uses. Table 2.1 shows the change detection statistics of GAMA from 1986 to 2016.

2.5 Spatio-temporal analysis of land use and cover change of GAMA between the years (1986, 1991, 2008 and 2016)

2.5.1 Introduction

Greater Accra Metropolitan Area has undergone changes in terms of land use as a result of urban sprawl and this study employed the use of Landsat images for some year periods and classified them using supervised classification (maximum likelihood algorithm) to know the changes in land use. The data for classification are obtained from the United States Geological Survey (USGS) Earth Resources Observation Systems data centre.

However, 1986, 1991, 2008 and 2016 images are pre-processed to allow for accurate pixel by pixel comparison during the change detection analysis. In order to do that, cloud free images have been atmospherically corrected by converting them to top of atmosphere reflectance to reduce the effect of atmospheric conditions on the data recorded.

These periods were characterized by dynamic changes in the urban economy, government policies and land use change at different stages of land development and land conversion process. These periods were selected due to adequate data available.

Certainly, 1986 was a period of stabilization and recovery with growth and transition into a lower middle income economy. Many policies of the economy during the period 1991 was geared towards developments. Land use planning were not strictly complied by many people which led to uncontrolled gradual developments on vacant land sites and encroachment of reserve areas.

Again, the year 2008 witnessed poverty reduction policies by the then government such as National Health Insurance Scheme, Single Spine Salary Structure and Youth Employment Program. These policies were meant to stabilize the economy thereby improving many

people's standard of living. Many people continued to put up residential developments which contributed to urban sprawl.

The 2010 population census indicated that Greater Accra Region has witnessed massive population growth of 4, 010,054 (GSS, 2012). The outcome of the 2010 population census clearly showed that urban population was 3,630,955 and rural population 379,090 (GSS, 2012). Residential developments continued to sprawl into the urban fringes due to urban sprawl.

Land use classes such as dense vegetation, grassland/shrubs, water bodies, open areas and settlement have been independently classified using a supervised technique based on the maximum likelihood algorithm which used a probability density function to assign a pixel to a specific class. The general trend of the classified images of GAMA indicates that the settlement continues to increase over the years. This is because of population growth which has resulted into urban sprawl. Dense vegetation also has decreased drastically as compared to grasslands/shrubs. Many people are encroaching natural reserves for the construction of residential buildings with institutions backing this illegal act. Areas around water bodies have been encroached due to the sprawl of human settlement and this has contributed to flooding in the city endangering many lives. Accuracy assessment is done due to its relevance in any image classification as it compared classified image to a data source that is found to be accurate or ground truth data.

Table 2.1 shows the change detection statistics of GAMA in the land use/land cover change classes with specific percentages.

Table 2. 1. Change Detection Statistics of GAMA from 1986 to 2016

CLASSES	1986 -1991	1991 -2008	2008 -2016
Water Bodies	12.32	-5.50	-6.87
Dense Vegetation	-343.80	-42.92	-226.98c
Open areas	316.18	81.19	-120.29
Grassland/Shrubs	484.70	-419.47	54.40
Settlement	316.18	81.19	-120.29

Source: Author's Construct, 2017

From figure 2.2, between 1986 and 1991, there were some changes in the area of features on the ground.

2.5.2 Land Use and Cover change between 1986 -1991

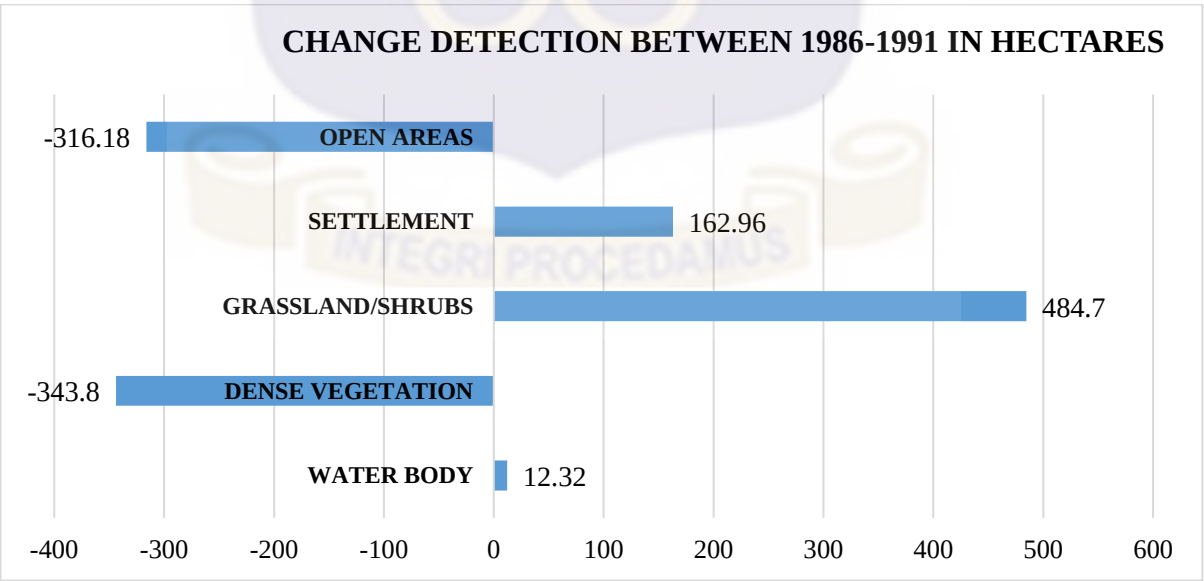

Figure 2.2. Change Detection between 1986- 1991 in Hectares
Source: Author's Construct, 2017

Settlement increased by 162.96 hectares with dense vegetation decreasing by 343.8 hectares. This clearly showed that settlement was gradually competing with dense vegetation. Vegetation was being cleared for residential purposes especially in the peri-urban areas of Accra. Open areas also decreased in size between these periods and there was no decrease in the area pertaining to grassland/shrub and water body. During this period, many people started migrating into the city centres to seek greener pastures and this led to congestion in the city. However, the spatial result of the change detection analysis of GAMA in hectares from 1986 to 2016 in Figures 2.2 can be shown in the Land Use and Cover Map of GAMA in Figures 2.3 and 2.4.

However, there were developments before 1986 which necessitated the revision of the Accra-Tema Metropolitan Area boundary now Greater Accra Metropolitan Area (GAMA) as the city expanded. Development took place ahead of the change in the boundary which led to the demarcation of the Accra-Tema Metropolitan Area boundary. This was because of the increasing space requirement from one period to the other and so the metropolitan boundaries needed to be shifted. Most of these changes were actually physical developments thus replacing the natural landscape with physical developments, economic growth, families and demography as shown in Figure 2.1.

1986 classified image is compared with 1991 classified image and this shows the outcome of the change detection analysis expressed as Land Use and Cover Map of GAMA in Figure 2.3.

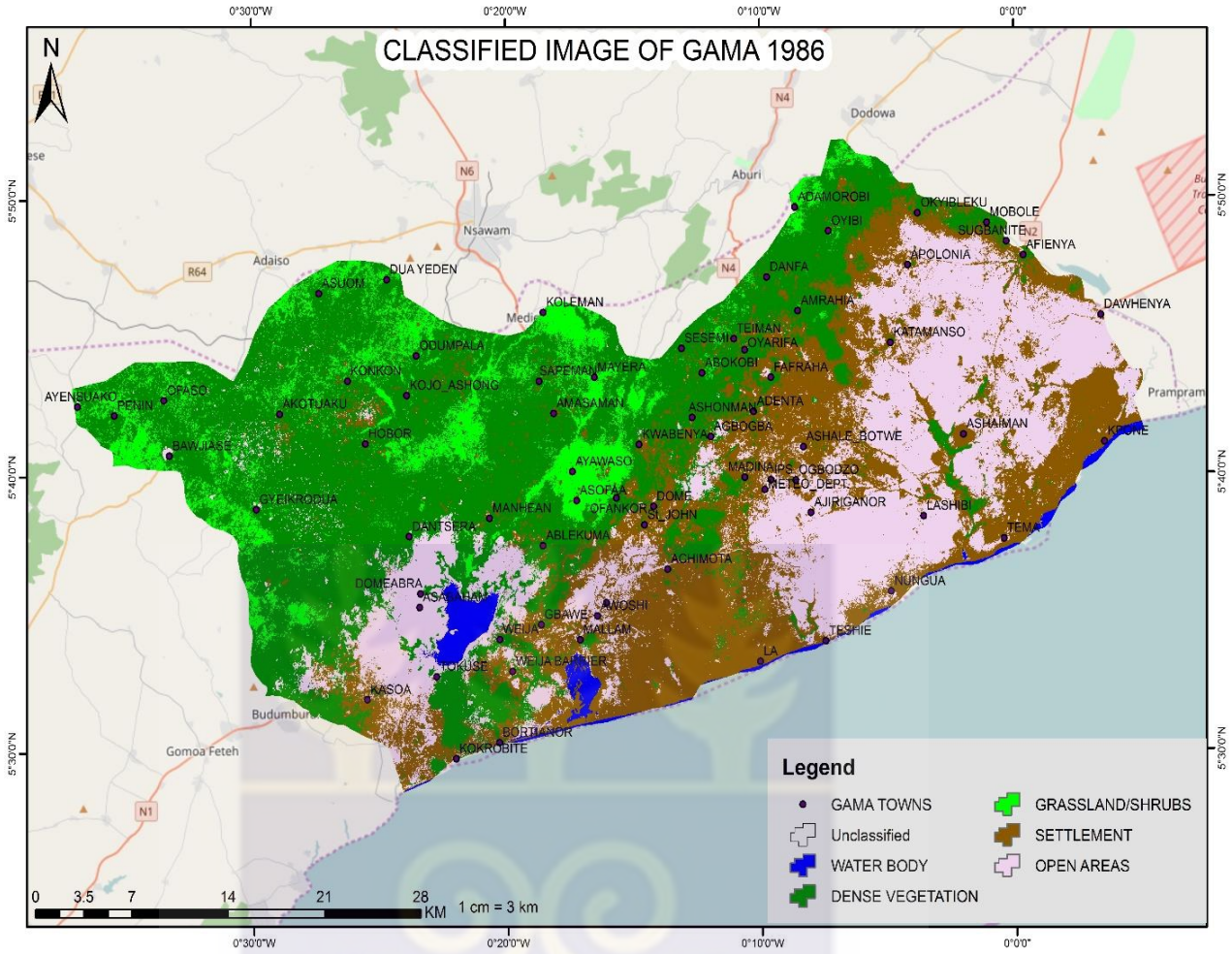

Figure 2. 3. 1986 Land Use/Land Cover Map of GAMA
Source: RS/GIS LAB, 2017

During the 1980's GAMA began to experience growth in terms of its population. Areas such as Tema, Adenta, Gbawe began to experience massive residential developments as indicated in Figure 2.3. Amasaman, Danfa, Oyarifa were all engulfed with dense vegetation and grasslands/shrubs and during that time residential developments in the peri-urban areas were not that much. The country experienced economic recession in the early 1970's and mid 1980's which had negative impacts on Accra's development, employment opportunities in the formal sector and also the growth rate as many people migrated from the country to neighbouring countries particularly Nigeria to seek greener pastures (Yankson & Bertrand, 2003). This affected employment opportunities particularly in the formal sector of the economy.

However, this situation at hand affected many people's source of income and hence residential development was not much at that time. A lot of peri-urban areas of GAMA used to have dense vegetation and most people used to farm on vast lands both for domestic and commercial purposes. Figure 2.4 indicates Land Use/Land Cover Map of GAMA in 1991.

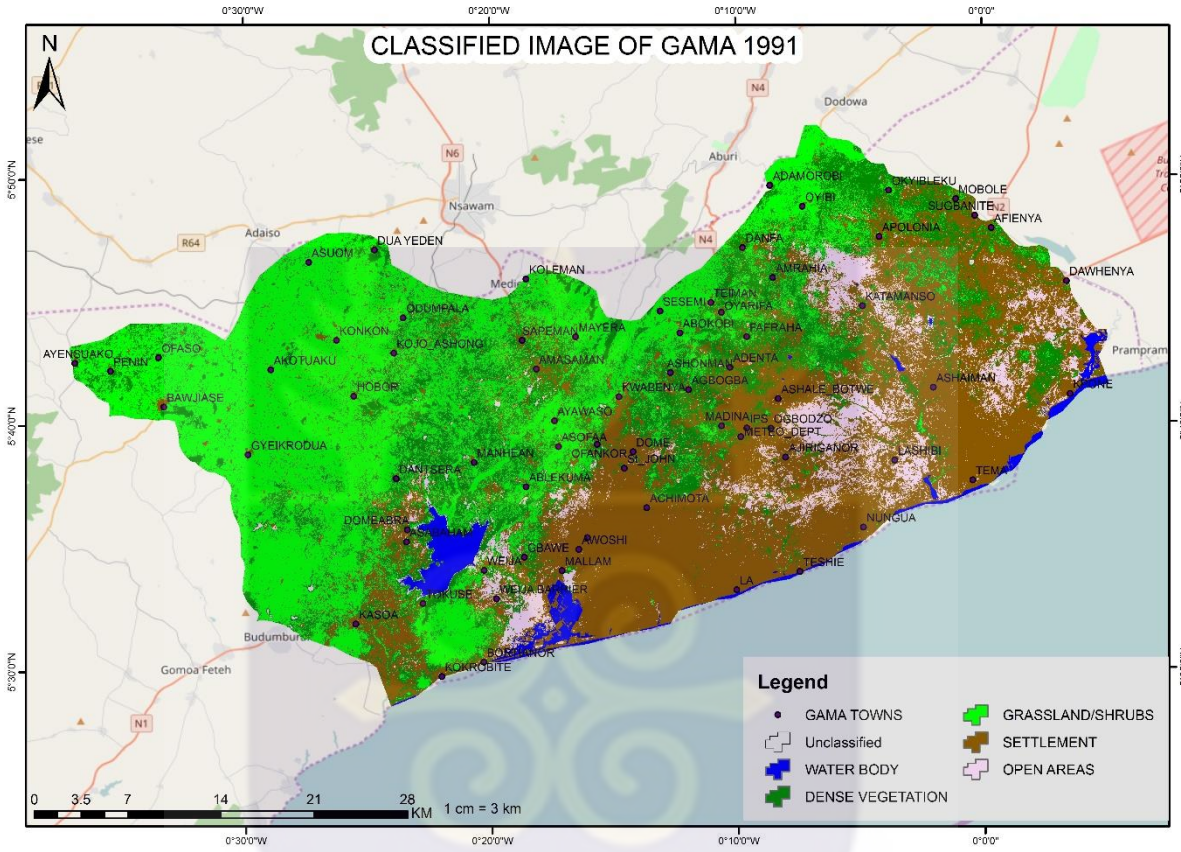

Figure 2. 4. 1991 Land Use/Land Cover Map of GAMA
Source: RS/GIS LAB, 2017

The land use change detection of GAMA between the year period 1986 and 1991 indicated a percentage change in the classes. The classes which include water body, dense vegetation, open areas, grasslands/shrubs and settlements have been compared to know the rate of land use change for the various time periods as shown in Fig. 2.4

During the year period of 1990's a lot of people migrated to the city centres to improve their standard of living and this led to congestion and population growth of Accra. This was because Structural Adjustment Programme (SAP)/Economic Recovery Programme (ERP), embarked

on by Ghana under International Monetary Fund (IMF) and World Bank sought to stabilize the economy, enhance trade liberalization, promote an economy where hard work pays, removal of subsidies in health and education, tax controls, realistic exchange rates and reform the financial sector. In addition to that, there were policies such as licensing the informal foreign exchange market into 'forex bureau', and improvement in the management and decentralization in the public sector. It was evident that the economy at that time was geared towards development and therefore restructured. The spatial planning of Accra was beset with numerous challenges with haphazard developments of building which led to urban sprawl and slum developments. Land use planning and development was not strictly enforced as many buildings sprang up in vacant land sites, open spaces and road reservations were encroached. Most residential developments sprang up around areas liable to floods and along drainage ways and this became a challenge to urban development (Larbi, 1996).

From Figure 2.3, peri-urban areas like Amasaman, Pokuase, Oyarifa, Abokobi and Kwabenya used to have intense dense vegetation and a little grasslands/ shrubs. Settlements were not manyat those places at that time. There was a change in Fig. 2.4 which indicated a decrease in dense vegetation with grasslands/shrubs occupying most lands. People started putting up residential buildings in the peri-urban areas. Peri-urban areas like Katamanso, Gbawe started to develop due to the movement of people from the city centres as a result of congestion and pressure on resources and open areas were also competing with dense vegetation as shown in the classified image. From the statistics Figure 2.2 comparing grassland/shrubs, settlement, dense vegetation and open areas witnessed difference in the image classes. First of all, the change detection analysis between the years 1986 to 1991 showed that dense vegetation has decreased by 343.80% as indicated in Table 2.1 which was quite massive. This was a clear indication of how urban sprawl negatively impacted on dense vegetation and so from 1986 to 1991. GAMA continued to decrease in open areas (316.18) as indicated in Figure 2.2 and this

posed threat to livelihoods in the ecosystem. Urban sprawl is a factor that contributes to decrease in dense vegetation in the peri-urban areas of GAMA as many people clear vegetation for the construction of buildings mostly for residential use. Activities by institutions such as real estate developers and traditional leaders contribute to the decrease in vegetation.

Also, many people encroached wetlands by putting up residential buildings thereby decreasing the percentage change in water body per the statistics. From Table 2.1 there was no decrease in the percentage of water body (12.32%). This meant that, during that period, many people had not started building around water bodies or wetlands. Settlement increased by 162.96 percent in GAMA depicting the rate of urban expansion in the peri-urban areas during the period 1986 to 1991 as shown in Table 2.1. The creation of various road corridors increased expansion of human settlement as urban sprawl occurs around major road axis. Settlement continued to increase in area during this period by 386.7 hectares as shown in Fig. 2.5.Figure 2.5 shows the change detection analysis of GAMA in hectares.

2.5.3 Land Use and Cover Change between 1991 -2008

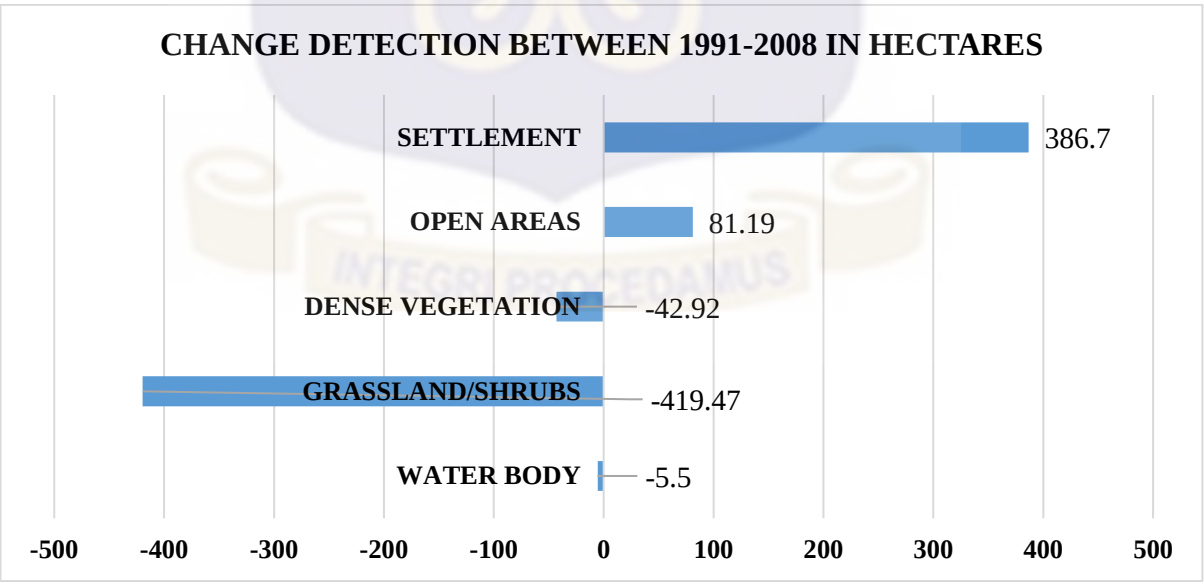

Figure 2. 5. Change Detection "between" 1991-2008 in Hectares
Source: Author's Construct, 2017

Many people continued to relocate to the inner cities of Accra creating the sprawl of human settlement. There was an increase in open areas (81.19 hectares) and this was because dense vegetation experienced a decrease in size during this period by 42.92 hectares as shown in Fig. 2.5. Comparing this period to that of 1986 to 1991, it was observed that water bodies decreased in size (5.5 hectares). This was because, many people started encroaching wetlands by putting up their residential buildings around them. Grassland/shrubs also decrease in size by 419.47 hectares due to residential developments. The spatial result of Figure 2.5 can be expressed in the Land Use/ Land Cover Map of GAMA in 2008 as shown in Figure 2.6.

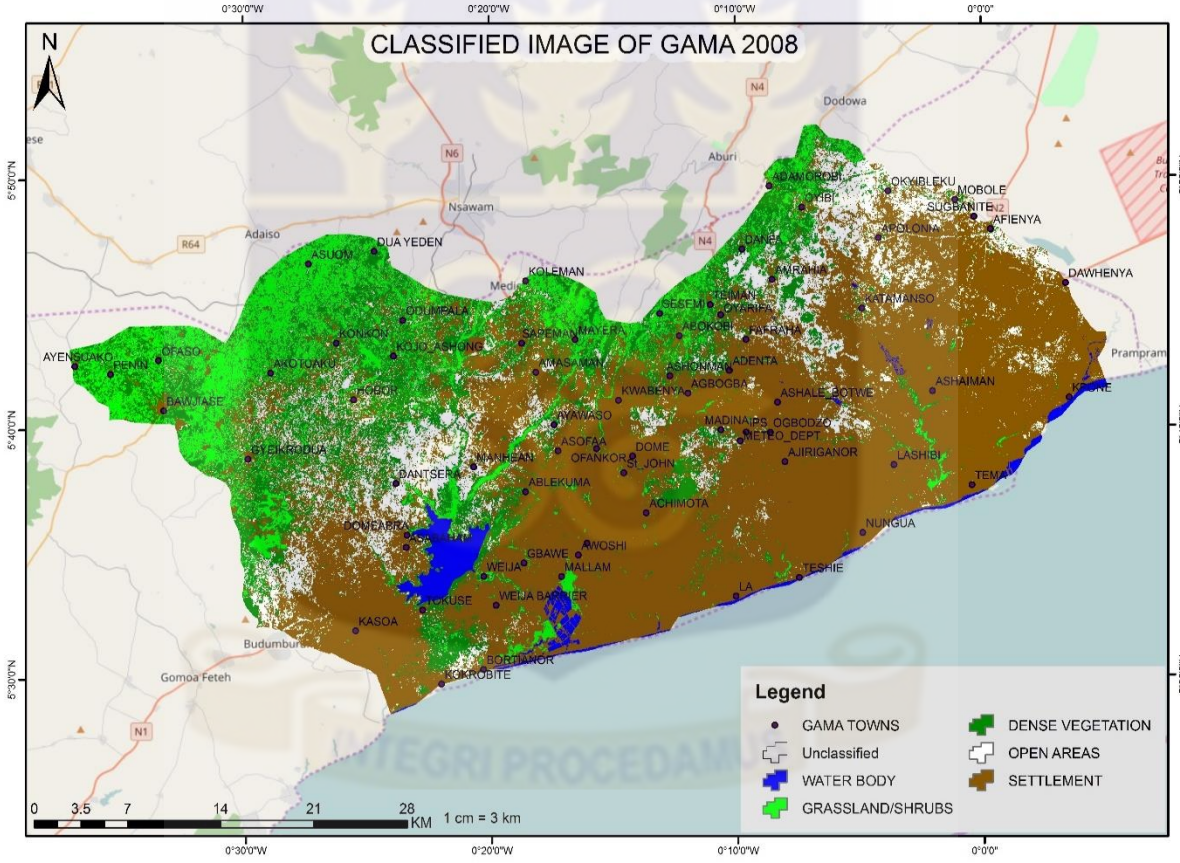

Figure 2. 6. 2008 Land Use/Land Cover Map of GAMA
Source: RS/GIS LAB, 2017

Residential developments as a result of urban sprawl caused an increase in settlement from 162.96% between 1986 and 1991 to 386.70% between 1991 and 2008 per the change detection statistics in Table 2.1. Grassland/shrubs during this time period decreased by 419.47% as

shown in Table 2.1 which indicate the rate of increase in built-up areas for residential use in the peri-urban areas. Areas such as Dawhyenya, Katamanso, Kpong and Lashibi witnessed massive residential developments due to urban sprawl as shown in Fig. 2.6. Many people who preferred a serene environment relocated from the inner cities to the peri-urban areas and that increased the rate of urban sprawl. Urban sprawl have impacts on livelihoods as settlement continuous to increase at the expense of dense vegetation. There was a percentage change (5.50) in water body during this period as shown in Table 2.1. In view of that, many people started developments around wetlands, water bodies and areas liable to flooding and a typical example of residential developments around the Weija dam.

Furthermore, the road axis of Accra to Nsawam has witnessed massive residential developments because it is a highway to Kumasi and its environs as shown in Fig. 2.6. Many people were seen engaging in road side and home base businesses to support their income. Dense vegetation continued to decrease affecting livelihoods in the ecosystem.

The introduction of poverty reduction policies such as National Health Insurance Scheme, Youth Employment Programme, Single Spine salary structure and others by the then government sought to stabilize the economy thereby improving people's source of income and standard of living. During this period, investor confidence was boosted for the economy and many people started up residential developments in the peri-urban areas. Peri-urban development was as a result of congestion in the inner cities of Accra. Activities of real estate developers started to spring up due to the lucrative nature of the land market.

The establishment of the Central University College at Dawhyenya on the Accra-Tema and beyond axis attracted residential and hostel development by entrepreneurs especially real estate developers for students and staff of the university. Commercial drivers on the other hand have taken advantage of residential development to improve their standard of living by

conveying passengers to their destinations for a fee in the peri-urban areas. Many people in the peri-urban areas such as Afienya and Dawhyenya use to have large tracts of lands for farming but with sprawl developments most of these lands have been converted to residential and non-residential use and this is clearly seen in Fig. 2.6.

Figure 2.7 represents the change in area (Hectares) between 2008 and 2016.

From figure 2.7 between 2008 and 2016 settlement increased drastically due to population growth. Accra received a lot of migrants to the city and as a result created congestion in the inner cities which resulted in urban sprawl.

2.5.4 Land Use and Cover Change between 2008 -2016

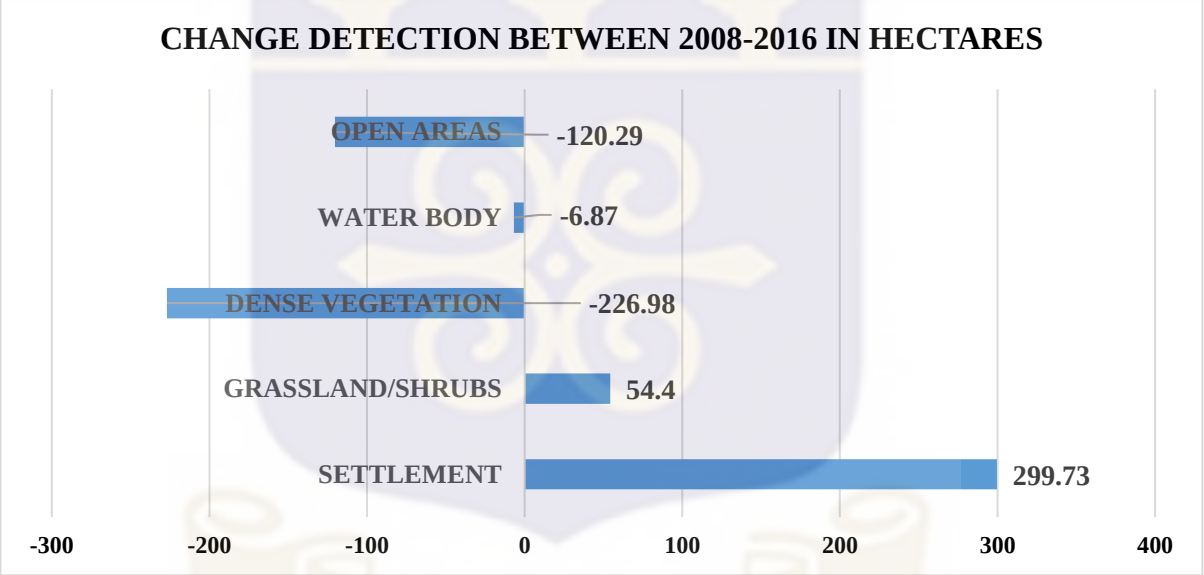

Figure 2. 7. Change Detection between 2008 to 2016 (Hectares)
Source: Author's Construct, 2017

Activities of institutions such as traditional leaders and real estate developers promoted the sprawl of human settlement. The area of settlement increased by 299.73 hectares with other features decreasing as shown in Figure 2.7. However, there were decreases in the areas of open area by 120.29 hectares, water body (6.87 hectares), grassland/shrub (54.4 hectares) and dense vegetation (226.98 hectares) as clearly shown in Figure 2.7. This showed a picture of how

urban sprawl impacted positively on settlement at the expense of the features such as water body and dense vegetation. Between 2008 and 2016, features such as open areas, grassland/shrubs, water body and dense vegetation decreased in area while settlement increased in area at a faster rate.

Finally, the change detection analysis shows how urban sprawl impact on the sustainability of livelihoods. For instance, farmers resort to other livelihood strategies when their farmlands are converted to residential use which affects their source of income. Migratory birds paths and other organisms in the ecosystem will be distorted when urban sprawl impacts negatively on them. By contrast, real estate developers and traditional leaders gain huge sums of profit from the land market due to urban sprawl. The spatial result can be expressed in Figure 2.8.

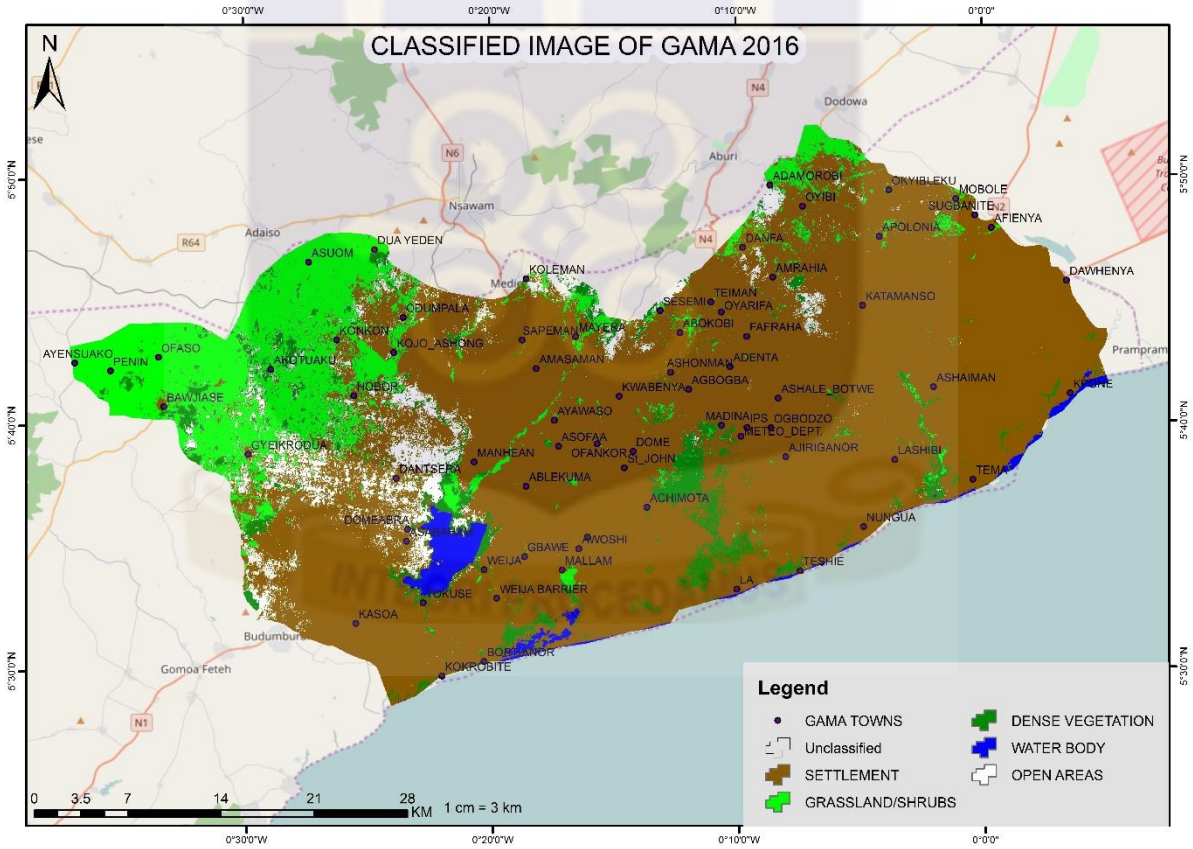

Figure 2. 8. 2016 Land Use/Land Cover Map of GAMA
Source: RS/GIS LAB, 2017

The change detection statistics between the years 2008 and 2016 as shown in Table 2.1 indicate that dense vegetation and grassland/shrubs have decrease by 226.98% and 54.40% respectively. Settlement has increased as high as 299.73% with a decrease in the percentage of water body and open areas which represents 6.87% and 120.29% respectively as shown in Table 2.1. The peri-urban areas of GAMA have witnessed massive residential developments. This is because many people are of the view that prices of lands in the peri-urban areas are affordable as compared to those in the inner cities and resort to buy large tract of lands for residential purposes. Real estate developers take advantage of that and purchase lands for residential developments for people on a payment plan and in return get huge profits from their activities. The 2010 population census indicated that Greater Accra Region has experienced massive population growth of 4,010,054 (GSS, 2012) and this has contributed to the massive growth of settlement in the peri-urban areas since the inner cities are not able to accommodate the growing population. The number of people living in urban centres outnumbered those in the rural areas. According to Ghana Statistical Service (2012) the number of people who lived in the urban centres during the 2010 population and housing census were 3,630,955 with rural dwellers of a population of 379, 090. This confirms the fact that many people prefer to live in the urban centres contributing to the sprawl of human settlement. The decrease in dense vegetation also affects livelihoods in the ecosystem and people's livelihood sustainability.

The establishment of non-residential developments such as West Hills Mall at Kasoa near Weija on the Accra-Winneba axis has motivated many people to put up their residential buildings in the peri-urban areas since many people can get access to goods and services without driving to the Central Business District of Accra. Many residents along this axis use to farm a lot due to the availability of lands for farming but with residential development as a result of urban sprawl, this has caused land use change. The location of University of Ghana, Legon has attracted massive residential and students hostel developments along the Accra-

Aburi axis as shown in Fig. 2.8 .Real estate developers and other entrepreneurs have put up accommodation facilities for students increasing urban expansion.

Also the university acquired large tracts of lands for residential developments for its staff and these developments contributed to the sprawl of human settlements. Peri-urban areas such as Katamanso, Ashiaman, Adenta, Oyibi, Apolonia have witnessed massive residential developments as indicated in Figure 2.8 due to urban sprawl. Dense vegetation in these areas is absent as a result of residential developments as clearly shown in Figure 2.8From the results of the change detection statistics shown in Table 2.1, it should be noted that natural reserves should be kept away from encroachers and those who go contrary to the rules should be sanctioned to serve as a deterrent to others. Urban sprawl if left uncheck will completely erode livelihoods that directly affected by its impact.

2.6 Summary

This chapter has highlighted the origin, urban economic growth and development of Accra. It has talked about the historical developments of Accra and the fact that the Kpesi people have been the first settlers on the stretch of the coastline now named Accra. It has also laid emphasis on the status of Accra as a coastal fishing port which has led to its development. Again, it has examined the processes that have led to the urban economic growth of Accra in the pre-colonial times, Nkrumah's period and post-independence era. It has also looked at the impact of economic recession that the country faced in the early 1970's and mid 1980's and the intervention by the Structural Adjustment Programme (SAP's) which sought to stabilized the economy.

Furthermore, the population dynamics of GAMA have been looked at with majority of the people settling in the Ga metropolis (Ga West, Ga South and Ga East). The extent of dynamics of land use in the city from 1924 to present has also been looked at with the peri-urban areas

having active land resources. Trend analysis of land use change in GAMA for the years 1986, 1991, 2008 and 2016 have been looked at. Change detection analysis have been done to know the percentage change between the image classes as well as the change in the features on the ground (area hectares) and this has been analysed to know how urban sprawl has impacted on the classified images and the features on the ground.

Having looked at the origin, urban economic growth and development of Accra and trends analysis of land use change of GAMA in this chapter, the next chapter now focuses on the drivers of urban sprawl in GAMA.

CHAPTER THREE

UNDERLYING DRIVERS OF URBAN SPRAWL IN GENERAL

3.1 Introduction

This chapter presents the analysis of the empirical data collected on the field. The results from the household survey have been indicated under different headings in order to meet the requirements of each objective. The first section discusses the demographic characteristics of respondent in the selected peri-urban areas of GAMA. The second section also examines the patterns and drivers of urban sprawl.

3.2 Demographic Characteristics of Respondents

The demographic profile of the respondents in the peri-urban areas of GAMA was captured through a household survey. It provided an insight into the background information such as sex, age, educational level, monthly income and occupation of respondents which play important role in examining the drivers of the sprawl. During the field work, 200 households were surveyed from the questionnaires distributed in the four road corridors of GAMA. These corridors were the Western Corridor (Accra to Kasoa axis), Northern Corridor (Accra to Nsawam axis), North-Eastern Corridor (Accra to Aburi axis) and the Eastern Corridor (Accra to Tema and beyond). 50 questionnaires were distributed at each of the four corridors summing up to 200.

The gender distribution of the respondents is presented in Figure 3.1 below. The data showed that about 58% of the respondents were males and 42% females. As stated in the methodology as roughly 50% males and 50% females interviewed, it was found out from the field that females were not cooperative and had to cover up with males. There are several reasons for high male dominance in the sample. First of all, most of the men worked on newly constructed

buildings in the peri-urban areas of GAMA. The peri-urban areas of GAMA have attracted massive residential developments, hence attracting more men to work on these buildings. Also men have easy access to land resources as compared to women in the Ghanaian setting. Women have been subdued in terms of land ownership and due to that, the peri-urban areas of GAMA have attracted male dominance in terms of land ownership.

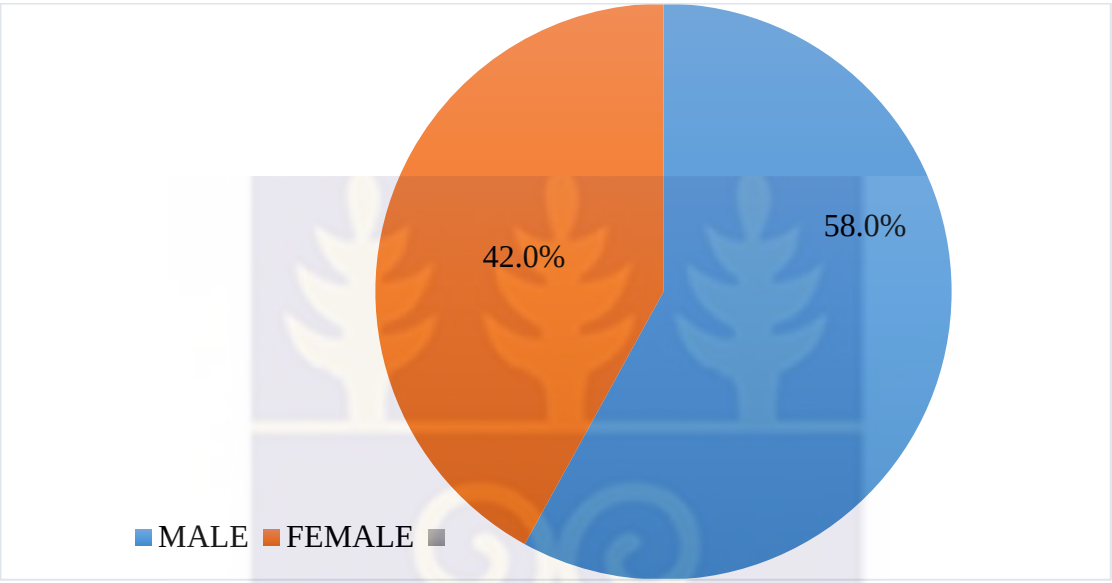

Figure 3. 1. Gender of Respondents

Source: Field Survey, 2017

Table 3.1 illustrate the age distribution of respondents. The results show that majority of the respondents are within the age range of 31 to 40years which represents 37.5% with only 6% being above 50 years. As a youthful population in Table 3.1, it is not surprising that mobility is a dynamic feature not only from rural to urban but intra-urban mobility and inter residential mobility and older population tend to be fixed to where they are unless they are wealthy. The younger population tend to move to seek greener pastures in the peri-urban areas. For instance, a Ga wealthy youth is willing to move to the peri-urban area. Also migrants with wealth especially the upper, middle and the business classes move out of the inner cities to the peri-

urban areas. The findings indicate that majority of the respondents belong to the active working population.

Table 3. 1. Age Distribution of Respondents

Age	Frequency	Valid Percentage
20 and Below years	3	1.5
21 to 30 years	48	24.0
31 to 40 years	75	37.5
41 to 50 years	62	31.0
51 and Above	12	6.0
Total	200	100.0

Source: Field Survey, 2017

Education forms the bedrock of every society and without it many people will be ignorant in terms of information dissemination. Many people are faced with land dispute challenges due to lack of education. Low level of education may also deter people from following instructions and procedures in terms of land acquisition and securing safe lands to put up their structures. Figure 3.2 indicates that majority of the respondents had Senior High/Vocational/Technical education represented by 32.5% and 12.0% of the respondents had no formal education. It is not surprising that majority of the respondents are in the Senior High/Vocational/Technical education range. This is because urban sprawl creates additional employment opportunities for individuals within this level of education. Artisans, caterers and other workers into the sale of construction material get the opportunity to improve their livelihoods by providing their services to the inhabitants in the peri-urban areas.

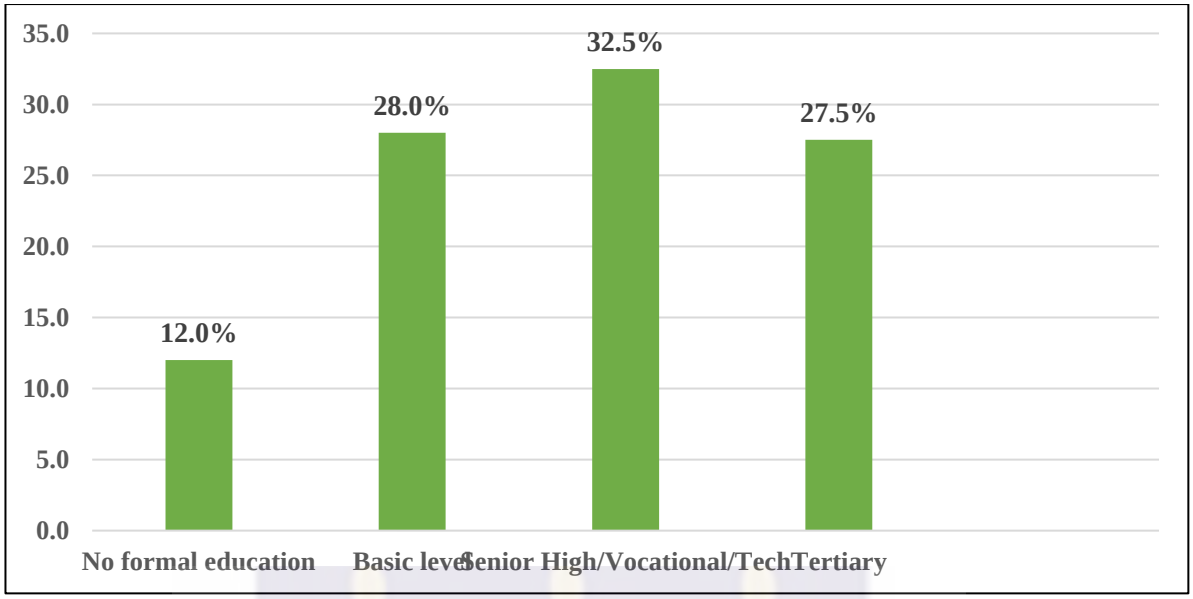

Figure 3. 2. Educational Background of Respondents

Source: Field Survey, 2017

Household size plays an important role in analysing the sprawl of human settlements. The peri-urban areas of GAMA have witnessed massive residential developments due to urban sprawl. A group of people who live together and eat from the same pot is defined as household. Table 3.2 indicates household sizes of the respondents. Majority of the respondents have household size ranging from 4 to 6 representing 49.5% whiles 18% with household size ranging from 1 to 3, 29% with household size ranging from7 to 9 and about 3.5% have10 or more persons per household. It is clearly evident that the peri-urban areas have received migrants more than the indigenous people due to land use change. Private ownership of homes has necessitated the emergence of smaller household size.

Table 3. 2. Household Size of Respondents.

Household Size	**Frequency**	**Valid Percentage**
1-3	36	18.0
4-6	99	49.5
7-9	58	29.0
10 and Above	7	3.5
Total	**200**	**100.0**

Source: Field Survey, 2017

The level of education is reflected in the type of employment by respondents. Classifying the occupation of respondents into Public Servant, Private Informal, Private Formal and Unemployed, respondents who are in the private informal sector formed the majority cohort (58.5) while public servants, private formal workers and unemployed were 17.5%, 20.0% and 4.0% respectively. The high percentage of traders and semi-skilled workers perhaps explains the dominance of the informal sector within the study area (Oteng-Ababio, 2011: Haug, 2014). Many people in the peri-urban areas work in the city centres as public servants and private formal workers and see the peri urban areas as dormitory towns.

The city centres have better educational institutions, easy access to financial institutions and better job opportunities which attract various public servants and private formal workers. As the study clearly indicated that majority of the respondents had Senior High/Vocational and Technical Education, many people are into street trading, carpentry works, electrical works, plumbing works, building works and catering. They provide services to the inhabitants in the sprawling areas. For example, artisans work on buildings to improve their source of livelihoods. Caterers provide services to the people in the peri-urban areas in the form of canteen operations which enhance their sources of livelihoods. This confirms the high dominance of private informal workers in the peri-urban areas of GAMA.

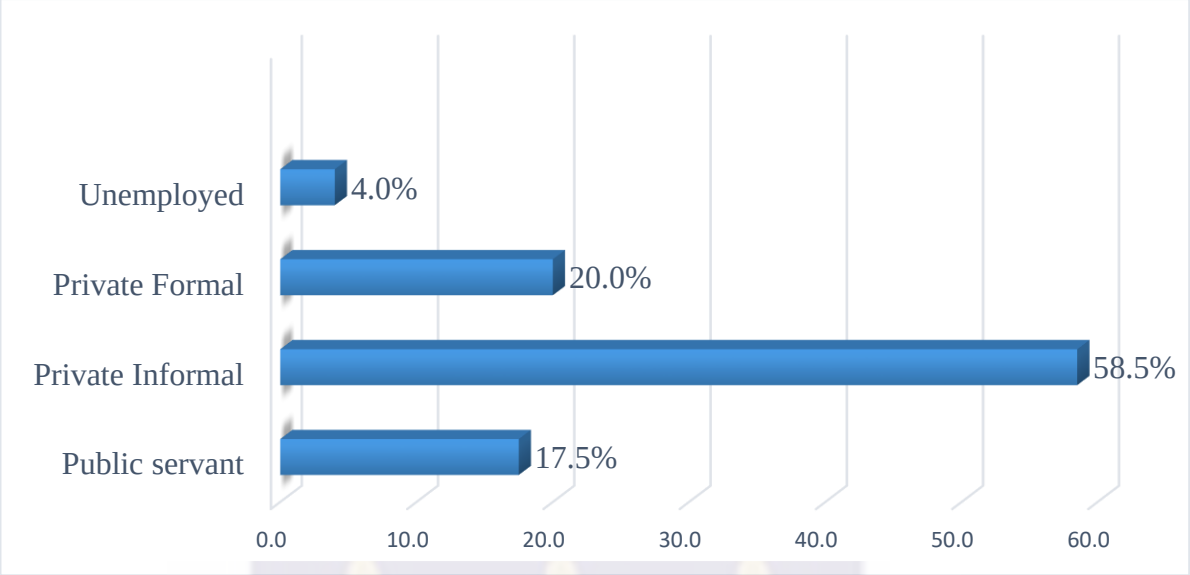

Figure 3. 3. Primary Occupations of Respondents

Source: Field Survey, 2017

The respondents were further asked of their secondary occupation and few people disclosed their additional work to their primary occupation (main work). Secondary occupation provides additional income to people although very few people disclosed their secondary source of income. About 189 out of the total respondents of 200 did not disclose their secondary occupation with the indication that they do not have any secondary occupation. Those who disclosed their secondary occupation were into primary sector work such as farming which was not lucrative as a result of urban sprawl and also depended on their secondary occupation as an additional source of income.

Household income levels play a vital role in sustaining livelihoods. Figure 3.4 indicates the average monthly income of respondents. The results show that about (31.0%) that is majority of the respondents average monthly income were between 101 to 300 Ghana Cedis. 6% had 100 Ghana Cedis and below average monthly income with only 23.5% of the respondents receiving more than 700 Ghana Cedis. The findings show that majority of the respondents in the peri-urban areas of GAMA are into informal sector businesses. Most of them operate home-

based enterprises and artisans dominated the areas due to the massive residential developments going on in the zones.

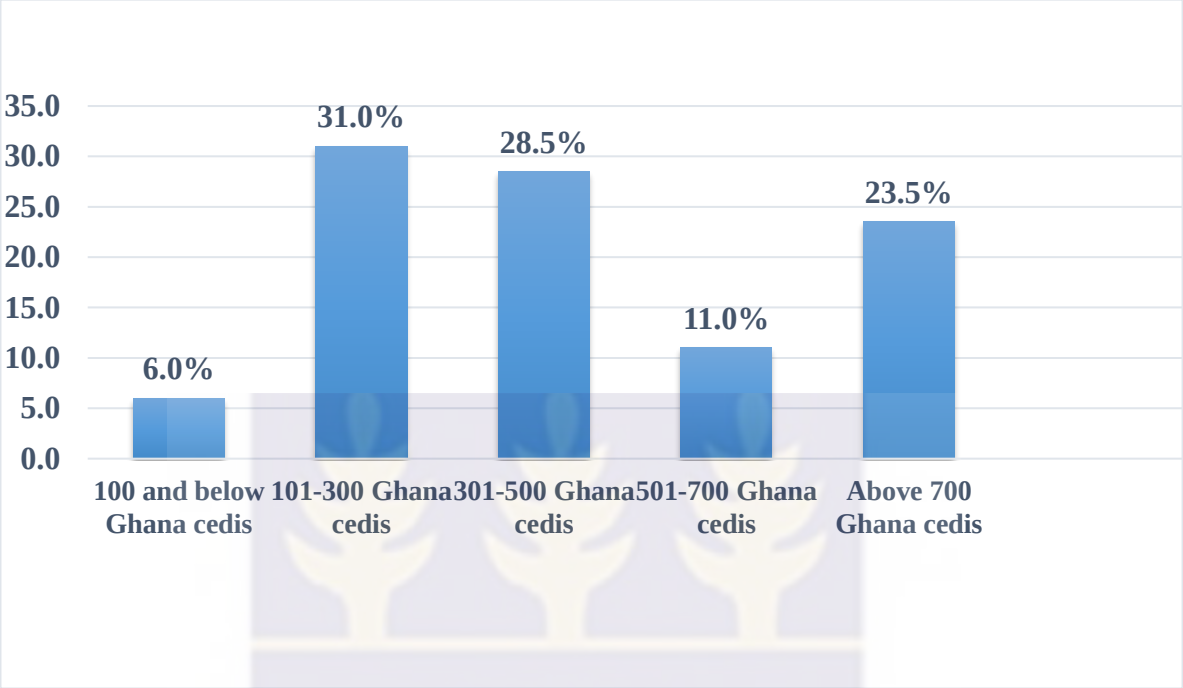

Figure 3. 4. Average Monthly Incomes of Respondents

Source: Field Survey, 2017

3.3 Patterns and Drivers of Urban Sprawl

The study sought to ascertain respondents' views on the patterns and factors driving urban sprawl in the peri-urban areas of GAMA. Urban sprawl is seen as an unplanned and uncoordinated pattern of urban growth into the surrounding peripheries leading to improper utilization of resources (Nnaemeka-Okeke, 2016). As the city expands into the peri-urban areas, more land is required causing land use change. The respondents were asked whether they have or have not experienced change in land use.

The survey revealed that 100% of the respondents in all the four road corridors of GAMA where the sprawl was massive answered 'yes' which was an indication that they have experienced drastic change in land use for the past years. Most of the lands in the peri-urban

areas of GAMA were covered with forest but due to population growth and urban expansion, most lands have been converted from their original use to other forms of land use especially for residential purposes. As a result all the 200 respondents sampled at the four road corridors of GAMA have experienced some form of land use change. Changes in land use are a phenomenon that cannot be avoided due to urban sprawl.

Respondents were further asked to identify the changes they have seen in the land use. About 47% of the respondents who are the majority said farmlands or sites have been converted to residential use. 20 percent of the respondents indicated that few people are into farming. About 32% of the respondents indicated loss of open spaces and only 1% of them indicated deteriorating of infrastructure. Conversion of farmlands or sites into residential use is as a result of increasing urban expansion into the peri-urban areas to accommodate the growing population. Therefore there was the need for land space to put up residential buildings in the sprawling areas at the expense of using the lands for farming.

Additionally it was discovered that the conversion of farmlands or sites into residential use was as a result of haphazard housing developments in the peri-urban areas of GAMA. This trend is common in African cities such as Addis Ababa in Ethiopia which has seen land use change due to the rapid growth of the city, ineffective land use control and this situation has led to settlements spreading uncontrollably into the fringe farmlands (Kassa, 2013).

The few people who are into farming support the fact that peri-urban lands are dwinling in size due to residential developments and farmers mostly farm on lands available that have not been developed yet along river banks, drains and catchement areas (Appiah et.al, 2014). Land use change as a result of residential developments has reduced the number of farmers in the peri-urban areas. The lands are needed most for residential developments. These changes confirmed why all the respondents said they have experienced land use change. Loss of open spaces and

deteriorating infrastructure were as a result massive residential development as revealed by the survey. Many entrepreneurs saw the need to invest in residential development because it served as a source of income for them. Figure 3.5 indicates the changes in land use that the respondents saw.

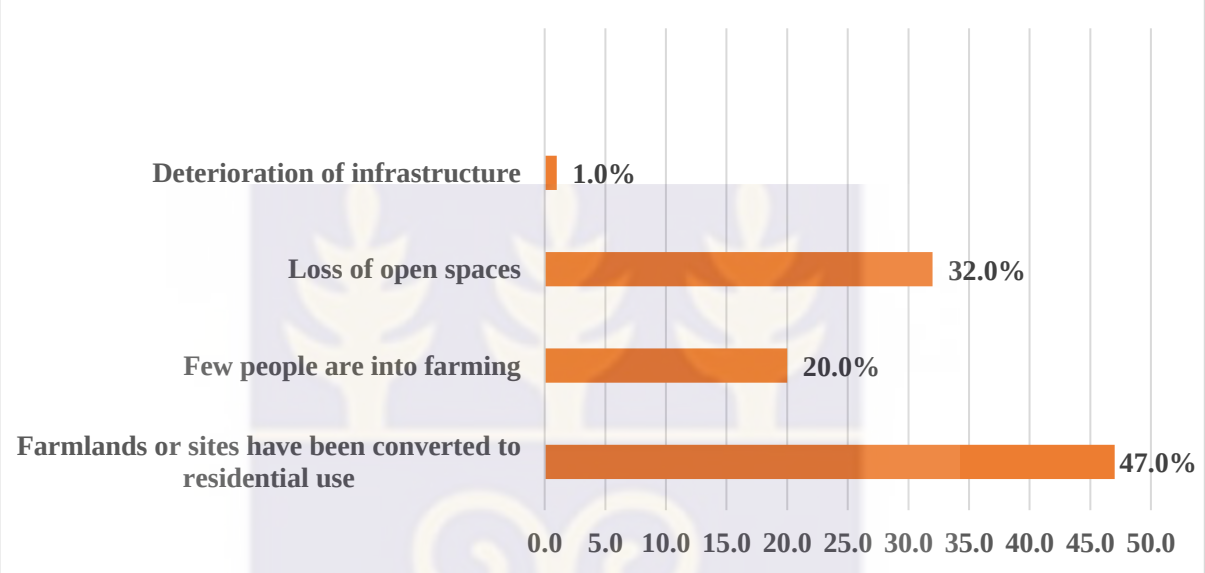

Figure 3. 5. What Changes Have You Seen?

Source: Field Survey, 2017

The study further investigated the length of stay of respondents in their towns or communities. The length of stay of respondents could influence their perception and knowledge of land use change due to urban sprawl. The results indicates that majority of the respondents (46%) have spent between 11 to 20 years in the study area. This cohort of respondents have broad knowledge of their environment and can give broad knowledge on the drivers of urban sprawl.People who have spent more than 10 years in the peri-urban areas were mainly focused on in order to get credible result on land use change and drivers of urban sprawl. Even though respondents who have lived there below 10 years were required to provide information on land use change, the attention was more on those above 10 years. 29.5%, 20.5% and 4% have spent

between 10 and below years, 21 to 30 years and 31 and above years respectively. Figure 3.6 indicates the number of years spent in the community by respondents.

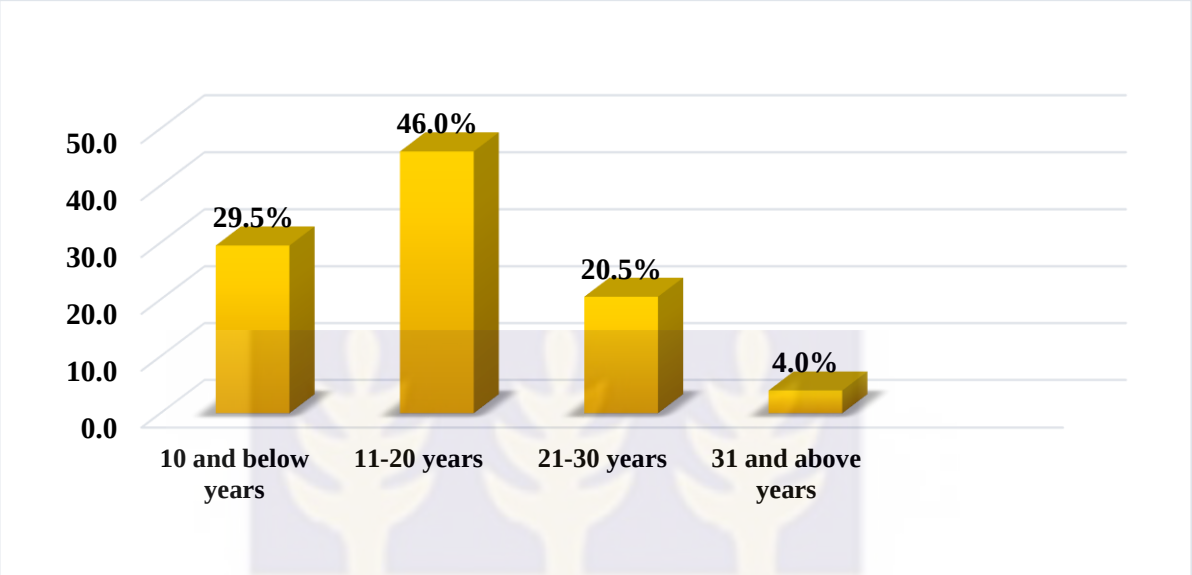

Figure 3. 6. Length of Stay in Community

Source: Field Survey, 2017

Respondents were further asked to rank the reasons that motivated them to move to their community of residence. The reasons provided were access to land, preference for serene environment and housing affordability. The study revealed that out of the 200 respondents, 140 of them ranked accessibilty as the most important reason for moving into the community representing 70%. 31 of them (15.5%) ranked housing affordability as the next reason for relocation into the community and 29 of them (14.5%) ranked preference for serene environment as the last reason for their movement into the community.

Access to lands in the peri-urban areas is easy as compared to the city centres. This is because large tracts of lands are available for residential use in the peri- urban areas as compared to lands in the city centres that are mainly used for commercial puposes and other related activities. Population growth and urban expantion have made it possible for people to move to

the peri-urban zones to buy large tracts of lands for residential purposes as lands in the city centres are very expensive as compared to the lands in the urban fringe. It was discovered during the survey that prices of lands in the peripheriral areas such as Oyarifa, Dawhenya, Amasaman just to mention a few range between GHC 3,000 and GHC 15,000 which is less expensive than the prices of lands in the inner cities. Urban sprawl which had led to unplanned and uncoordinated urban expansion into the peri-urban areas have made lands easily accessible in the peri-urban areas of GAMA. The results of the study also indicated that real estate developers buy large tracts of lands in the peri-urban areas and resell it to people to develop into residential buildings or they build for people to buy. It was also discovered from the survey that the patronage of estate houses in the peri-urban areas was high. This was because a lot of the respondents indicated that buying houses from real estate developers provided security for them as compared to acquiring lands from families and traditional authorities. This cannot be done in the city centres where lands are already scarce.

Again many people want to live in their own homes and not in rented appartments and therefore relocate to the peri-urban areas where they can have access to lands for residential use. A lot of houses in the inner cities are not affordable as compared to the ones in the peri-urban zones and therefore serves as a motivation for people to relocate to the peripheral areas. Unplanned residential developments in the peri-urban areas was due to people's inability to afford accommodation in the inner cities. Their inability to rent accommodation in the city centres serves as a motivation for them to relocate to the peri-urban areas. It was also observed from the survey that lands in the Central Business District of Accra had high values and due to that many people were motivated to move to the peri-urban areas where the land values were not high as compared to the city centres. Figure 3.5 shows the respondents reasons for relocating to sprawling areas.

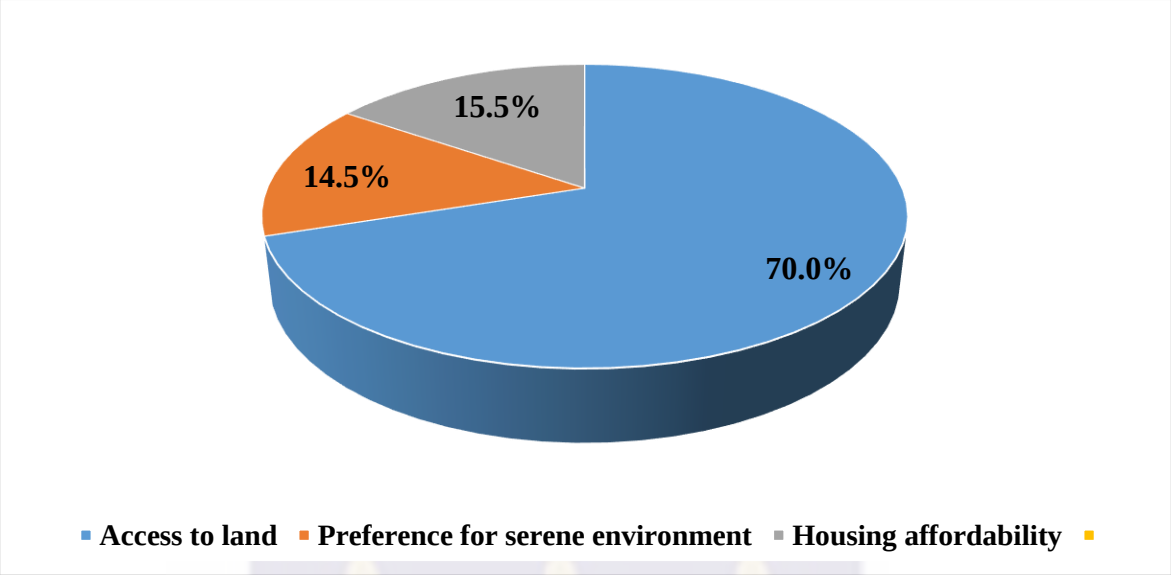

Figure 3. 7. Reasons for Relocation

Source: Field Survey, 2017

Table 3.3 presents relationship between reasons for relocation by respondents and educational level and gender of respondents with a chi-square test. Chi-square test is used know the relationship between one categorical independent variable, for instance gender of respondents and one categorical dependent variable. The chi-square value measures the degree of deviation between observed results and expected results.

From the results, 16.7% of the respondents with no formal education relocated to peri-urban areas due to housing affordability, 21.4% of the respondents with basic education relocated due to housing affordability in the peri-urban zones. Similarly, respondents with senior high/vocational/tech education (20.0%) relocated due to housing affordability. On the other hand, for respondents with tertiary education, housing affordability did not seem to be their motivation for relocating to the peri-urban areas. It was observed that respondents with education lower than tertiary seem to be more concerned about housing affordability as compared to respondents with tertiary education.

Another reason for relocating to the peri-urban areas was preference for serene environment. For serene environment, respondents with no formal education and basic level of education did not seem to have preference for serene environment but respondents with senior high/vocational/tech education or tertiary education seem to have higher scores for serene environment as the reason for relocating into the peri-urban areas. For access to land all the respondents at the various levels of education saw it as a motivation for relocating to peri-urban areas. The result is confirmed by the relationship between educational level and reasons for relocation of respondents by the chi-square test which has a significant value of 0.03% which is less than (0.05%) P-value. This shows that there is a significant relationship between educational level and reasons for relocation. Respondents with higher levels of education seem to care less about affordability and care more about preference for serene environment in addition to access to land as reasons for relocating to the peri-urban areas. Housing affordability and preference for serene environment also had higher representation by both males and females as reasons for relocating to the peri-urban areas. This seemed to suggest similar patterns for reasons of relocation along gender groups and this is confirmed by the chi-square test with a significant value of (0.469%) which is more than (0.05%) significance level confirming that there is no relationship between gender and reasons for relocation of respondents. Although educational level of respondents influenced the reasons for relocation to peri-urban areas, gender did not seem to play any role in terms of reasons for relocating to peri-urban areas by respondents.

Table 3. 3. Relationship between reasons for relocation and education/gender of respondents.

Educational Level	Reasons for relocation			Chi-Square Tests of Independence	
	Access to land	Serene Environment	Housing Affordability	Pearson Chi-Square	Sig.
No formal education	75.00%	8.30%	16.70%	13.604	0.034
Basic level	69.60%	8.9%	21.40%		
Senior/ High/Vocational/Tech	58.50%	21.50%	20.00%		
Tertiary	81.80%	14.5%	3.6%		
Gender					
Male	67.20%	14.70%	18.10%	1.513	0.469
Female	73.80%	14.30%	11.90%		

Source: Field Survey, 2017

The survey again investigated the factors driving the land market in the peri-urban areas of GAMA. The rapid growth of urban population in African countries is a contributory factor to the high demand for urban land. A significant number (41.0 %) of the respondents were of the view that the land market was lucrative. The other respondents indicated that private ownership of homes (25.0%), land speculation (23.0%) and adequate land spaces (11.0%) in the peri-urban areas drive the land market. It was observed that population growth of GAMA has been very quick with most people settling in the Ga districts which constitute most of the peri-urban areas. Many people have built in the peri-urban areas as a result of high rent levels in the inner

cities. The land market in the peri-urban areas of GAMA is lucrative due to higher population demand for lands for residential purposes hence a lot of people are involved in the land market to enhance their source of livelihoods.

According to an estate developer at Castle Gate Estate Ghana Limited, people buy lands from them as they are safer than buying it from individuals. He continued that they sometimes buy the lands from families usually 50acres or more in a particular peri-urban area. They either develop the lands for residential purposes and sell it to people or re-sell the lands to people with a payment programme such as on mortgage basis or by paying initial deposit and spreading the balance monthly. Another reason he gave was that most of the farmers were actually the owners of the lands and they preferred to sell it to them at a fee since farming was no more lucrative. Due to lucrative nature of the land market in the peri-urban areas he said the company is better off in terms of money. One interesting development at Dahwenya during the field survey was that people could even exchange cars for lands due to its lucrative nature.

According to members of the Rice Growers Association at Dahwenya, rice farming was no more providing them with adequate income as a result of non- availability of lands to farm on. They lamented that all the lands were being sold by traditional leaders or family heads to people for residential purposes. They continued that traditional leaders or family heads could sell the same land to different people due to its lucrative nature which most of the time generates land litigations. The high demand for lands in the peri-urban areas of GAMA is as a result of high investments opportunities in the city centres of GAMA which attract many people to move to the city centres and this create congestion in the inner cities resulting in an increase demand for lands in the peripheries.

Furthermore, land speculation in the peri-urban areas was one of the factors driving the land market. Due to the high demand of lands in the peri-urban areas for residential purposes, many people, political figures and companies invest in these lands with the hope of gaining profit.

Again the survey revealed that adequate land spaces in the city centres were rare. The inner city is congested and lands are not adequate for residential purposes and so people tend to relocate to the peri-urban areas where they can get access to large tracts of lands. GAMA has attracted a lot of migrants hence creating congestion in the inner city. The preference for living space motivates many people to relocate to the peri-urban areas.

Many people do not have the purchasing power to rent accommodation in the city centres since they are expensive. Those who can afford to rent accommodation also decide that they don't want to rent people's homes or apartments for the rest of their lives hence they tend to make plans to own their own properties. Preference for private ownership of homes is one of the factors driving the land market in the peri-urban areas of GAMA as revealed by the survey. Lands for residential developments in the city centres are rare, expensive and most of the times people want their peace of mind and so move to the peri-urban areas. The survey is in line with Cowell's (2011) assertion that in the United States the peri-urban areas developments enhance higher standard of living due to the preference for household privacy which can be difficult in the inner cities. This assertion was not different from what was happening in the peri-urban areas of GAMA. Figure 3.8 indicates the response of the respondents.

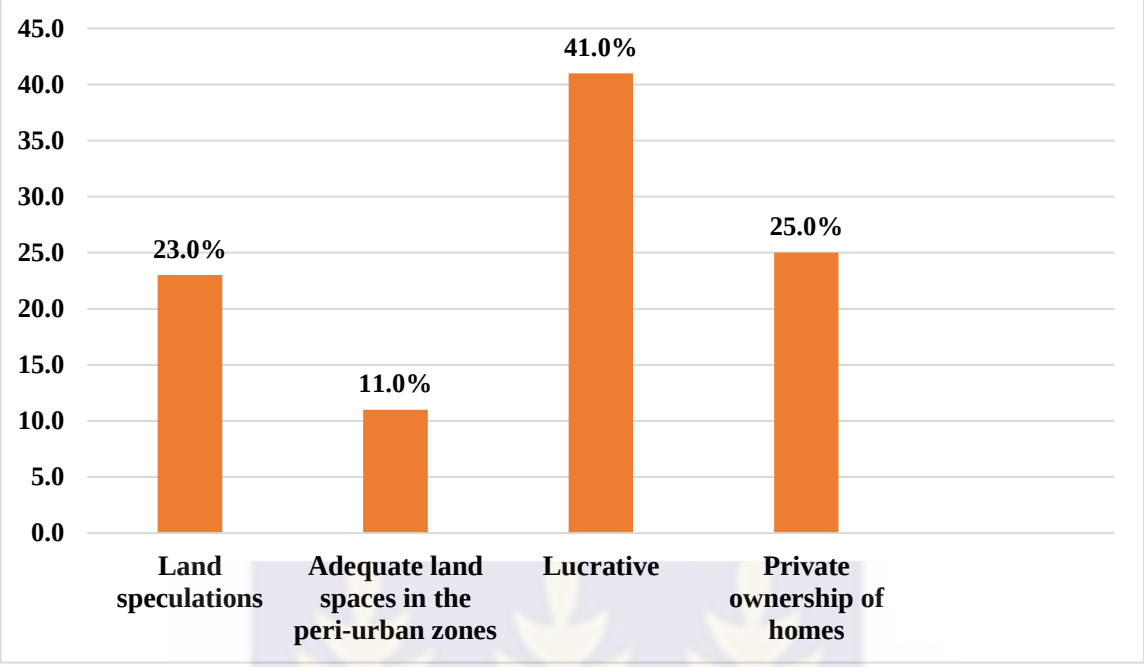

Figure 3. 8. Factors Driving the Land Market

Source: Field Survey, 2017

The study further sought to ascertain respondents' knowledge on the institutions that drive urban sprawl in their communities. Respondents were asked to rank the institutions on a scale of 1 to 5 with 1 being the highest. The results indicate that 69.5% of the respondents ranked traditional authorities as the highest institution driving urban sprawl, followed by real estate agencies (20.5%), financial institutions (8.0%), global development patners and Non-Governmental Organization had the same rank representing (1.0%) each as shown in Fig. 3.9

The 69.5% of the respondents who ranked traditional authorities as the highest institution driving urban sprawl could be attributed to the fact that chiefs, queen mothers and elders were active driving forces behind land use change in the peri-urban areas of GAMA. This goes to confirm Kasanga and Kotey's (2001) assertion that traditional authorities were in charge of most lands in GAMA and also have authority on compulsory acquired lands. The traditional leaders are the custodians of the lands and have strong impact in driving urban sprawl.

Financial institutions such as Ghana Homes Loans provide loans to people who wish to put up their own residential developments. It was discovered from the survey that a lot of residents in the peri-urban areas acquired loans from financial institutions to put their buildings. An official from the Castle Gate Estate Limited indicated that Ghana Homes Loans provided them loans to finance their residential developments for sale. Mortgage banks, informal financial institutions and other foreign capital inflow provide assistance for people to put up residential developments and this serve as another factor driving the land market. The peri-urban areas of GAMA has witnessed massive residential developments due to financial assistance to many residents as indicated by the respondents.

The respondents indicated that, multi-national companies that have put up high rise buildings for both commercial and residential use in the inner cities have made prices of land in the inner city of Accra expensive hence many people have relocated to the peri-urban areas where prices of lands have been less expensive ever since.

While the study ranked traditional authorities as the highest institution driving urban sprawl in the peri-urban areas of GAMA, findings by Pal and Fang (2016) revealed that national government in China are the main custodians of the lands. This study added that the sale of lands accounts for huge revenue to the country. Figure 3.9 indicates the response of the respondents.

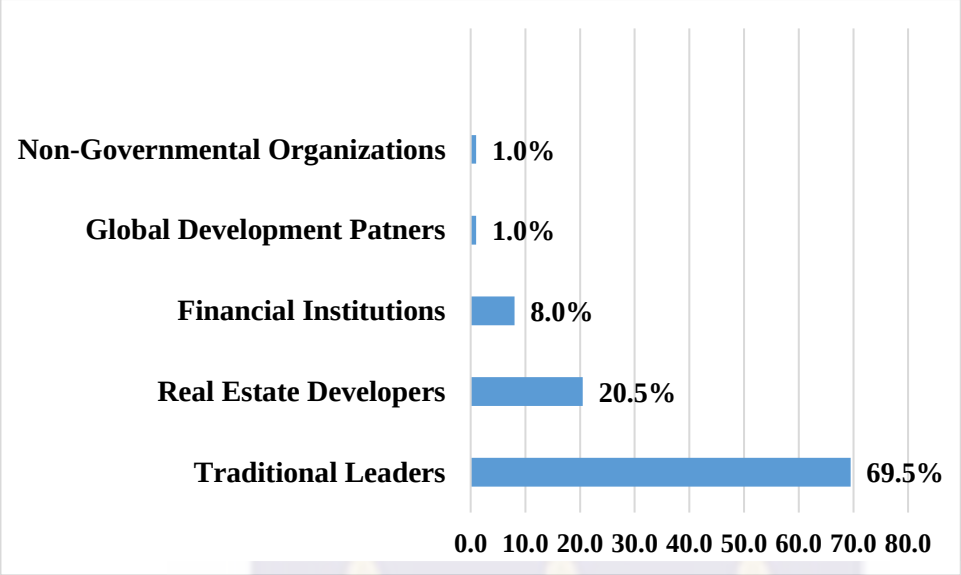

Figure 3. 9. Institutions Driving Urban Sprawl

Source: Field Survey, 2017

According to a traditional ruler of Amasaman, the lands belong to them and nobody has the right to sell lands to anybody without seeking their consent. He emphasized that due to their activities, a lot of people are now moving to the peri-urban areas which has made the area urbanized as compared to 10 years ago when the area looked bushy.

Plate 3.1 below shows how the city is sprawling along the peri-urban area of Gbawe in the Ga-South Municipality. People have put up their buildings in the peri-urban areas due to the sale of lands to them by traditional authorities who are the main institutions driving the sprawl of human settlements.

Plate 3.1. Newly constructed buildings in a peri-urban area (Gbawe Top-base)

Source: Field Survey, 2017

In order to understand the effectiveness or otherwise of the institutions driving the sprawl of human settlement, the "respondents" perception of these institutions were sought. The survey reviewed that majority of the respondents in all the sample areas were of the view that the institutions driving urban sprawl have been very effective. The results of the survey are clear indication that the institutions especially traditional authorities are the driving forces behind urban sprawl. They are very effective in driving the urban sprawl in the peri-urban areas through the sale of lands for construction of residential buildings by people.

3.4 Summary

In this chapter, attempts have been made to explore the socio-demographic characteristics of respondents. Among the variables discussed included issues of gender, age, educational level

of respondents. Generally, the study identifies that about (100%) of the respondents have seen changes in land use due to urban sprawl. Among the reasons driving urban sprawl, it was observed that the land market was very lucrative for individuals and institutions such traditional authorities and real estate developers. Chi-square test was used to find the relationship between educational level of respondents and their reasons for relocating to peri-urban areas. It was observed that there was a significant relationship between the two variables as a result of the chi-square value (0.034%) less than the 0.05% level of significance. The next chapter will examine the effects of urban sprawl on livelihood sustainability in the peri-urban areas.

CHAPTER FOUR

EFFECTS OF URBAN SPRAWL ON LIVELIHOOD SUSTAINABILITY

4.1 Introduction

This chapter explores the effects of the sprawl on livelihood sustainability in the peri-urban areas of GAMA. The study interrogated individual's sources of livelihood before and after the sprawl and the general community sources of livelihood before and after the sprawl. Lastly it seeks to know the factors causing livelihood change and the categories of people mostly impacted by the sprawl.

4.2 Impact of Urban Sprawl on Sources of Livelihood

Urban sprawl is a phenomenon that cannot be prevented due to population growth and urban expansion. However, its impact could be negative or positive depending on the individuals affected as there are winners or losers. While some people view the sprawl of human settlement as an urban planning challenge, others see it as an avenue for urban expansion where rural lands have been converted to urban land use. A lot of people's sources of livelihood have changed due to urban sprawl. For instance farmers have to resort to other livelihood strategies when their farmlands have been converted to residential land use. On the other hand real estate developers benefit from urban sprawl due their activities.

The household survey conducted revealed that people's livelihoods have changed from primary sector to secondary or service sector. Majority of the respondents from the peri-urban areas of the four major road corridors of GAMA said they were employed in the primary sector (62.0%) as their source of livelihood. The respondents were of the view that, before the phenomenon of urban sprawl, there were large tracts of lands available for primary sector work and they were able to sell some of their produce as well as feed their families. They indicated

that they earned more than 2,000 Ghana Cedis each on the average from the sale of their produce before the emergence of the sprawl.

The sector was lucrative and a lot of people depended on it for their source of livelihood. The respondents indicated that, most of them were involved in large scale farming and food security was at its best and due to that, farm produce were fresh devoid of chemicals that enhance premature growth of fruits and vegetables. Many people in the peri-urban areas of GAMA from the survey, used to farm for both commercial and domestic use.

About 15.5% of the respondents indicated that they were into the secondary sector which involved manufacturing. Again 18.0 percent of the respondents were in the services sector which involved the provision of services such as teaching, provision of security, just to mention a few and some of these services were provided by artisans such as masons, carpenters, tillers and plumbers on construction of buildings and as low as 4.5% of the respondents were unemployed. Figure 4.1 indicates respondents' livelihood activities before they were engulfed by sprawl.

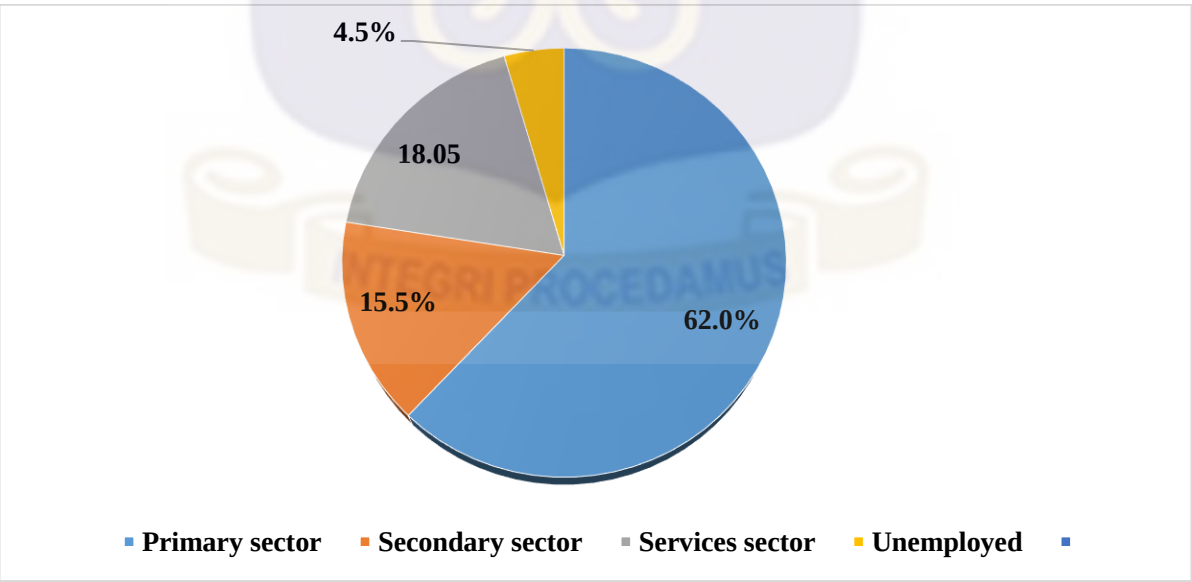

Figure 4.1. Livelihoods Activities of Respondents before Urban Sprawl

Source: Field Survey, 2017

The study further sought to know the general sources of livelihood of the community before the incidence of urban sprawl. There were large tracts of lands for the community to engage in their various activities as their source of income. The survey revealed that majority of the respondents 68.5 percent were into farming as their source of livelihood before the incidence of urban sprawl. The peri-urban areas of GAMA used to be rural and most of the lands were prime agricultural lands. Indeed most of the communities were involved in large scale farming for both commercial and domestic purposes as their sources of livelihoods. The survey is in line with the study by Gough and Yankson (2000) that the peri-urban areas of Accra especially the Ga Districts (Ga South, Ga West and Ga East) used to contain dispersed rural settlements where agriculture was widely practiced. It was discovered from the survey that areas that used to be open areas are now engulfed with residential and commercial developments in the peri-urban areas of the various road corridors. This was because institutions driving the sprawl such as traditional authorities and real estate agencies saw it as wastage of space when the area was left open and therefore rather sell or construct buildings for residential and commercial use in return for a fee.

Again 25.0 percent of the respondents were into stone quarrying especially areas that are hilly. It was also observed from the survey that many people in peri-urban communities such as Gbawe Top-base and John Teye near Pokuase used to work on stone quarrying. The gravels were sold for road construction and construction of buildings and it boosted the communities' sources of livelihood there. There were large tracts of lands available for cattle rearing and sand winning activities by communities.

About 2.0 percent of the respondents in Dawhyenya indicated that the community members were involved in cattle rearing as their sources of livelihood. Sand winning was the major activity for the people of Abehenease a community near Amasaman as their source of livelihood and about (4.5%) of the respondents were involved in sand winning in their

communities. The survey revealed that majority of the communities along the major road corridors of GAMA were involved in farming as their sources of livelihood before the occurrence of urban sprawl in the peri-urban areas of Accra. Figure 4.2 shows response of the respondents in various communities.

According to a traditional leader at Amasaman, large portions of their lands were used for farming in their community before massive residential developments in the area. Many people in the community were involved in farming and it provided them their sources of income both from commercial and domestic use.

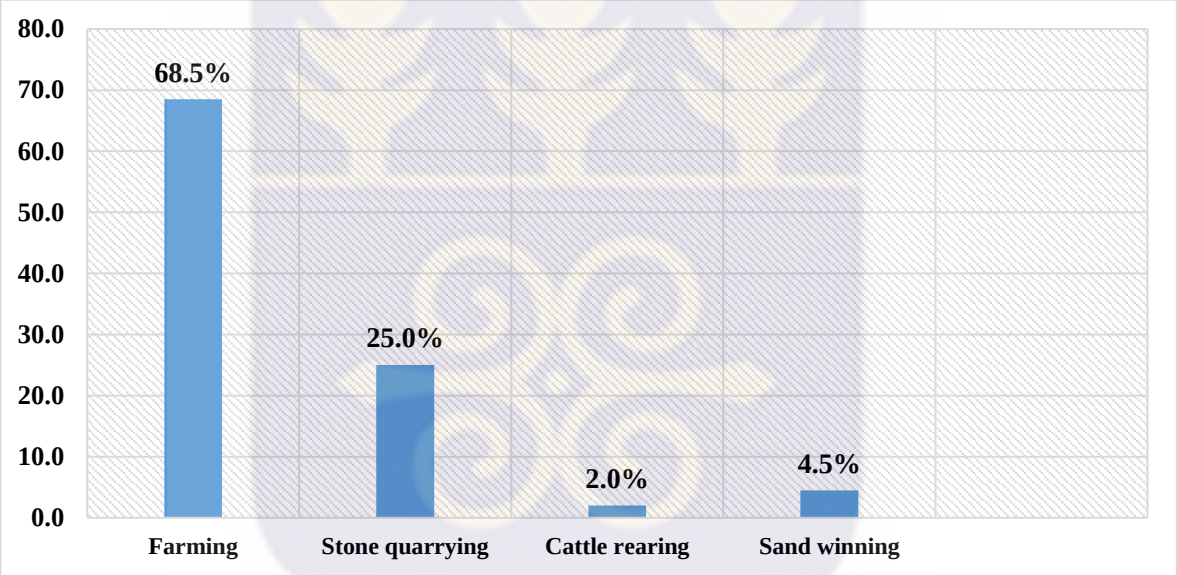

Figure 4.2. Peri-urban Community's general sources of livelihood before urban sprawl
Source: Field Survey, 2017

The study further investigated individual livelihood activities after the impact of urban sprawl. The results of the study indicated that as high as (60.5%) of the respondents are into the provision of services as their sources of livelihood now. Many people in the peri-urban areas of GAMA are into the sale of construction materials such as roofing sheets, cement, blocks, iron rods and other building materials. It was discovered from the survey that individuals have put up stores by the roadside for the sale of these construction materials. Also a lot of artisans

such as plumbers, electricians, masons and carpenters are mostly located at the peri-urban areas. Their activities serviced buildings that were being developed either for residential or commercial use. Many entrepreneurs are into real estate development which provide residential buildings for people. This was in line with what the results of the survey said about the lucrative nature of urban sprawl for artisans, shop owners of construction materials and real estate developers in the peri-urban areas of GAMA since they gain good income from their operations.

Again about 36.0% of the respondents were into the manufacturing sector that is turning raw materials into finished products. Interestingly, few individuals were into the primary sector for their sources of livelihoods now. The results of the survey indicated that as low as 3.5 percent of the respondents were depending on the primary sector for their sources of livelihood because of the decline in agricultural lands. The lands are not available for farming due to urban sprawl. During an interview with a farmer at Afienya, he revealed that he was compensated by a real estate developer who bought his land for residential developments. Also during one of the focus group discussions with some of the inhabitants Dawhyenya where sprawling was massive, they noted:

"*They used to come across watermelon and other fruits on my way home and it served as food for me whenever they went hungry. Ten years ago, they farmed on a large scale for both commercial and domestic purposes and their source of livelihood improved due to my large scale farming but now due to urban sprawl, there are no lands available to farm on a large scale. People have put up residential buildings which make them difficult for involvement in farming activities. The institutions driving urban sprawl see the sale of lands as an avenue to gain huge profit and do not want to leave it for farming purpose which is not lucrative now".* (FGD'S, February 12, 2017). Figure 4.3 shows the livelihood sources of the respondents.

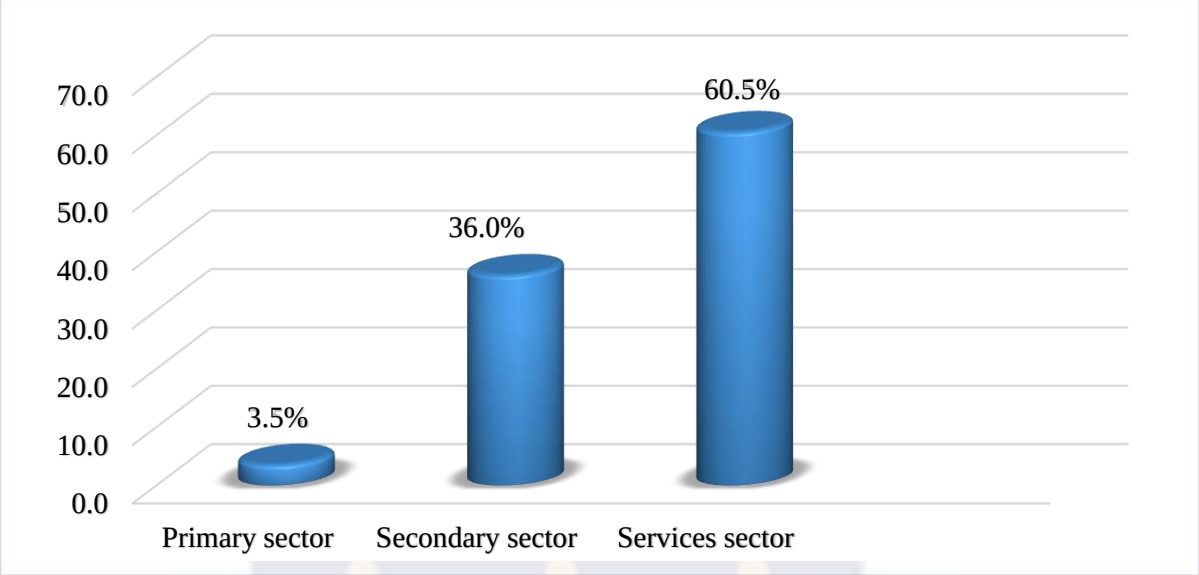

Figure 4.3. Livelihood Activities of Respondents after Urban Sprawl

Source: Field Survey, 2017

However, residential developments in the peri-urban areas have altered communities' sources of livelihood before the emergence of urban sprawl. There are few lands available for farming in the peri-urban areas. Many people have resorted to home-based businesses to meet the growing population in the peri-urban areas. On the other hand, people also travel to the inner cities to do their private work or government work as their sources of livelihood. This clearly showed that there were no uniform sources of livelihood for the communities in the peri-urban areas due urban sprawl. The survey revealed that, most of the peri-urban communities (79.5%) were into private informal work as their source of livelihoods. According to an interview with a respondent at Amasaman, he noted that many people in their community work in other areas as plumbers, carpenters and wielders just to mention a few. Figure 4.4 shows peri-urban community's general sources of livelihood after urban sprawl.

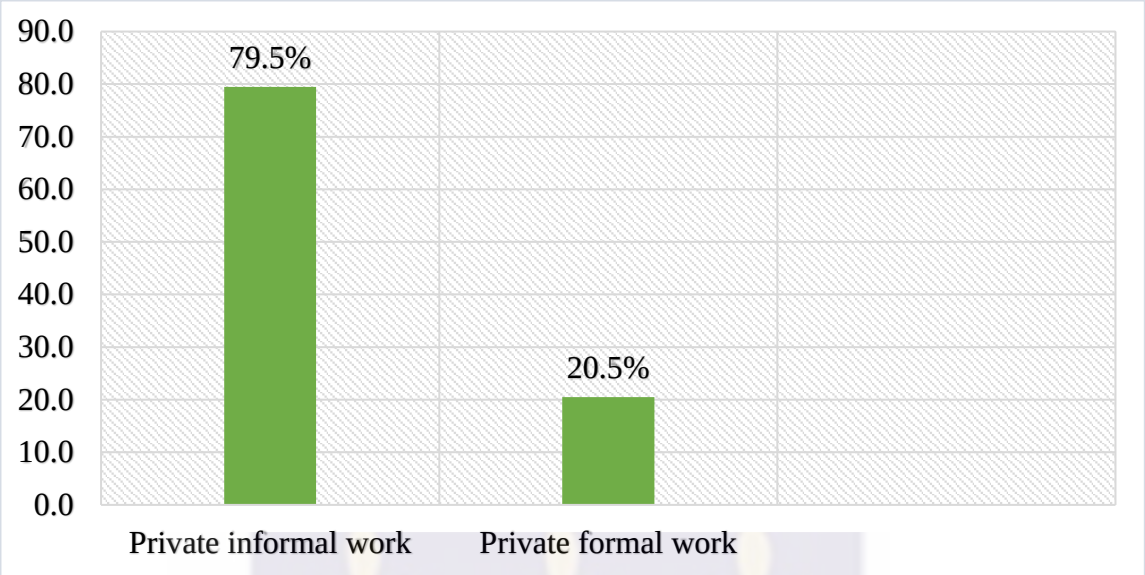

Figure 4. 4. Peri-urban community's general sources of livelihood after urban sprawl
Source: Field Survey, 2017

4.3 Factors Causing Livelihood Change

Again respondents were asked to rank the factors that caused their livelihoods to change. Factors such as social segregation, conflicts, migration, urban and population growth and primary sector work not lucrative were listed for the ranking. It was observed that urban sprawl has resulted in livelihoods change for many people in the peri-urban areas. It was discovered from the survey that about 35.0% which represents majority of the respondents ranked primary sector work not lucrative as the main factor causing livelihood change in the peri-urban areas, followed by conflicts (30.0%), migration (13.5%), social segregation (9.5%), urban growth (6.5%) and population growth (5.5%) as shown in Fig. 4.5.

The 35.0% of the respondents who ranked primary sector work as not lucrative could be attributed to the effects of urban sprawl on their livelihoods sustainability. For instance, residential developments in the peri-urban areas have made farming no more lucrative and attractive. It was also observed from the survey that agricultural lands in the peri-urban areas have been turned into residential developments with agricultural adaptation being altered, farm practices and management being changed and these affect the agro diversity of farm practices

negatively. When this happens, people who depend on agriculture as a source of income and do not have skills to do any work will have to seek other livelihood strategies to fend for themselves and families.

Also lot of people were into large scale farming for both commercial and domestic use and their activities provided huge sums of income but occurrence of urban sprawl has limited lands available for primary sector work such as farming, stone quarrying just to mention a few. The results from the survey were not different from what was happening in Nyahuru, a peri-urban area in Kenya where the area had high agricultural potential but residential development in the area has competed with agriculture thereby affecting livelihoods sustainability of people involved as asserted by (Stefan et al., 2010).

Also the survey revealed that, many people lived in their own homes and the sense of community cohesion was broken. The emergence of urban sprawl has promoted social segregation in the sense that many people do not want to mingle with other people in the communities since they live in their private homes. According to a respondents at Dawhyenya, she indicated that, she does not see the need to mingle with other members of her community when she has her own home and wants privacy for herself and family.

Conflicts emanate when people disagree on certain matters. With the emergence of urban sprawl, the land market is occupied with a lot of conflicts between sellers and buyers of the land. It was discovered from the survey that, many respondents' livelihoods have changed due to conflicts on lands as one piece of land could be sold to different people at the same time. Those who depended on these lands for farming and other primary sector work had to resort to other livelihoods strategies for survival. Some of the respondents indicated that, land guards who provided their services in the form of protecting people's lands scared them away from

working on these lands for survival and due to that their sources of livelihood had to change to meet the growing population and urban growth.

On the other hand, many people's livelihoods have improved due to the urban population growth that led to sprawl developments. Land markets activities give avenue for investors whether families, individuals, government and private companies to get huge sums of profit (Kasanga & Kotey 2001). From the survey, it was discovered that many people were involved in home-based businesses to meet the demands of the inhabitants in the sprawl areas and since urban sprawl mostly occur along road axis, many people sell items along road sides to sustain their livelihoods. This goes to confirm Briggs and Mwamfupe (2000) argument that sprawl development along highways usually created avenues for residents to set up home- based and road side businesses to generate income. Residential developments due to urban sprawl in the peri-urban areas impacted livelihoods sustainability of some people per the results of the survey. Figure 4.5 shows views of the respondents on the issue.

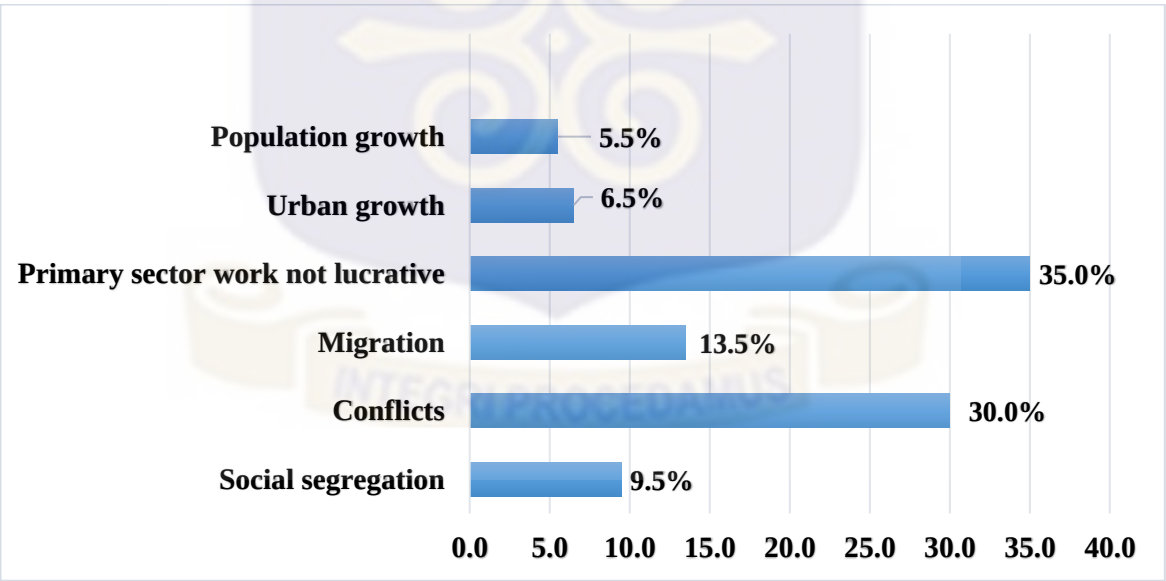

Figure 4.5. Factors Causing Livelihood Change of Respondents

Source: Field Survey, 2017

4.4 Effects of Urban Sprawl on Peri-Urban Livelihoods

In order to understand how urban sprawl impact on livelihoods sustainability in the peri-urban areas, respondents were further asked about the effects of urban sprawl in their communities or towns. While a significant 40.0 percent of the respondents indicated that land disputes were major effects of urban sprawl in the peri-urban areas. 23.0 percent of the respondents also indicated loss of farmlands as the effect of urban sprawl. Approximately 20.0 percent of the respondents viewed unequal access to social amenities and 17.0 percent indicated traffic congestion as the effects of urban sprawl. The majority of the respondents who viewed land disputes as the major effects of urban sprawl as shown in Fig. 4.6 could be attributed to number of land litigation issues that occurred in the peri-urban areas. This goes to confirm Peprah's (2014) view that conflicts on land use emanate when cities begin to sprawl into the peri-urban areas.

In an interview with a traditional leader at Dawhwenya it was observed that lands in the peri-urban areas of Accra are mostly in the hands of families and stools. He further explained that land disputes occur when a piece of land is sold to different people by a family member at the same time and this brought about conflict between people involved and cases like these mostly ended up in the law court to claim rightful ownership of the land. He cited a situation where the same piece of land was sold four times to individuals by the same family members which resulted in conflict between the individuals and land guards. The land dispute led to the death of one of the people who bought the lands. This situation become worrisome when individuals have started developing the lands and have put assets on it. The informal land market in the peri-urban areas are associated with problems like land conflicts and litigation, bottlenecks and uncertainty.

Another officer at the Town and Country Department at GAMA office lamented that, quite a number of people who put up residential buildings in the peri-urban areas do not have building

permits and also do not have any lay out schemes and by law there should be a scheme or land documentation before putting up a structure but yet people still develop their lands for residential purposes without proper documentation. She explained that when most of these structures are pulled down it generates conflicts between the individual who bought the lands and the owners of the land which mostly belongs to families. The department is beset with challenges such as logistics, inadequate personnel and it becomes very difficult to monitor what is going on in the peri-urban areas.

In an interview with the Corporate Affairs Manager at Castle Gate Estate Limited, he indicated that even though they get huge profit from the sale of houses and lands, they are beset with numerous challenges such as land disputes. He indicated that most of the time there were double sale of land from the same location to different real estate companies which generate conflicts among families. Recently, there was a potential land conflict that occurred on 8th March 2017 at Dawhyenya between the youth and the chief of Dawhyenya over the sale of lands by the kingmakers and principal elders. The youth were of the view that Dawhyenya lands were family lands and not stool lands and so the chief should not sell the lands without the consent of family (Ghana News Agency, Tuesday, 7th March, 2017). The survey found out that land disputes as a result of urban sprawl was gaining popularity of late in the peri-urban areas and needed to be curtailed so as to reduce its effects on livelihoods.

The survey captured some respondents who were of the view that one of the effects of urban sprawl was loss of farmlands as shown in Fig 4.6. Residential development in the peri-urban areas led to the conversion of farmlands to residential land use. The results of the study confirmed the argument by Qi and Lu (2008) that urban sprawl resulted in series of social problems such as encroachment of farm lands and open spaces which is against the principle of sustainable development. This confirmation was not different from the assertion by Owusu (2013) that loss of farmlands lead to limited employment and concentrated poverty. Food

security is also under threat when farmlands are lost for residential developments (Peprah's 2014). Food insecurity due to loss of farmlands to residential developments may lead to hunger and high cost of food produce.

Furthermore, the respondents who indicated unequal access to social amenities as the effect of urban sprawl as indicated in Fig.4.6 were of the view that most peri-urban areas were neglected in terms of infrastructural development. The respondents indicated that some of the areas in the zone were faced with a challenge of extending electricity, potable drinking water, effective waste management, roads and other social amenities that will sustain their livelihoods. Similar argument were made by Barnes et al., (2001), that the sprawl of a settlement poses a significant threat to inhabitants in the peri-urban areas as ground water supplies, aquifers as potable sources of water are altered for residential development and non-residential developments which sometimes results in high treatment cost and poor water quality affecting livelihoods sustainability. It was observed during the survey at the peri-urban areas of the four road corridors of GAMA that most of the areas affected by the sprawl lack social and welfare infrastructure like potable drinking water, electricity, educational facilities, and health care facilities which affect livelihoods sustainability.

Traffic congestion as indicated by the respondents in Fig. 4.6 were as a result of the long hours spent on roads by vehicles commuting to the inner cities. According to one trader at Pokuase, she has to spend long hours on the road before getting to the city centre to conduct her business and this has affected her income. Similarly, a study by Qi and Lu (2008) confirmed that urban sprawl in China is a critical land use problem as it contributes to traffic congestion, long hours of commuting and high levels of fuel consumption which affect livelihood sustainability in the peripheries. The respondents confirmed that the long hours spent on driving generate environmental problems such as air pollution which serves as a threat to their health. However,

sustainable transportation is key to sustainable development since many people will not waste precious time commuting long distances to their work place.

A study by European Environmental Agency (2001) confirms the argument that traffic congestion in the peripheries due to urban sprawl creates a challenge for household spending for moving from their homes to work over long distances and the use of public transport and mass transit system are hindered due to the use of private cars by most inhabitants. This situation is not different from what is happening in the peri-urban areas of GAMA and it was discovered to a large extent during the survey that the effects of urban sprawl in the peri-urban areas was a serious challenge and needed a critical attention by government and city authorities. The results from the survey contradicts Cowell's (2001) assertion that urban sprawl was a positive phenomenon in the United States since it enhances higher standard of living due to the preference for household privacy in homes located away from the inner cities.

Figure 4.6 shows the response of the respondents.

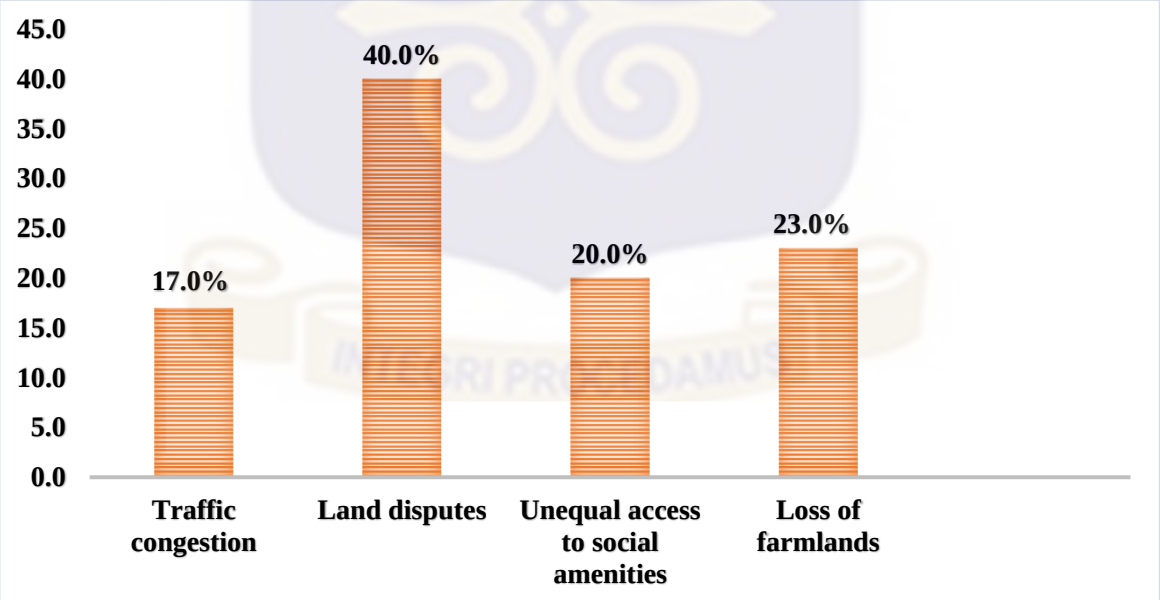

Figure 4.6. Effects of Urban Sprawl in Peri-Urban Areas
Source: Field Survey, 2017

4.5 Coping Strategies

In order to ascertain the effect of urban sprawl on livelihoods sustainability, respondents were further asked about how they intend to plan their livelihoods in the wake of urban sprawl. Urban sprawl in the peri-urban areas has affected many people either positively or negatively. For instance real estate developers are gaining at the expense of farmers who depend on farming for their source of livelihood since most farmland in the peri-urban areas are now turned into residential use. Many people identified ways to cope with this phenomenon. From the survey, it was discovered that, majority of the respondents (75.0%) as indicated in Fig.4.7 planned to improve their sources of income in the peri-urban areas as ways of coping with the sprawl.

Another 25.0 percent of respondents planned to migrate in order to cope with the sprawl as shown Fig 4.7. The majority of respondents who wanted an improvement in their livelihoods did not have any alternative since they could not stop people from relocating and building their homes in the peri-urban areas. Since people are moving into the peri-urban areas, many of them take that as an advantage to establish their businesses in the peri-urban areas to meet the growing population. Artisans such as carpenters, welders, plumbers and tilers were mostly located in these areas. From the survey, it was observed that people who were mostly affected by the sprawl had to venture into other forms of businesses such as artisanship to provide services to residents in the peri-urban areas. Others are also contracted to work on new buildings in the area to improve their sources of income.

Again people were spotted operating non-residential developments such as banks, shopping malls, construction materials stores in the peri-urban zone to serve the growing needs of residents. The reason 25.0% of the respondents gave for migration as a way to cope with urban sprawl was that they did not have adequate skills to work on any other formal work since their sources of livelihood have been negatively affected by urban sprawl and therefore sought to

migrate to the inner cities to seek alternative work or greener pastures to improve their sources of livelihood.

The occurrence of urban sprawl in the peri-urban areas as a result of massive residential development that make people to resort to other livelihoods strategies goes to confirm Abass et al., (2013) argument that peri-urban inhabitants resort to all forms of livelihood strategies such as migration, involvement in non-farm activities in order to adjust to new developments in the peri-urban areas. Figure 4.7 indicates the coping strategies of respondents.

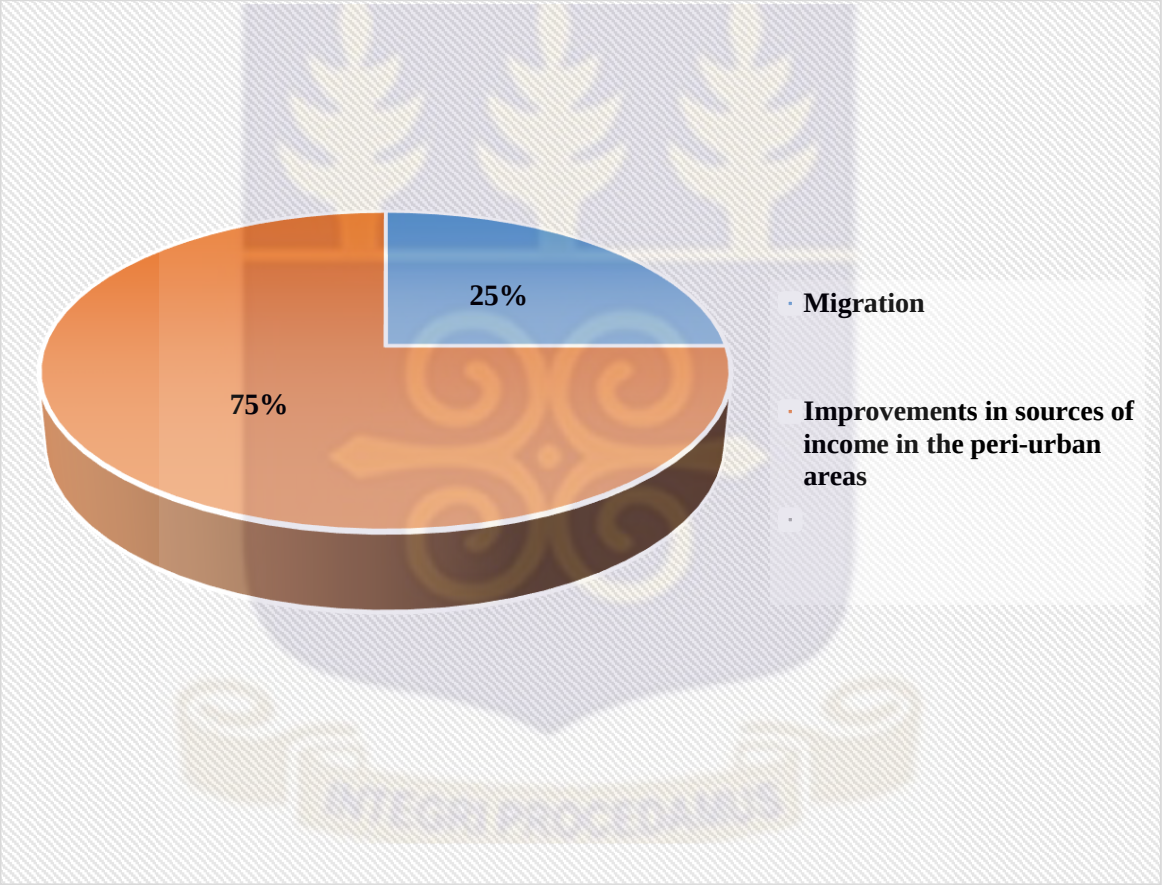

Figure 4. 7. Coping Strategies by Respondents

Source: Field Survey, 2017

4.6 Respondents most negatively affected by the sprawl of human settlements

Consequently, respondents were further asked to rank the categories of people most impacted by the sprawl of human settlement. Results show that many people's sources of livelihood have been curtailed due to urban sprawl and hence impacted on their sources of income. The data revealed that majority of the respondents ranked women (630%) as the most impacted by urban sprawl, followed by men (37.0%) as shown in Fig. 4.8

The 63 percent of respondents specified women as most affected by the sprawl. On the negative side, the land tenure system in Ghana does not give women opportunities to own lands. This is typical of the peri-urban lands in GAMA where lands belong to families but women are not allowed access to lands which is quite discriminatory. The survey again revealed that women were mostly farmers and their farming activities provided them their sources of livelihood for their children and families. According to an interview with one woman who used to be a farmer, she indicated that, "farming created an opportunity for me to get additional source of income through commercial sale of my farm produce in large quantities however, residential developments altered my farming activities since my farmland was converted to residential use.

Initiatives such as Planting for Food and Jobs by the Ghana Government cannot be operationalized in GAMA since most of the lands have been acquired by real estate developers for residential use and category of people such as women are mostly negatively affected when such initiative is not implemented. This is because such initiative can provide additional source of income to them. This is clear indication that women are more vulnerable in terms of land use change.

Elderly women during the field survey indicated that their health statuses were at stake due to the sprawl of human settlement. This was because they indicated that, they used to farm on

lands to improve their standard of living and served as a form of exercise to improve their health statuses but now most lands available have been sold to individuals and private developers and this has contributed to land use change.

In an interview with some young women at Amasaman, they indicated that, “land guards who protected properties posed a big challenge to them and this was because people who were rich hired them to protect their lands and this situation made them vulnerable”. They continued that, their vulnerability lies with the fact that the rich were buying most of the lands for both residential and non-residential purposes and this situation was going to make future ownership of properties on lands in the peri-urban areas difficult since most of lands were sold

On the positive side, the study also revealed that the effect of urban sprawl on men were not much felt as compared to women in the peri-urban areas. This was because men could easily learn artisanal works such as carpentry, masonry, and plumbing to work on residential buildings in the peri-urban areas and also resort to migration to the inner cities as indicated in Figure 4.7 to maintain their standard of living. Even though the sprawl of human settlement in the peri-urban areas affects their livelihood sustainability, they are more able to adjust to the new developments than women.

This goes to confirm Abass’s et al., (2013) view that many people are vulnerable due to land use change in the peri-urban areas especially women who are into agriculture. The survey indicated that the youth did not get the opportunity to learn farming skills and their future ownership of properties in the peri-urban areas were at stake since most of the lands were sold to people for residential developments.

Figure 4.8 shows categories of people affected by urban sprawl.

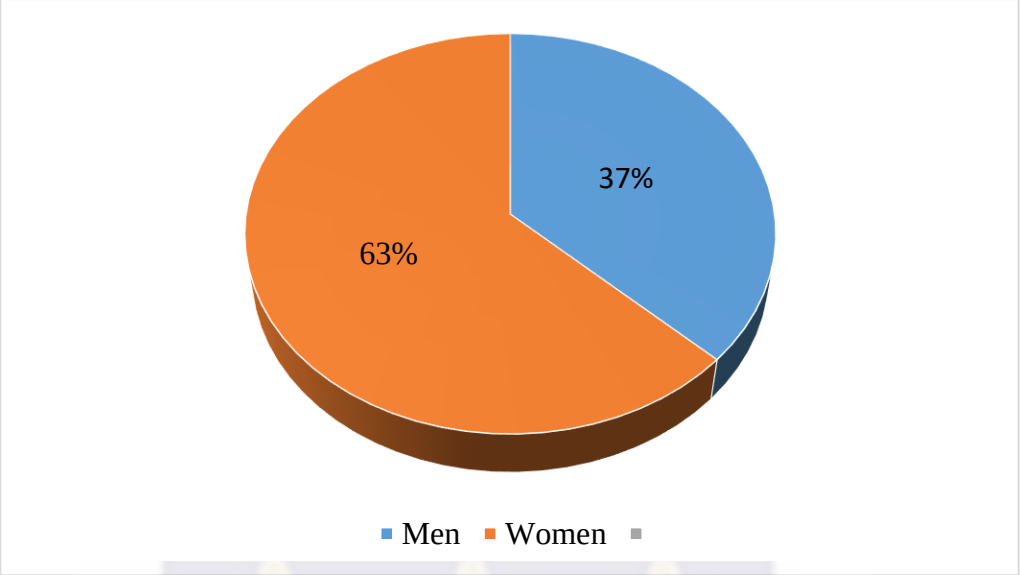

Figure 4.8. Categories of people negatively affected by urban sprawl

Source: Field Survey, 2017

4.7 Summary

This chapter has discussed the results from the survey and has highlighted broadly the effects of urban sprawl on livelihoods sustainability in the peri-urban areas of GAMA. By this it has laid emphasis on how the emergence of urban sprawl in the peri-urban area has affected individuals and communities sources of livelihood. It has also looked at the factors causing livelihoods to change and the categories of people mostly impacted by the sprawl of human settlement in the peri-urban areas. The next chapter focuses on the ecological footprints of urban sprawl.

CHAPTER FIVE

ECOLOGICAL FOOTPRINTS OF URBAN SPRAWL

5.1 Introduction

This chapter examines the ecological effects of urban sprawl in the peri-urban areas of GAMA. The study interrogates respondents' view on the changes seen in the ecology and further sought reasons that might have accounted for the change in the ecology. Additionally, it aims to bring to the fore how the ecological footprints of urban sprawl affect livelihoods and what can be done to protect the ecology. Lastly it focuses on the institutions involved in protecting the environment from the sprawl and measures to curb the sprawl of human settlement in the peri-urban areas.

5.2 Components of the ecology

Ecology studies the interaction between living organisms such as humans and their physical environment and provides knowledge on connections between plants and animals and their surroundings. Future generations will benefit from a healthy environment if the earth's resources and the ecology are protected. Ecologists study the interactions between these living organisms. However, managing the components in the ecology provides value to the environment and the resources found in it. Ecosystem is any geographical area that comprises of organisms and non-living organism in their natural homes.

5.3 Ecological History of Greater Accra Metropolitan Area

There have been increasing interest in ecological issues due to the deteriorating state of the

Indigenous and global environment at large. In Ghana, the conditions of the ecology has generated enormous concern due to the recent ecological loss as a result of human activities.

In GAMA, this situation is very pervasive as ecologically sensitive zones have been encroached for other land uses such as residential and non-residential developments by

individuals, real estate developers and other government officials and this has negative effects on present and future generations.

Dickson (1969) indicated that historically, the ecology of GAMA with reference to its vegetation basically was open forest and deciduous forest in the further north. Since GAMA was and still a coastal area, there was the availability of luxuriant vegetation. Areas like the Labadi coast were forests. Many people settled in the southern and coastal parts of Ghana due to the nature of vegetation, the flourishing nature of towns and villages and the logical pattern of population distribution than the Northern parts Ghana.

Ntiamoah-Baidu et.al (2016) added that the coastal wetlands in Ghana are under dangerous threat due to the activities of humans and this has altered a wide range of species composition. These plants and animal species play vital role to keep the wetland ecosystem.

With reference to the spatio-temporal variation in small mammal species, at the Muni-Pumadze Ramsar site a coastal wetland in Ghana, it was discovered that there were changes in the small mammal species with a baseline data gathered in 1997 and compared with that of 2012. There was a reduction in number of the small mammal species richness and abundance such as the *Hylomyscus alleni, Lemniscomys barbarous, Mastomys erythroleucus, Gerbilliscus kempi and Uranomys ruddi* and this was a result of human population encroaching on the wetland (Ntiamoah-Baidu et.al, 2016). The traditional belief and customs that used to protect wetlands ecosystem are no more effective.

Similarly, the study indicated that species of shrews such as *C. buettikoferi and C. grandiceps* used to be located along the Accra Plains but due to urban sprawl, these species have been lost. Also the breeding pattern of rodents that used to be normal has been altered by residential developments.

Lieberman (1979) added that the major vegetative cover of Accra Plains included short grassland or steppes which was in the class of *Vetiverietea*, tall savannah grassland and open woodlands which was in the class of *Hyparrhenieta* and finally the closed forest (thickest) belonging to class Pycnanthetea. The study indicated the presence of tree species in the Pinkwae area which was a South-east outlier forest affiliated with patches of forest on the western and sub-scarp Accra plains and its lands surrounding the forest was the property of Katamanso (a Ga village subject to Nungua, Greater Accra Region). These tree species were found in habitats such as Evergreen forest, Semi-deciduous forest, Dry forest, Forest margins, Thickets clumps and Open grasslands. Examples of some these tree species found in the various habitats included *Baphia pubescens, Dialium guineense, Antiaris africana, Cassipourea congoensis, Acridocarpus smeathmannii and Uvaria ovata.*

There was the presence of animal species such as antelopes, bushbuck, black duiker, green monkeys, Togo hare and different kinds of bush fowls that people hunted for and served as food in Pinkwae (Lieberman. 1979).

Also preferred wood species such as *Zanthoxylum xanthoxyloides, Azadirachta indica, Albizia glaberrima and Lannea acida* were cut and used for firewood and charcoal making due to the increasing population GAMA and these wooded areas included Oyarifa, Fafraha but now due to residential developments these species are rare.

Similarly, residential developments around the Shai Hills which is a resource reserve in Doryumu in the Shai Osudoku District in Greater Accra Region have altered the existence of some bird species. Examples of these bird species that have been endangered by urban sprawl include; brown snake eagle, white stock, African white vulture, white back vulture, violet turaco and stone partridge (Dowsett & Dowsett, 2013).

Plants, animal and birds species play vital roles in the ecosystem but due to the activities of humans such as residential developments around reserve areas, such species have been endangered and their livelihoods have also been threatened.

5.4 Consequence of Residential Developments on the Ecology

The study sought to ascertain respondents' views on how urban sprawl affected living organisms and their physical environment. Residential developments in the peri-urban areas have altered land use previously in their natural state. For instance wetlands, wildlife habitats have been encroached for residential use due to urban sprawl. The survey revealed that 42.5 percent of the respondents as shown in Fig. 5.1 indicated that urban sprawl in the peri-urban areas resulted in deforestation and by this they meant that, vegetation is being cleared for residential purposes. From the land use change detection analysis between 2008 and 2016, there was a great change in terms of vegetation as compared to settlements. It was observed that dense vegetation decreased drastically and settlements increased during the time period in GAMA.

Moreover the respondents were of the view that cutting down of trees to get space for residential developments often affected the ecology badly because trees serve as windbreak. This resonates Stone et al's., (2010) view that, trees play significant role in minimising floods and storm water runoff in the cities and cutting them down to get space for residential developments have negative impact on the ecology. Also, the results indicated that residential developments have altered vegetation cover and this was confirmed by (Thuo, 2013) assertion that changes in vegetation cover was problematic to the environment.

According to an interview with a woman who used to be a traditional birth attendant, she indicated that she used to go to areas not far from her house to uproot plants to prepare medicines for pregnant women to enable her generate income but due to urban sprawl all these

indigenous medicine plants and rare species are lost and one needed to go to the interior to search for these species.

Also 31.5 percent of the respondents as shown in Fig. 5.1 indicated that increased population in the sprawling areas brought about heat and emission of fumes from cars commuting on the high ways. It was observed during the survey that many people have private cars and spent long hours driving on roads to the inner cities to transact their businesses and this contributes to climate change through the emission of exhaust gases. The situation was not different from the nature of sprawl in European cities where the ecology has been affected due to the sprawl and the impacts included rise in energy used, rise in greenhouse gases emissions which lead to climate change, air and noise pollution as put forward by the European Environment Agency (2006).

Again, the results of the survey were in line with Frumkin (2002) argument that automobile traffic and long hours spent on roads to the inner cities from the sprawling areas contributed to climate change due to the emissions of greenhouse gases such as methane, nitrogen oxides and volatile compounds from motor vehicles. This serves as a threat to human health including direct heat and respiratory disorders such lung cancer and ecosystems around.

Additionally, as the survey revealed, urban sprawl resulted in the encroachment of wetlands and most of them lost their purposes to residential developments and the responses were represented by 12.5 percent of the respondents as shown in Fig. 5.1. The respondents indicated that many places that used to be wetlands have been filled up with sand and gravels for residential developments. For instance, the survey revealed that Sakumono Ramsar site along Accra to Tema road have been encroached and this has had negative impact on the species richness and their livelihoods there. Migratory birds' paths are blocked due to the encroachment. The study also revealed that some residential buildings were located around

areas liable to flood, sources of water, natural reserves and other valuable resources due to urban sprawl.

Urban and Meets (1992) confirms that many endangered species depend on wetlands for survival and this leaves ecological footprints when their lives are threatened. Plate 5.1 and Plate 5.2 depict one of the incidents observed during field work where people encroached the Sakumono Ramsar site for residential developments. It was observed that, people mounted pillars, walls and even put their blocks on the lands to claim ownership of that piece of land. According a man who has bought a piece of land at the site it was one of the ways of protecting the land from encroachment by other people.

Plate 5.1. Encroachment of Lands around the Sakumono Ramsar Site using a Pillar

Source: Field Survey, 2017

Plate 5.2. Encroaching Portion of the land at the site with a Wall

Source: Field Survey, 2017

Also plate 5.3 depicts how species such as cattle and birds depended on the wetland for their livelihoods. Residential developments alter their sources of livelihood and it was observed during the survey that migratory birds and cattle depended on Sakumono lagoon and its surroundings for survival and per the observation, if residential developments are not stopped around the site the future of these species become endangered.

Plate 5.3. Cattle and Bird Species feeding on the Wetland and Its surroundings

Source: Field Survey, 2017

Plate 5.4 depicts how private developers have encroached on wetlands. It was observed during the survey that the Sakumono Ramsar site has been encroached by private developers and this posed as threat to livelihoods depending on it. The site is a natural reserve but residential

developments on the wetland is gradually causing a land use change due to the sprawl of human settlement.

Plate 5.4. Recent Encroachment of the Sakumono Ramsar Site with a Concrete Wall

Source: Field Survey, 2017

Again, 13.5 percent of the respondents as shown in Fig. 5.1 indicated that a lot of wildlife habitat were lost due to the sprawl of human settlement. Wildlife includes plants and animals in their natural homes without disturbances but due to the competition for space for residential developments by individuals and institutions such as real estate developers, areas reserved for wildlife species have been encroached. The respondents along the Accra to Nsawam road axis indicated that species like deer, millipedes were mostly found in the forest but due to urban sprawl all these species that add nutrients to the soil especially the millipedes are no more present.

Again along the Accra to Winneba axis, the respondents indicated that species such as grass cutters, snails were mostly found in the forest but with the phenomenon of urban sprawl, residential developments have altered the habitats of these species. The respondents indicated that they had to go to the interior in order to get access to these species.

Again the respondents along the Accra–Aburi axis indicated that plant species such as *chromolaena odorata* known as "Acheampong weed" was medicinal and easily located within different communities within the area and these plant species were used by herbalist to cure skin infections but due urban sprawl all these plants have been cleared for residential developments.

Additionally, the respondents along the Accra-Tema axis indicated that most of their communities used to have plant species such as the super herb "nunum". Herbalist used this plant for medicinal purpose such to cure infertility, fibroids and reduce inflammation and this provided source of income for the herbalists and health benefits for the people. Residential developments in the peri-urban areas have made all the plant rare for medicinal purposes.

The results of the survey resonate with Urban and Meets (1992) argument that peri-urban development due to urban sprawl affect wildlife by threatening their survival because most of these species of wildlife needed large natural places to increase their population numbers. Gurin (2013) confirms that aesthetic value is lost to residential developments which lead to social loss, for instance the conversion of wildlife habitat for other form of land use loses their attraction and causes threat to nature. Figure 5.1 shows the effects of urban sprawl on the ecology of respondents observed.

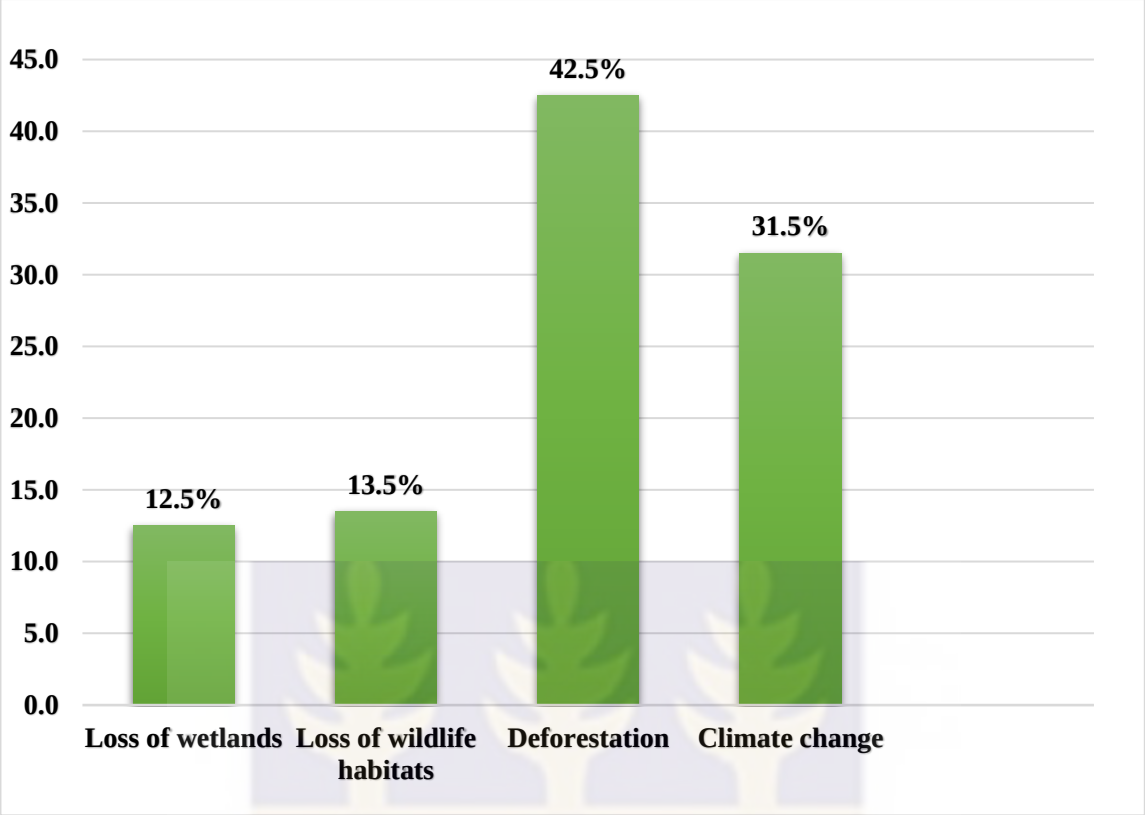

Figure 5.1. Effects of Urban Sprawl on the Ecology

Source: Field Survey, 2017

Plate 5.5 indicates settlements around a water body which pose a threat to livelihoods of people who depend on it. It was discovered during the survey that people bought lands around water bodies at a cheaper price to put up their residential buildings. During an interview with a man who used to be a fisherman, he indicated that residential development around the Weija River impacted his source of livelihoods and pointed out that these developments endangered aquatic species. He continued that lands around water bodies are low lying and also liable to floods.

Plate 5.5. Residential Location around Water Body

Source: Field Survey, 2017

5.5 Effects of Ecological Footprint of Urban Sprawl on Respondents

Respondents were further asked about how the ecological impact of residential developments affected their livelihoods. It was discovered from the survey that 29.5 percent of the respondents as shown in 5.2 indicated food insecurity as an ecological impact of urban sprawl that affected their livelihood. 27.5 percent of the respondents indicated exposure to flooding, exposure to landslides (15.0%), respiratory disorder (18.5%), exposure to wildfires (7.0%) and prone to earthquake (2.5%) posed a minimal impact to the respondents. Figure 5.2 shows the implication of the ecological footprints on respondents.

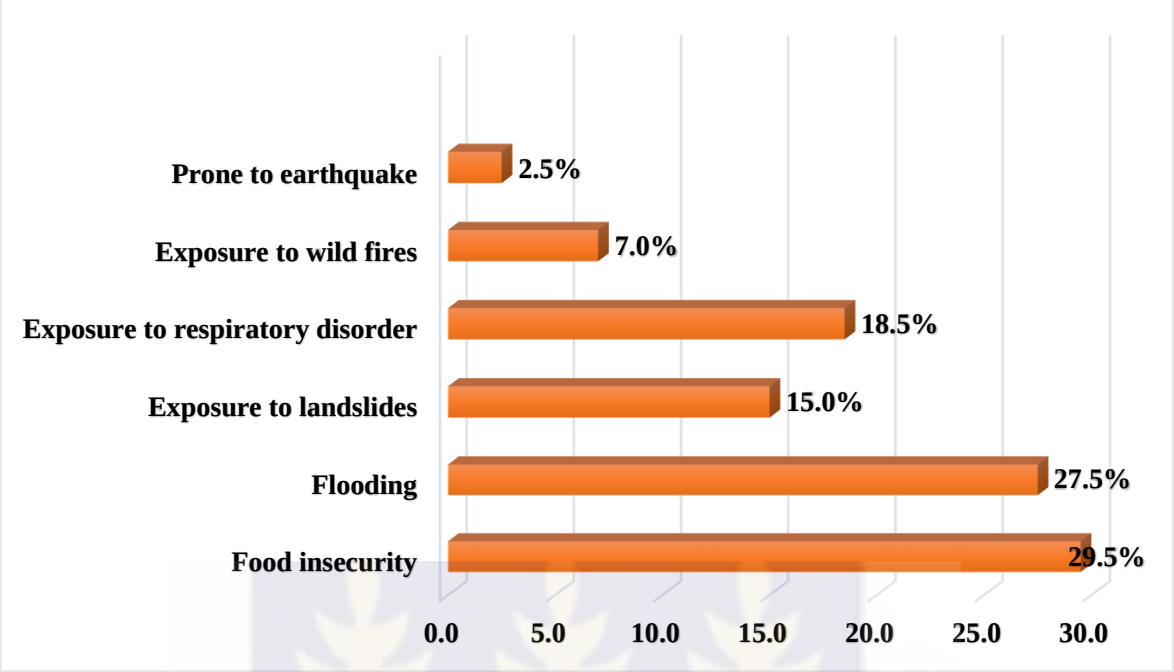

Figure 5.2. Implications of the ecological footprints on livelihoods

Source: Field Survey, 2017

The 29.5 percent of the respondents who viewed food insecurity as the most threatening ecological impact of urban sprawl attributed this to the clearing of vegetation which included farmlands for the other land use such as residential developments and the resultant effect of climate change on rainfall, temperature which in turn affect crop production and may lead to high cost of foodstuff.

This goes to confirm Stefan et al's., (2010) assertion that extreme heat events which result in climate-related fatalities increase surface temperatures which impact plant life and other organisms in the ecosystem. This means that destruction of plant life due to urban sprawl leads to food insecurity. The results of the study are also in line with Peprah's (2014) argument that sprawl developments are threat to food security and increases cost of food production. When food security is under threat, many lives are also under threat as it could lead to hunger.

Again, the respondents who indicated flooding as an ecological impact of urban sprawl that affected their livelihoods were of the view that, residential developments around wetlands and areas liable to floods served as a threat to their lives. They indicated that a lot of people who buy lands around wetlands were rich and mostly filled them up for their residential developments and the negative aspect was that, most of the areas flood after heavy downpour. In an interview with a resident at Abehenease a community near Amasaman, he indicated that, when the area floods after heavy downpour he was not able to transact business and this affected his source of income. This situation is evident in the argument on a workshop on managing wetlands in Accra (2006) which indicated that wetlands in Accra were under threat as a result of urban sprawl and the rapid conversion of wetlands into residential developments had impact on the environment and causes destruction to many lives and properties.

Additionally, respiratory disorder as indicated by respondents could be attributed to the fact that many people spent longer hours in traffic and drive for long distances to the inner cities.

According to a respondent at Afienya, he indicated that he spent almost 2 hours in traffic every day and this affected his income.

The respondents indicated that diseases such as lung cancer, respiratory disorder, and asthma are associated with air pollution which affects livelihoods in the area and this was as a result of the sprawl.

Respondents who mentioned exposure to landslides and earthquake were of the notion that people who built their houses on hilly areas were under threat as any vibration in the earth's crust and rock fall in the area will endanger many lives. The peri-urban areas of Accra are sprawling to the extent that people do not mind buying land and building on hilly areas. It was discovered from the survey that peri-urban areas such as Gbawe-Top Base and McCarthy Hill were earthquake prone areas and yet people have put up their residential developments there.

Clearing vegetation for residential developments sometimes exposes people to wildfires. The respondents who indicated exposure to wildfires insisted that urban sprawl affected their livelihoods by burning of vegetation for residential developments.

During an interview with a resident at Pokuase, he indicated that, ten years ago, he used to have species such as snails, mushrooms and grass cutter for domestic and commercial use but they have disappeared due to the occurrence of urban sprawl that led to burning of vegetation for other land use. These species are rare now for consumption unless one searches in the deep forest. Plate 5.6 depicts how vegetation was burnt to get space for other land use such as residential developments.

Plate 5.6. Burnt Vegetation for Residential Development

Source: Field Survey, 2017

5.6 Institutions Responsible for Protecting the Ecology

Respondents were further asked of the institutions involved in protecting the ecology from the impact of urban sprawl as shown in Figure 5.3.

Majority (62.0%) of the respondents indicated that, individual representatives of institutions were capable of protecting the ecology from sprawl development. Respondents were of the view that individuals such as traditional leaders and real estate developers were active in the land market which drives urban sprawl and made suggestions that these actors should not think about the profit they get from the land market but desist from selling ecologically sensitive areas to people.

The data also revealed that, Local Government Authorities (15.5%) play part in protecting the ecology from the impact of urban sprawl. They indicated that the Town and Country Planning Department should ensure that all buildings have permits and layout schemes and this will deter people from building on ecologically sensitive zones. For instance, in an interview with an officer of Town and Country Planning Department in Accra, she indicated that most residential developments in the peri-urban areas do not have building permits and proper lay out schemes and so most developments were unplanned and uncoordinated which negatively impacts the ecology. She continued that when people abide by the correct procedures, ecological sensitive areas will be protected.

Furthermore, 12.5 percent of the respondents were of the view that wildlife societies were involved in protecting the ecology. They indicated that wildlife societies should provide public education on the need to protect plants and animals in their natural homes without disturbances. Wildlife species provide aesthetic value and add to the foreign exchange earnings of the country at large through tourism and should be protected. The respondents also revealed that their habitats should not be converted for other land use such as residential developments.

Furthermore, only 10.0 percent of the respondents indicated that, Environmental Protection Agency plays a key role in protecting the environment. As the name suggests, they are active in protecting the environment.

According to an interview with an officer at the Built Environment Department of EPA, he indicated that, they identify locations that are sensitive to the environment and also conduct environmental impact assessment to know how to protect the environment. He was of the view that many people do not consult them before putting up their structures.

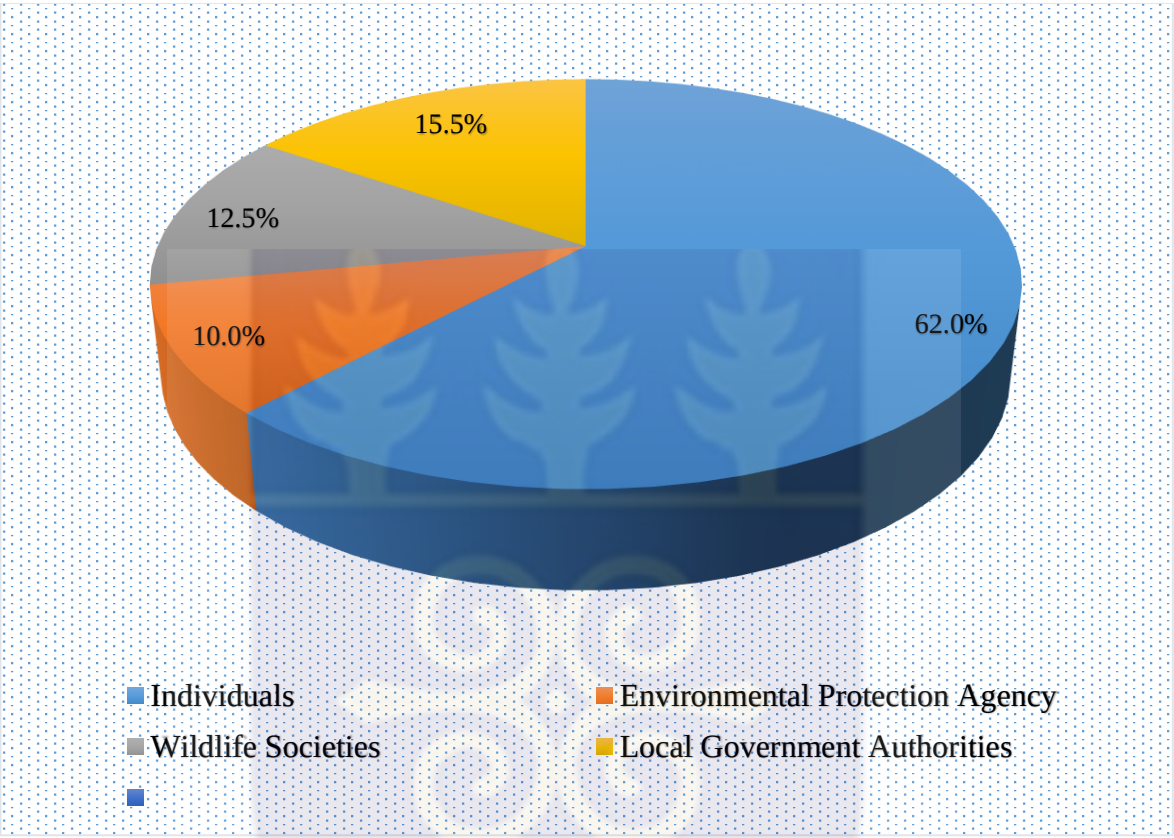

Figure 5.3. Institutions that Protect the Ecology

Source: Field Survey, 2017

5.7 Effectiveness of the Institutions protecting the Ecology

In order to understand the effectiveness or otherwise of institutions involved in protecting the ecology, respondents were first asked whether the institutions are effective or not. However as shown in Figure 5.4 majority of the respondents (64.5%) indicated the institutions are ineffective in protecting the ecology from sprawl developments. About 14.5 percent of the respondents were indifferent towards the institutions. Predictably, only 3.5 percent and 13

percent of the respondents indicated the institutions as very effective and effective respectively.

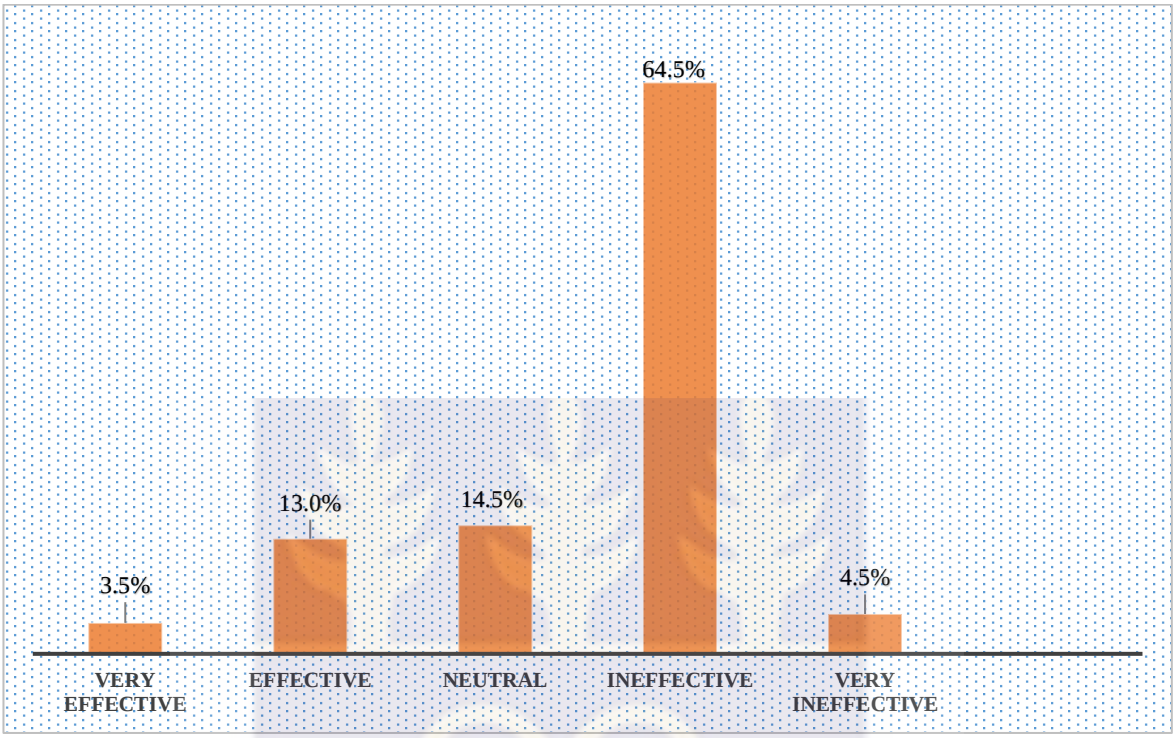

Figure 5.4. How effectives are the Institutions

Source: Field Survey, 2017

The findings revealed that corruption, financial constraints, lack of logistics, inadequate resources, and political influence accounted for the ineffectiveness of institutions protecting the ecology from the impact of urban sprawl. The widespread notion of corruption hindering the institutions activities according to the respondents normally occurs when politicians speculate on lands in the peri-urban areas to develop them. According to an interview with an officer at the Greater Accra Town and Country Planning Department, she indicated that, they do not have offices in all the 216 districts in Ghana and hence lack human resource capacity to monitor what was going on in different areas of the country. She stated that many of the departments around the country do not have cars to go round to perform their duties effectively.

5.8 Summary

The study has clearly showed the effects of urban sprawl on the ecology. Ecological effects such as loss of wetlands, loss of wildlife habitat, deforestation and climate change were highlighted as phenomena that posed threat to livelihoods in the ecosystem. In that perspective, respondents indicated how the ecological footprints have affected their livelihoods. It looked at the institutions involved in curbing urban sprawl to protect the ecology and their effectiveness in delivering their duties. The final chapter presents the summary of the findings, conclusions arrived and some recommendations for policy consideration.

CHAPTER SIX

SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

6.1 Introduction

The previous chapter presented a discussion of the results of the study. In the main chapter, the study looked at the drivers of the urban sprawl, its effects on livelihoods sustainability and its footprints on the ecology. This chapter looks at the summary of the major findings of the study and important conclusions. Finally, recommendations are made for policy consideration.

6.2 Summary of Findings

Urban sprawl caused by rapid population growth is loosely defined as low – density residential and sometimes commercial development that is outside the borders of higher density urban centres**.** The unprecedented and unplanned residential developments pose a serious challenge for urban planning and management hence the need to investigate urban sprawl and its impact on livelihoods sustainability in the peri-urban areas of Greater Accra Metropolitan Area. Urban sprawl has affected many cities in Ghana but that of the peri-urban areas of Accra is exceptional due to the existence of vast lands and the proliferation of housing developments by real estate developers in the peri-urban areas. Rural-urban migration and the high prices of lands in the inner cities of Accra also contribute to the sprawl.

The study highlighted and sought answers to the following questions; to what extend has the city sprawled over the last decade? What livelihoods are being most affected? And how does that affect sustainability of the ecosystem around Accra. These research questions aided the formulation of the research objectives. Primary and secondary sources of data were collected and used in the study. Primary data was obtained from semi-structured questionnaires from respondents using a sample size of 200 respondents in the peri-urban areas of GAMA where sprawling was massive. Interviews were conducted with officers at Town and Country

Planning Department (Greater Accra Regional Office), Environmental Protection Agency, Castle Gate Estate Ghana Limited. Secondary data was obtained from journals, articles, publications, organization data base and websites.

Furthermore, multi-temporal set of Remote Sensing Data of the study area was used to classify the study area into classes such as dense vegetation, grassland/shrubs, water bodies, open areas and settlements. The dataset included mainly Landsat images of (1986, 1991, 2008 and 2016). These Landsat images were classified using unsupervised classification (maximum likelihood algorithm) and was used to generate Land Use Land Cover map of GAMA. Change detection analysis was done to know the rate of change in the image classes between the year periods. ENVI was used to process, analyse and integrate the spatial data. Frequencies, tables, percentages, summations and diagrams were used as statistical techniques in analysing the data. Geographic Information Software ArcGIS was used to produce the map output. The research was constrained by resources and finance.

The research focused on the major road corridors within GAMA where sprawling was massive. These road corridors were; Western Corridor (Accra-Winneba axis), Northern Corridor (Accra-Nsawam axis, North-Eastern Corridor (Accra-Aburi axis) and the Eastern Corridor (Accra-Tema and beyond axis). Using multi-stage stratified sampling, selection of corridors was first identified and then blocks within residential or developing areas were sampled. This was followed by sampling the actual places where development was taking place. Clearly, the results confirms that urban sprawl is massive along these road corridors.

Again the study had revealed that, out of the 200 respondents interviewed, 58 percent were males and 42 percent were made up of females. It was discovered that the peri-urban areas of GAMA experienced massive residential developments hence attracted more men to work on these newly constructed buildings and this accounted for the dominance of males during the

survey. As stated in the methodology as roughly 50% males and 50% females targeted, females did not cooperate and had to cover up with men.

During the survey, all the respondents 100 percent indicated that they have experienced changes in land use. They attributed it to the fact that, farmlands were converted for residential use, loss of open spaces, deterioration of infrastructure and a decline in the farm population. The survey revealed that, 70.5 percent of the respondents have stayed in the study areas for more than ten years and were familiar with the patterns and changes in land use. It was evident from the satellite imagery from 1986 to 2016 that settlements increased at the expense of vegetation and this impacted on livelihood sustainability.

The study discovered that accessibility was ranked as the highest motivation for people to relocate to the peri-urban areas. The respondents indicated that lands in the inner cities were expensive and having access to them become difficult. The study further uncovered that the land market was lucrative hence urban sprawling. Many people were engaged in the sale of lands for their source of livelihoods. Traditional leaders were identified as the main institution driving the sprawl of human settlement through their activities. Most lands in the study areas belonged to stools and families and they were active in the land market.

Moreover, the study identified that some respondents' sources of livelihoods changed due to urban sprawl. For instance, farmlands were converted to build up areas and diverting farmers sources of livelihoods. It was also discovered that, the sprawl of human settlement created avenue for people to engage in road side and home-based businesses. Others used it as an opportunity to work on these new buildings and sold construction materials to people in the peri-urban areas. This meant that primary sector work was no more lucrative in the peri-urban areas due to ongoing residential developments.

Again, it was discovered that urban sprawl led to the generation of land disputes among individuals. This was seen in situations where one piece of land was sold to different people at the same time and this act was confronted with series of land litigation cases in court. The study found out that, many people resorted to ways to cope with the phenomenon and some of them planned to improve their sources of income (75.0 %) in the peri-urban areas to cope with the sprawl.

Another revelation the study uncovered was that women (48%) were most negatively impacted by the urban sprawl. The survey revealed that women were mostly farmers and depended on their farming activities to feed themselves and families but with the advent of sprawl development, farmlands have been converted to residential land use and this made them vulnerable. By contrast men take advantage of urban sprawl to work on buildings for their sources of income and artisans were mostly men. One reason that was discovered was that most women used to be traditional birth attendants who used plants and herbs to cure diseases and aided pregnant women during delivery but with the advent of residential developments in the peri-urban areas, all these plant species for medicinal use have become rare causing livelihood change.

Furthermore, the study revealed that urban sprawl had serious implications on the ecology. It was discovered that wetlands were filled up for the construction of buildings and this had effects on species which depended on the wetlands for survival. Another ecological footprints of the sprawl development that was found during the survey was loss of wildlife habitats, deforestation and climate change.

The study also identified how the ecological footprints of urban sprawl affected livelihoods. It was discovered that people were exposed to flooding, respiratory disorder, food insecurity, wild fires and landslides due to urban sprawl and served as threat to their lives and properties.

Additionally, the study discovered institutions and stakeholders that are responsible for protecting the ecology from the footprints of sprawl developments. They are Environmental Protection Agency, individual land owners and developers, Wildlife Societies and Local Government Authorities. It came to light that individuals were the main people that should be actively responsible for protecting the ecology. For instance, traditional authorities and real estate developers should not think of their personal gains from the land market since they play key roles in driving the land market but rather focus on ways to protect the ecology. The survey discovered that these institutions were ineffective in performing their roles to curb urban sprawl. These institutions were beset with political influence, inadequate personnel, corruption and inadequate logistics.

6.3 Conclusions

Per the findings of the study, it can be concluded that the peri-urban areas of GAMA are experiencing massive residential developments. Using remote sensing satellite imagery classification from 1986 to 2016, it is evident that residential developments in the peri urban areas of GAMA are enormous. The study has provided empirical evidence that demand for private ownership of houses and high prices of land in the city of Accra and activities of real estate developers leads to an outward movement of people to the peri-urban areas and a rippling effect on livelihoods sustainability.

Again, human settlement in the peri-urban areas has involved the rapid losses of farmlands, wetlands, wildlife habitats, vegetation and the resultant effect is climate change. The loss of farmlands as a result of residential developments are threat to food security in the future. There is also increasing roadside and home based businesses in areas where sprawling is massive.

Apart from its effects on people, there are other effects of urban sprawl on the ecology. This include loss of wetlands, wildlife habitats, biodiversity and climate change. The possible

aftermath of the ecological footprints of urban sprawl threatens lives and properties in the form of exposure to flooding, respiratory disorders, landslides and wildfires.

Finally, sustainable livelihoods involve activities that do not pose a threat to individuals. Urban sprawl is a threat to sustainable livelihood due to the uncontrolled or haphazard expansion of buildings, land conflicts, land degradation in the peri-urban areas causing land use change of the areas. There is, therefore the need for further research into the assessment of institutions responsible for curbing sprawl development and its effects on livelihood sustainability in the peri-urban areas.

6.4 Recommendations for Policy Consideration

On the basis of the findings, the following recommendations are highlighted for policy consideration:

6.4.1 Proper Planning Policies

It is recommended that institutions that are involved in land management in the country properly control and monitor the trends and devise comprehensive planning strategies to control the haphazard, unplanned and uncoordinated urban expansion into the peri-urban areas. City planners and Local Government Authorities such as Town and Country Planning Department should provide proper planning strategies to enhance the city's development. The Town and Country Department of GAMA is beset with numerous challenges and needs serious attention by the Government in order for them to deliver their activities in an efficient manner. To this effect, there should be enforcement of law and order in the planning for urban development and those who go contrary to the laws and regulations should be punished or made to pay fines to serve as a deterrent to others. Division of areas into zones also ensure proper urban planning and by this an orderly pattern of development can be achieved.

Areas such as agricultural lands, wildlife habitats, wetlands and open spaces such as parks should be properly zoned by the city to prevent people from encroaching them for other land uses such as for residential developments. Ecologically sensitive areas like the Sakumono Ramsar site which has been encroached per the findings of this survey needed to be protected from encroachers. Stakeholders and institutions should contribute their knowledge in terms of land management to ensure efficient management of lands.

6.4.2 Vertical Housing Developments

The national, regional and district level should make effective attempts to identify land use plans for urban land management. It was discovered from the survey that many residential developments in the inner cities of Accra were horizontally built and this housing style in the city and many parts of the country occupies large portions of land size with few residents.

As part of recommendations, high rise building in vertical form should be built in the inner cities for mixed uses thus for both residential and commercial use in order to accommodate large number of people. The government should intervene by building high rise buildings for people to rent in the inner cities of Accra or create enabling environment for the private sector to develop high rise building for both residential and commercial use in the inner cities for people to rent. Many people will now get enough land space to develop their homes when vertical housing developments style is adopted rather than horizontal housing developments which use lots of land space. This will reduce people moving to peri-urban areas to promote urban sprawl.

6.4.3 Affordable Housing

Residential developments in the inner cities of Accra should be made affordable to enable people to rent. It was discovered from the survey that there was housing shortage and high rentals of houses in the inner cities of Accra. Many people who cannot afford to rent houses in

the city centres tend to move to the peri-urban areas such as Dawhwenya, Amasaman and Oyarifa just to mention a few during the survey where lands are affordable to put their homes and with this continuous residential developments in the peri-urban areas the city begins to sprawl and has implications on livelihood sustainability. The government should intervene by paying much attention and directing resources in order to maintain the affordable housing projects for people to get the opportunity to rent apartments of their choice in the inner cities of Accra rather than moving to the peri-urban areas to encourage the sprawl of human settlement.

6.4.4 Infrastructural Development and Equitable Distribution of Resources

Many people migrate from other parts of the country to Accra to have access to services. Accra is the capital city of the country and has developed a lot of its infrastructure such as the National Theatre, good roads at the expense of other cities in the country. It was observed during the survey that infrastructural developments in the inner cities of Accra which motivated many people to relocate to Accra thereby creating congestion and overcrowding in the inner city. It is therefore recommended that, there should be infrastructural development in other parts of the country to reduce the movement of people to Accra which contributes to population growth and congestion in the inner city. Infrastructure development and equitable distribution of resources in other parts of the country will help reduce urban sprawl in the peri-urban areas of Accra.

6.4.5 Creation of Employment Opportunities

It was discovered from the survey that Accra was and still the hub of employment opportunities. It is also evident from the survey that many people migrate to Accra to seek greener pastures and in turn increase the number of people found in the city. For instance, Accra is noted to be the capital city of the country with several avenues for job opportunities for many people. Also many organizations have their headquarters in Accra and this creates lot of job opportunities for people who migrate to the city centres. It is recommended that creation of employment opportunities in other parts of the country will reduce the number of people who migrate to Accra to seek greener pastures. Urban sprawl will then reduce since people will not be motivated to migrate to Accra.

6.4.6 Development of Eco-city Model in Ghana

More importantly, it is recommended to develop eco-city model that can be used and practised by people in the city. Cities like Barcelona (Spain) and Umberite (Italy) have designed their cities in such a way that they are eco-friendly and this can be practised in cities of Ghana especially Accra where urban sprawl is massive. Per the findings of the survey, the inner cities of Accra have gradually transformed and gentrified into non-residential developments such as modern business houses than residential developments. These activities have created reduced space that should be eco-friendly. The eco-city model is designed in such a way that residential areas are mixed with green space, parks and gardens, trees of different species and must be complemented by water features like water fountain and small ponds. A well planned eco-city will provide aesthetic environment and protect the environment from climate change.

Urban sprawl creates avenue for the elimination of vegetation for the construction of residential buildings and this phenomenon is evident in the peri-urban areas of GAMA such as Afienya, Pokuase, Oyarifa and Dawhyenya as indicated by the findings of this research and this does not create eco-friendly cities.

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APPENDICES

Appendix 1: Questionnaire for a Study on Urban Sprawl And Its Impacts on Livelihoods in Peri-Urban Areas of Accra: a Case Study of Greater Accra Metropolitan Area.

This research is being carried out in partial fulfilment as part of MPhil degree at the Department of Geography and Resource Development, University of Ghana. Your support and co-operation is very much anticipated and confidentiality will be strictly observed.

Please tick or write where applicable. Thank you for your participation

NAME OF TOWN……..

NAME OF COMMUNITY…… QUESTIONNAIRE NUMBER……

SECTION A: BACKGROUND INFORMATION

1. Sex: A. Male B. Female
2. Age: ……..
3. Educational Level: A. No Formal Education B. Primary/Junior High C. Senior High/Vocational/Tech D. Tertiary E. Other, specify…….
4. What is your household Size? .....
5. What is your primary and secondary occupation? i. Primary occupation…… ii. Secondary occupation……..
6. What is your average monthly income (Ghana Cedi)? ……...

SECTION B: PATTERNS AND DRIVERS OF URBAN SPRAWL

7. Have you experienced any change in land use? A. Yes B. No
8. If yes, what change have you seen? A. Farmlands or sites have been converted to residential use B. Few people are into farming C. Loss of open spaces D. Deteriorating of infrastructure E. Other, specify……

9. For how long have you been in this community? ……

10. List in rank order three reasons why you moved to this community? On a scale of 1-3 with 1 being the highest.

	REASONS	RANKS
A	Accessibility	
B	Preference for serene environment	
C	Housing affordability	

11. What are the factors driving the land market?.....

12. Rank the institutions that drive urban sprawl in this community? On a scale of 1-5 with 1 being highest.

	INSTITUTIONS	RANKS
A	Traditional Leaders	
B	Real Estate Developers	
C	Financial Institutions	
D	Global Development Partners	
E	Non-Governmental Organization	

13. How effective are these institutions in driving the sprawl of human settlement?

A. Very Effective B. Effective C. Neutral D. Ineffective E. Very Ineffective

SECTION C: EFFECTS OF URBAN SPRAWL ON LIVELIHOODS SUSTAINABILITY

14. What was your source of livelihood before?.....

15. What is your source of livelihood now?.....

16. What was the general source of livelihood in this community before?.....

17. What is the source of livelihood in this community now?.....

18. List and rank three factors causing livelihood change in this community?

LISTS	RANKS

19. What are the effects of urban sprawl in this community? A. Traffic congestion B. Land disputes C. Unequal access to social amenities D. Loss of farmlands E. Other, specify…….s

20. How do you plan for your livelihood in the next ten years (Coping strategies)? ……

21. List and rank the categories of people impacted by urban sprawl in this community?

.SECTION D. ECOLOGICAL FOOTPRINTS OF URBAN SPRAWL

22. What are the effects of urban sprawl on the ecology?

    A. Loss of wetlands B. Loss of wildlife habitat C. Deforestation D. Climate change E. Other, specify…….

23. How has the ecological impact affected your livelihood?.....

24. What are some of the institutions involve in protecting the ecology from the impact of urban sprawl? A. Individuals B. Environmental Protection Agency C. Wildlife Societies D. Local Government Authorities

25. How effective are they? A. Very Effective B. Effective C. Neutral D. Ineffective E. Very Ineffective

THANK YOU

Appendix 2: Interview Guide: Real Estate Developer

This interview is part of the thesis topic namely "urban sprawl and its impact on livelihood sustainability in the peri-urban areas of Accra: A case study of Greater Accra Metropolitan Area" for the award of a Master's Degree in Geography and Resource Development. The objective of the study is to assess the impact of urban sprawl on livelihoods sustainability in the peri-urban areas of Accra.

Interview Guide: Real Estate Developer

1. What is the name of your Estate Development Company?
2. How many years have you been working as an estate developer?
3. Have you acquire lands in the peri-urban areas of Accra?
4. How many acres of lands do you normally acquire for estate development?
5. Do you think your activities are contributing to urban sprawl?
6. Does it have impact on livelihoods?
7. If yes, what are the measures taken to protect livelihoods affected by your activities?

THANK YOU

Appendix 3: Interview Guide: A Traditional Leader

This interview is part of the thesis topic namely "urban sprawl and its impact on livelihood sustainability in the peri-urban areas of Accra: A case study of Greater Accra Metropolitan Area" for the award of a Master's Degree in Geography and Resource Development. The objective of the study is to assess the impact of urban sprawl on livelihoods sustainability in the peri-urban areas of Accra.

Interview Guide: A Traditional Leader

1. For how long have you stayed in this town?
2. Have you seen any change in land use for the past 10 years?
3. What change have you observed?
4. How are lands acquired for farming and residential purposes?
5. Who are the custodians of the land?
6. Have you witnessed any form of cooperation or conflict as a result of the land market?
7. Do you think your activities account for the cooperation and conflict in the land market?
8. What are you doing to provide livelihood security for individuals impacted by urban sprawl?

THANK YOU

Appendix 4: Interview Guide: Environmental Protection Agency (Epa)

This interview is part of the thesis topic namely "urban sprawl and its impact on livelihood sustainability in the peri-urban areas of Accra: A case study of Greater Accra Metropolitan Area" for the award of a Master's Degree in Geography and Resource Development. The objective of the study is to assess the impact of urban sprawl on livelihoods sustainability in the peri-urban areas of Accra.

Interview Guide: Environmental Protection Agency (EPA)

Basic Information

i. Name of Respondent……

ii. Sex…….

iii. Rank of Respondent…….

1. How long have you been working here?
2. How do you rate this institution performance?
3. And why?
4. What are some of the responsibilities of this institution?
5. What is the role of EPA in controlling the impact of urban sprawl on the ecology?
6. Have you put institutional policies in place to protect the environment from the consequences of urban sprawl?
7. Do you think people who encroach on natural reserves should be sanctioned to serve as a deterrent to others?

THANK YOU

Appendix 5: Interview Guide: Town and Country Planning Department

This interview is part of the thesis topic namely "urban sprawl and its impact on livelihood sustainability in the peri-urban areas of Accra: A case study of Greater Accra Metropolitan Area" for the award of a Master's Degree in Geography and Resource Development. The objective of the study is to assess the impact of urban sprawl on livelihoods sustainability in the peri-urban areas of Accra.

Interview Guide: Town and Country Planning Department

Basic Information

i. Name of Respondent……

ii. Sex…….

iii. Rank of Respondent…….

1. How long have you been working here?
2. How do you rate your performance in this institution?
3. And why?
4. What are some of the responsibilities of this institution?
5. What is your view on land use change in GAMA?
6. As an institution, what are the roles you play that lead to urban sprawl?
7. What measures are being put in place to control urban sprawl?
8. What are some of the challenges that beset this institution?

THANK YOU

Appendix 6: Focus Group Discussion Guide

This interview is part of the thesis topic namely "urban sprawl and its impact on livelihood sustainability in the peri-urban areas of Accra: A case study of Greater Accra Metropolitan Area" for the award of a Master's Degree in Geography and Resource Development. The objective of the study is to assess the impact of urban sprawl on livelihoods sustainability in the peri-urban areas of Accra.

1. Background information of respondents
2. Historical background of the community
3. Views on the drivers of land use change
4. How have the change in land use affected your livelihoods?
5. Coping mechanisms to sustain livelihoods due to urban sprawl