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**URBAN EXPANSION AND ITS EFFECTS ON PERI URBAN  
AGRICULTURE IN THE WA MUNICIPALITY OF GHANA**



**ALFRED TOKU**

**2018**

**UNIVERSITY FOR DEVELOPMENT STUDIES, TAMALE**

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IN THE WA MUNICIPALITY OF GHANA**

**BY**

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UNIVERSITY FOR DEVELOPMENT STUDIES



**THIS THESIS IS SUBMITTED TO THE DEPARTMENT OF AFRICAN AND  
GENERAL STUDIES, FACULTY OF INTEGRATED DEVELOPMENT  
STUDIES,  
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OF  
THE REQUIREMENT FOR THE AWARD OF MASTER OF PHILOSOPHY  
DEGREE IN DEVELOPMENT STUDIES**

**MARCH, 2018**

## DECLARATION

I, Toku Alfred hereby declare that except for references to other people's work which has been duly acknowledged, this work is the result of my own research carried out in the Faculty of Integrated Development Studies, University for Development Studies.

Signature..... Date .....

NAME OF STUDENT: TOKU ALFRED

## SUPERVISOR'S DECLARATION

I hereby declare that; the preparation and presentation of this research project were supervised in accordance with the guidelines on supervision of dissertation laid down by the University for Development Studies.

Signature ..... Date .....

NAME OF SUPERVISOR: DR. EBENEZER OWUSU-SEKYERE



## ABSTRACT

From a small district capital in the early 1980s, Wa the capital of the Upper West Region has grown to the status of a municipality. The phenomenal urban growth and its accompanying expansion have had a profound effect on the peri-urban communities. These communities have had their livelihood activities negatively affected but the extent to which the urban expansion has affected agricultural output and peri urban farmers' coping strategies has not attracted much academic attention. The main objective of this study was to examine how the urban expansion of Wa has impacted peri-urban agricultural activities. The study used GIS (Landsat images) to trace the extent of urban growth from 2000 to 2016. Heads of 370 farming households were sampled through simple random sampling for questionnaire survey. This was supplemented with in-depth interviews with key stakeholders connected with land-use management in the municipality, focus group discussions, and (non-participant). The results show that since 2000, the extent of expansion has engulfed many of the peri-urban communities including Bamaho, Kpongu, and Kperisi. The results further indicated that farm sizes and crop output had drastically been reduced with mean differences of 7.988 and 13.225 respectively. Farmers have been forced to adopt alternative livelihood activities such as weaving of smock, sand weaning, and some formal sector jobs such as cleaners while others cope within agriculture by applying organic and inorganic fertilizers, tree cropping and crop rotation. The study concludes that if the current rate of expansion is not managed properly, it could have a dire effect on food security in the municipality in particular and the region in general. The study recommends that stakeholders should have collaborative management approaches on land decision-making and increase extension programs to assist peri urban farmers to address the challenges that come with urban expansion.



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## **DEDICATION**

This work is dedicated to the Most High God whose divine guidance and strength has made it possible for me to successfully complete this programme. To my dearly cherished parents and dear siblings and lecturers of UDS Wa Campus, I gracefully dedicate this thesis with all my love, and to all who have inspired and encouraged me.



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## GLOSSARY

|      |  |
|------|--|
| ALC  | Agricultural Land Conversion                           |
| AOI  | Area of Interest                                       |
| CBD  | Central Business Districts                             |
| EFP  | Exploratory Factor Analysis                            |
| EPA  | Environmental Protection Agency                        |
| FAO  | Food and Agriculture Organization                      |
| FGD  | Focus Group Discussion                                 |
| GIS  | Geographic Information System                          |
| GLSS | Ghana Living Standard Survey                           |
| GSS  | Ghana Statistical Service                              |
| KMO  | Kaser -Mayer Olkin                                     |
| OECD | Organization for Economic Co-Operation and Development |
| OLI  | Operational Land Imager                                |
| SHS  | Senior High School                                     |
| SPSS | Statistical Package for Social Scientist               |
| TM   | Thematic Imager  |
| UDS  | University for Development Studies                     |
| UN   | United Nation  |



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UNFPA

United Nation Population Fund

UN-HABITAT

United Nations Human Settlement Programme.

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## CHAPTER ONE

### INTRODUCTION

#### 1.1 Background of the Study

Intense and rapid urbanization is confronting all regions of the world, whether developing or developed, with new opportunities and threats (United Nation, 2011). Unlike countries in the Global core (developed north) where urbanization has engineered industrialization and employment generation (UN-Habitat, 2010), in Africa, the process is inextricably linked with myriad of challenges such as urban expansion (sprawl), environmental degradation, emergence of slums, poverty and conflict (Owusu and Kotey, 2010). Africa's urbanization has been described variously as 'parasitic urbanism, 'urbanization of poverty' and 'premature urbanization' (Ravallion et al., 2007; Kinver 2007; also see Obeng-Odoom 2009), this is partly due to the form, magnitude and its inherent peculiar characteristics.

As rightly captured by an OECD report, these parasitic urban centres are characterized by persistent social exclusion (primarily, an excessive number of people below a given standard in terms of income and other features of well-being) in specific places and unending urban biases (Jones, 2010), where the already struggling urban centres are depleting the resources in the fringes and also attracts the largest share of the country's investment. UN-Habitat predicts that by the year 2030, Africa will enter its urban age with 759.4 million people thus, half of its total population will be living in cities, and further projections are that by 2050 there will be more than 1.2 billion African city dwellers (UN-Habitat, 2008).





In the African region, sub-Saharan Africa is considered as the last global macro-region to experience the urbanization process, hence Jenkins et al., (2006) outlined that the major demographic ‘bulge’ experienced in sub-Saharan Africa will continue for decades. For instance, as at 2011, the 414 million Africans who lived in cities are expected to rise to 662 million by 2050 with the assumption that the urbanization trend will continue worldwide, Africa and its sub regions (UN- Habitat, 2010). This unprecedented urban population increase has been attributed to migration or birth as has happened in other world macro-regions (Jenkins, 2013).

However, the United Nations Population Division estimated that by 2030, each of the major regions of the developing world will hold more urban than rural dwellers and by 2050, two-thirds of their inhabitants are likely to live in urban areas (Montgomery, 2008). Urbanization however results in dramatic transformation of land uses. According to Mutuga, (2009), expansion of urban areas has been related to unplanned and haphazard city structure in a lot of cases which referred to as urban sprawl. Urban expansion is alarming, since more land is taken up by urban areas (build-up) which result in encroachment into agricultural land in peri urban areas.

Governments in the sub region have tried to respond to the urbanization challenges in five ways which Turok and Parnel, (2009) outline as: doing nothing about urbanization; reacting in piecemeal to the crisis as they emerge; promoting rural development to reduce urban-bound migration; implementing small-town development policies; and considering cities stable, healthy and resilient centers of economic growth that delivers services and combat environmental problems associated with rapid urban growth.



These observations and other contemporary institutional reforms that have not yielded the expected results means that governments on the African continent need to re-double their efforts if they are to maximize the national benefits of urbanization and mitigate the ills associated with the urbanization process.

Urbanization in Ghana is a very recent phenomenon. Ghana crossed the urbanization threshold in 2010 when 50% of the population was reported to be living in cities (GSS, 2012). Available data indicates that the downgrading of the urban centers is due to the ecological disruption, resource depletion, urban expansion into the city hinterlands and environmental health problems such as inadequate safe potable water, poor drainage facilities, inefficient waste management, pollution of water sources and ambient and indoor air pollution associated with the urbanization process. Other challenges include growth of insecurity in urban areas, inadequate affordable housing, increasing social exclusion, and traffic congestion, shrinkage of the formal economy and more importantly shrinkage of agriculture lands in peri-urban communities.



Whereas this situation is not different in Wa, it presents municipal authorities with with challenges of providing for urban and peri urban livelihoods, governance, social service, infrastructure development, poverty alleviation, minimizing environmental degradation and the exclusion of groups from urban society (Annez et al., 2010); UN-Habitat 2010). Agricultural activities in Peri-urban Wa has been affected in terms of output reduction and farm size losses due to increasing land use changes emanating from Wa's expansion which have had a severe effect on their farm sizes and output.

This is therefore looming because of increasing land commodification due to demands of land for accommodation facilities, retail shops, gas/fuel station, educational facilities and recreational parks among others which has come as a result of urban expansion of Wa. This therefore set the precedence of the study in Wa municipality of the upper west region of Ghana.

## 1.2 Problem Statement

Demographic trend in the Wa municipality epitomizes a fast growing and urbanizing city. With increasing population in Wa since 1970 which stood at 13,740, 1984 was at 36,067, 2000 was at 66, 644, 2010 was at 71051 and the estimated population in 2016 was at 79,097 (GSS, 2012; Wa Municipal, 2012). The Municipality now has a population of 135,638 with a growth rate of 2.7% and an urban growth rate of 4% (GSS, 2012; Wa Municipal, 2012). This has had effects on spatial transformations in Wa. Changes in peoples' decisions on where to live, firms' decisions on where to locate production and the economic composition of locations, alongside their spatial expansions are all part of these spatial transformations.

Such rapid spatial transformations influenced by urban expansion have negatively skewed land use changes in the peri-urban communities of Wa. Wa's urban expansion has been attributed to the establishment of some growth poles (University for Development Studies, Wa Polytechnic, Jahan College of Education) and many of such institutions which has triggered the expansion of the social, economic, and educational sector which have had profound effect on Wa's spatial transformations. Population growth, urbanization and urban expansion is becoming inevitable phenomenon and the emerging peri urban areas with dominant agricultural activity being affected by the



nature of urban expansion. Increasingly, changes in peri urban land use to infrastructural land use is causing a great negative impact on peri urban farmers who must adopt certain surviving mechanisms to enhance and sustain production. The key problem of urban expansion processes is the rapid conversion of large amount of prime agricultural land to non-agriculture land uses in the urban periphery (Lerise et al., 2004). This development could greatly affect crops that are grown for export and for local consumption.

Apart from the likelihood danger food crop farmers have with land space, there are suspected food insecurity due to rapid loss of farmlands to government development and private estate developers. Affected farmers would have to adjust their livelihood by adopting coping strategies within agriculture and shifting from agriculture to different ventures (other livelihood). Many studies on the impact of urban expansion in Wa, is related to poverty and environment (Amoah and Kosoe 2014; Peperah, 2014; Owusu-Sekyere et al., 2017) but these studies have often glossed over the effects of the urban expansion on agriculture in the peri-urban communities in the area of output reduction and the coping strategies farmers adopt.

Studies have revealed that indeed large tracts of hitherto agricultural land in peri-urban Wa are indiscriminately being converted to urban infrastructure especially housing Eledi and Kuusaana, (2014) which expelled majority of peri urban farmers further from farmlands and increasing farm cost. Recent urban expansion in Wa has altered land use patterns and livelihood option in the peri-urban communities. However, urban expansion is affecting peri-urban agriculture in terms of output reduction, farm size reduction, and the coping strategies farmers are adopting has not gained much attention as revealed by the literature. This study therefore focuses on this literature gap.



### **1.3 Research questions**

How are the urban expansion challenges in Wa unsettling peri urban agriculture (crop farming)?

#### **1.3.1 Specific Research questions**

- i. What is the nature and trend of urban expansion in Wa?
- ii. How does urban expansion affect peri urban agriculture (crop farming) Wa?
- iii. How are crop farmers in peri-urban Wa coping with the urban expansion effects in Wa?

#### **1.3.2 Research Objectives**

To examine how the urban expansion challenges in Wa is unsettling Peri urban agriculture (crop farming)

#### **1.3.3 Specific Research Objectives**

- i. To examine the nature and trend of urban expansion in Wa.
- ii. To examine the extent to which urban expansion in Wa affect Peri-Urban agriculture (crop farming).
- iii. To investigate the coping strategies adopted by peri-urban crop farmers in response to urban expansion in Wa

### **1.4 Scope of the study**

Geographically, the study was conducted in Municipal Wa in the Upper West Region of Ghana taking into consideration communities that has been affected by urban expansion from the inner-city development in the past decades. Five communities were



sampled including Bamahu, kpongu, Kperisi, Danko and Nakori. The study focused on the effects of urban expansion on Peri-Urban agricultural (crop farming activities) in Wa. It also concentrates on the nature and trend of urban expansion in Wa, the extent to which urban expansion in Wa affects peri-urban crop farming in the municipality whereas the last objective dealt with coping strategies peri-urban crop farmers adopts in response to urban expansion in the Municipality. The study takes into account urban expansion in Wa from 2000 to 2016. Hence the through spatial changes and it effect on peri urban agriculture was addressed.

### **1.5 Significant of the study**

It is very essential for this research to be conducted, though several studies have been done on the impact of urban growth on peri urban agriculture worldwide and nationwide, most of them point out how farm lands are dwindling. This study seeks to identify all the major peri urban areas of Wa as a result of urban expansion and further examine the coping strategies farmers adopt to enhance and sustain peri urban agriculture in Wa. Peri urban crop farming in Wa has accounted for positive social, environmental and cultural effects which all have implications on society especially in the areas of food, income and employment. It is expected that findings of this study will become a working document for addressing issues of urban expansion, examine challenges it poses to peri urban agriculture and how farmers are dealing with the situation to increase output. Also, the study will help authorities like the Town and Country Planning Department to plan and avoid problems related to sprawl or urban expansion which has become an inescapable social phenomenon in societies today because it is constantly putting pressure on peri urban agricultural land use.



The study will also serve a useful document which will assist Traditional Authorities in these Peri urban areas to effectively manage their lands and other facilities to the advantage of themselves, their respective communities and the population trooping in as well. The study is also intended to help Non-Governmental Organisations who may want to invest in the township particularly with those who may want to increase the living standards of people in and around the township through agriculture with Trias, Literacy Bridge for example as to the nature of urban expansion in Wa, how it is affecting agriculture, and impotency of the peri urban farmer to bargain for land. The study too will help guide policy makers to make informed and appropriate policies on the management of peri urban lands and to encourage peri urban agriculture in a way by maintaining the green environment around the fast urbanizing cities which can help maintain ecosystem balance. On the side of the researcher, the research enlightened him on the nature of urban expansion, peri urban crop farming challenges and the coping strategies crop farmers adopt.



## **1.6 Organization of the study**

The First Chapter of the study looks at the background information and the statement of the problem. It examines the nature, causes, effect and the extent of the problem. The chapter outlines the questions the study pursues to answer and the objectives to be achieved, the rationalization for doing the study and the scope of the study. The Second Chapter reviews literature about the subject from various sources. The literature review looks on the issues of urbanization, urban expansion, peri urbanization and coping strategies crop farmers adopt in peri urban Wa. Its further comes out with a conceptual framework that seeks to explain how cities have expanded due to some natural and anthropogenic causes and the coping mechanisms farmers are adopting.

Chapter Three of the study gives a profile of Wa Municipality as well the Five (5) peri-urban communities involved in the study. It further spells out the methodology used for the study including research design, sample size determination, sampling techniques, ethical considerations, data sources and means of analysis and presentation. Analysis of data collected from the field is presented in Chapter Four using Spatial images, and other graphical presentations including graphs and charts. Data analysis included growth patterns, nature of land use changes, changing land use pattern in peri urban Wa, crop farmers coping mechanisms to enhanced production. The final Chapter seeks to bring out the major findings from the study, give some recommendations and then draw a conclusion.





## CHAPTER TWO

### LITERATURE REVIEW AND CONCEPTUAL ISSUES

#### 2.1 Introduction

This section of the thesis broadly aims at reviewing literature on urbanization, urban expansion and impacts on peri urban agriculture. It is categorised into themes which gives insight on the different concepts of urbanization, theories and how peri urban agriculture (crop farming) as a livelihood strategy is affected by such anthropogenic phenomenon. The issue of food security as an on-going developmental agenda in most urban and peri urban environments is relevant to the discourse under consideration. A review of key concept and theories will provide the framework for the study. Consequently, major notion on peri urbanization, peri urban agriculture, relationships between urbanization, urban expansion, peri urban agriculture and development as well as food security and the coping strategies to mitigate the challenges on peri urban agriculture by urban expansion. These themes shall be discussed from the general idea of peri urban agriculture to it specific meaning and focus as well as the challenges peri urban crop farmers face and the coping strategies they adopt.

The concept of peri urban agriculture is also explored since it role is instrumental in terms of income generation through employment to the rich and poor in and around the city of Wa. There shall be a thorough review of empirical working areas mentioned above and to situate it to the knowledge this thesis will be inputting in the academic society. Therefore, the aim of this literature review is to examine the complexity of the theoretical discussion on concepts and models of peri urban agriculture and how



urbanization and urban expansion impacts on it and the coping strategies Peri-Urban farmers adopt to sustain production.

## 2.2 Conceptual Issues

### 2.2.1 Peri Urban Concepts

The term ‘peri-urban’ has been used to define ‘a place, concept or processes (Narain and Nischal 2007). As a place, it refers to the movement of goods and services between physical spaces and to the transition from rural to urban contexts as a process and finally, as a concept, it refers to an interface between rural and urban activities, institutions and perspectives. The concepts originally coined to describe the rural-urban interface in Europe. Davis, (2005) explained peri-urban as a place of dependency and colonization; power stations and waste landfills, farming and vacant lands and are the service zones of low income housing for workers and dependents or public housing in ‘peripheral estates’ but has often been disturbed by urban growth which usher changes in land uses.

Ravetz et al. (2013) indicated that Peri-urban is not just a fringe in-between city and countryside, but a zone of transition, and a new kind of multi-functional territory for the growing urban population. Such zones are considered as transitional between urban and rural areas, the habitat of a diversity of populations, the heterogeneity of land uses, the morphological conditions and densities of built-up areas, Hence the complex functional relations and the changing social structure are some of the characteristics of the peri-urban area (Allen, 2001; Tacoli, 2001).



The transformation process decreases the arable areas Zeng et al. (2005), Pam, (2005) also indicated that, expanding cities affect the surroundings by altering the natural resource base, converting land to new uses. Very much prevailing in Ghana, peri-urban areas usually exist when residents move for land outside the city for residential or commercial purposes (Appiah et al., 2014). Though the boundaries between urban and the countryside or fringes areas are getting blurred (Jones and Visaria, 1997). there is an inherent dynamic in the peri-urban interface, emphasizing that as cities expand the surrounding peri urban areas also grow hence often becoming a zone of disordered growth which impact critically on peri urban crop farming (Pam, 2005; Ravetz et al., 2013).

### **2.2.2 Conceptualizing Urbanization**

The word urban was derived from the Latin word urbanus meaning characteristic of, or pertaining to, the city (Macionis and Parrillo, 2007). Urban interpretation should always be done with measurement of urban growth which rests on a definition of urban area which is not standardized throughout the world and differs even within the same country depending upon the nature of local prerogatives and how they might have changed with time. There is no universally accepted definition for an urban dweller but many countries use data, administrative considerations to label people as urban dwellers (Addo-Fordwuor, 2014). Hence, Thomas, (2008) defined urbanization as the growth in the proportion of a country's population living in urban areas taking advantages of their environment in the urban and Peri urban areas.

Though, such features differ from country to country and city, to city Muggah (2012) noted that most states apply core set of variables in their definition which often includes a demographic threshold and an index of urban functions which are typically linked to



the absence of agricultural land and rural employment. Tamakloe (1997) opines that United States of America and Kenya, settlements with population of 2500 and above are considered urban. Depending on all of these criteria, then, countries can be described as either majority urban or rural (Muggah, 2012).

As at 2010, the share of Ghana's total urban population was at 50.9% (GSS, 2012). Yeboah et al. (2013) explained that the current definition of urban in Ghana is problematic for two reasons because it dates back to the 1960 and today, the country's population is four times as large and many localities with about 5,000 inhabitants still exhibit agricultural functions. Urban is a place based on characteristic that incorporates elements of human settlement with high population density, social and economic organization such built environment (Addo-Fordwuor, 2014). Urban areas are created through urbanization and are categorized by urban morphology as cities, towns, conurbations or suburb and hence is a spatial concentration of people whose lives are organized around non-agricultural and agricultural activities which increases with technology with urban-rural divide becoming very elusive.

The world is turning into a giant urban area which is assumed to be providing much livelihood opportunities (Safavi, 2012) but it challenge is particularly acute over the last two decades, where the global proportion of urban population has been rising rapidly (United Nations, 2014). Despite the benefits gotten from urbanization, Adjei (2014) notes that urbanization remain a single prime factor that is always associated with the destruction of urban green spaces and affects peri urban crop farming. For instance, urbanization which is synonymous to urban expansion involves both horizontal and vertical expansion of the physical structure of urban areas through



increasing population Growth leading to the loss of arable land, natural beauties, range lands, parks and sceneries. Satterthwaite et al., (2010) indicated that demographic studies define urbanization as increasing share of a nation's or a region's population living in urban areas and a declining share living in rural areas.

Factors such as; rural to urban migration, natural increase, and reclassification are major causes of urbanization in literature (Satterthwaite et al., 2010). Potts (2009) also believes that countries experiencing minimal economic growth tend to have very high rates of natural increase in their populations which is predominantly in most developing regions presenting different trend of urbanization likened to Europe and North America and China currently. Urbanization is therefore emerging as a colossal trait to humanity, government of Ghana in 2012 adopted the urban policy to address the increasing urbanization trend and its impact on development. The policy identifies the significance of urbanization for social and economic progress but the issue of hazards associated with disorganized, uncontrolled and uncoordinated urbanization, urban growth and development which further spread to the peripheries and affect livelihood activities such as agriculture was not properly assessed (MLGRD, 2012).

One key challenge to urbanization process in Ghana is the rapid conversion of large amount of prime agricultural land to urban land use (mainly residential construction), mostly in the urban periphery thereby causing Peri-urban land prices to escalate (Gantsho, 2008). Zana et al. (2013) specified that urbanization is necessary but not to the extent of denying the rural folks of their main source of livelihood, being agriculture. Rapid growth at the peri-urban fringe has resulted in increased commercial development along arterial roads connecting cities and the countryside (Sullivan and Lovell, 2007). This pattern is as a result of the largely urban skewed population policies



and programs which have initiated the existing gap in livelihood opportunities and further affecting the productivity of some peri urban farmers. Lerise et al. (2004), pointed out that, rapid urbanization, population pressure, shelter, infrastructural, industrial and commercial needs of fast growing cities have stretched the land delivery system to its limit, and Peprah (2014), confirmed that it has adversely affected development efforts in many cities in Ghana leading to severe land grabbing and agricultural land conversion. It has attracted developmental relative's, investment strategies while some policies turn to become pull factors that aids urban expansion which influences peri-urban land use changes and reduces agricultural productivity with the likely coping strategy being employed by crop farmers to enhance and sustain production.

### **2.2.3 Trends of Africa's Urbanization**

Though urban dwellers have dramatically increased, the degree of urbanization vary significantly across geographical regions and countries (Adomako, 2013). Africa has the lowest level of urbanization, approximately 39% in 2007, compared to Asia (48%), Europe (72%), in Latin America 78%, and 81% in North America. However, the rate of urbanization in Africa since 1950 is the highest among all the continents in the world (Osumanu et al., 2015). Urbanization in Africa is expected to double between 2000 and 2030 UNFPA, (2007) while the projected of over 50% of Africans to live in urban areas by the year 2030 has passed (United Nations, 2008). Whereas developed countries urbanization is associated with economic development, the situation is different in developing countries. Urbanization in Africa is influenced by demographic factors which drive urbanization process with its driving forces in Africa today as rural-urban



migration, redevelopment of cities and natural increase within towns and cities (Thu, 2010).

Urban expansion as a product of urbanization has extensive consequences on the natural environment as well as the livelihoods of people living in peripheries of urban centers (Abera and King, 2005). Urbanization in Africa for this reason is not driven by radical transformations of agricultural land use to industrial and residential uses as witnessed in the developed countries in the past and made Songore (2003) to described Africa 's urbanization as demographic rather than economic hence population spread subject land to use changes (Adomako, 2013). Therefore, the rapidly deteriorating physical and living environment is associated with many African cities (Olujimi, 2009), and approximately 13% of the urban population in developing countries lives in sub-Saharan Africa but the sub-region hosts greater urban concentration which is detrimental to peri-urban agricultural development and threaten food security (Osumanu et al., 2015).



#### **2.2.4 Urbanization in Ghana**

With an annual growth rate of about 2.5%, the population of Ghana is constantly on the surge and eventually increasing the trends of urbanization in the country as shown in the Table 2.1. Less than 10% of the total population lived in towns and cities by 1921 and this value increased drastically to more than 51% in 2010 with traces of increasing in the next census. However, the concentration is dominating in some regions such as Greater Accra, the coastal belt, Ashanti in the middle belt, Northern and the Western region of Ghana with current taking place in the rest of the regions in Ghana such Wa. Though Wa was previously not recognizing as an urban canter but on the verge taking

over from some dominant urban centres in Ghana due to increasing number of growth poles. Consistent with observed trends in other parts of Africa, Ghana 's population is becoming increasingly urbanized and has pass 50% in recent times which has refuted the observation of Naab et al. (2013) that half of Ghanaians would live in urban settlements by the year 2020.

**Table 2.1: Trend of urbanization in Ghana**

| Year | Total population | Percentage urbanized | Urban population | Number of Urban settlements |
|------|------------------|----------------------|------------------|-----------------------------|
| 1921 | 2,298,000        | 7.8                  | 179,244          | -                           |
| 1931 | 3,163,000        | 9.4                  | 297,322          | -                           |
| 1948 | 4,118,000        | 12.9                 | 570,597          | 41                          |
| 1960 | 6,727,000        | 23.1                 | 1,551,174        | 98                          |
| 1970 | 8,559,000        | 28.9                 | 2,472,456        | 135                         |
| 1984 | 12,296,000       | 32.0                 | 3,938,614        | 203                         |
| 2000 | 18,912,000       | 43.8                 | 8,278,636        | 364                         |
| 2007 | 23,000,000       | 49.0                 | 11,270,000       | 492                         |
| 2010 | 24,658,823       | 51.0                 | 12,542,229       | 636                         |

**Source: Ghana Statistical Service, (2010)**





### 2.2.5 The Concept of Peri Urbanization

Particularly in Africa, the current pervasive peri-urbanization results from unprecedented informal urbanization accompanied with poverty, land use changes and livelihood diversification (Kombe, 2005), and out migration of urban residents to escape from urban policy harassment which trigger peri urban agricultural reduction (Lupala, 2002). Ravetz et al., (2013) refer peri-urban as “something” between, neither urban nor rural. Peri-urban’ and peri-urbanization generally has loose definitions often described as newly urbanized zones at the fringes of cities or countryside, especially in developing regions, which are described as ‘peri-urban interface’ (McGregor et al., 2006).

European perspective conceptualizes as mixed areas under urban influence but with a rural morphology (Caruso 2001) while Bertrand (2007) viewed peri-urban area as a transition zone moving from strictly rural to completely urban relating to a high pressure of population growth and urban expansion which is far from temporary, but instead can form a new kind of permanent landscape which influence the livelihood practices which outbid the dominant one which is agriculture. Peri-urbanization is a form of urbanization that gradually incorporates peri-urban zones into the city Mugisha and Nyandwi (2015). Visible expansion in Ghana due to increasing population growth is a major concern for future land use as it accelerates depletion of land for other uses justifying peri urbanization in most urban areas of Ghana with urban growth having extensively consequences on the natural environment and livelihoods at the peripheries of urban centers (Aberra and King, 2005).



Development is often marked by the emergence of urban activities such as; hobby farms and second homes, open spaces for recreation that transform lifestyles and social focus to urban but crop farmer's bare greater consequences (Caruso, 2001). The study dwells on peri-urbanization, according to Owusu (2008), as an outward expansion of cities into peri-urban areas or fringes which changes land use patterns basically against agricultural land use in most developing regions. Though Danese et al. (2007) described Peri-urbanization as the process within the phenomenon of urban sprawl that has spatial consequences of threatening sustainable use of space around the urban areas of many cities with such conversion occurring to the physical, economic, and social terms often in haphazard manner, as observed by Chirisa (2010) that the natural physical environment suffers greatly from the peopling of the peri-urban areas.

Ex-urbs or commuter town or bedroom community (towns) in literature is found in a different manifestation in peri urban regions of the world (Zasada et al., 2010). Currently, it is ongoing in Ghana leading to an expansion in physical terms with housing densification, functional relationships and creating an area of urban influence. One another widely used concept describing peri urban environmental dynamics is "counter urbanization" which is an opposite trend to urbanization where people migrate from the city to the countryside as was evidenced in 1970s in the United States and Western Europe when there was an inner-city deprivation and overcrowding. The concept is common in most urban fields in Ghana with variety of places developed and branded by a mixture of urban and rural features which then suggest a similar style of Ex-urbs.



### **2.2.6 Similarities and Distinction of Urbanization and Urban Growth**

Urban growth is multifaceted, and the main cause of urban expansion is population pressure, Berhanu (2005) argues among other factors that population pressure causes horizontal expansion of African cities. The horizontal expansion of cities is at the expense of prime agricultural lands and productivity which is the main livelihood activity in peri urban communities for survival. Urbanization and urban growth are considered as a modern the world touched a spiralling point in 2008, for the first time in history that more than half of its human population, 3.3 billion people live in urban areas (UN Habitat, 2010). While cities command an increasingly dominant role in the global economy as canters of both production and consumption, rapid urban growth throughout the developing world is seriously outstripping the capacity of most cities to provide adequate services for their citizens hence most urban build up is expected to submerge most fringes and affect farm lands and transforming them into urban infrastructural grounds which affect household consumption and inequality as (Cohen, 2005).



This major implication in land use pattern and socio-economic aspects in peri urban affected farmers mostly adopt some coping mechanisms to sustain and enhance production at the fringes. Urbanization and urban growth are powerful social and physical transformational forces throughout the world and has become the major driving force for settlement change in the periphery or fringe areas. Whiles rapid population increase, urbanization and changing in socio-economic pattern are deriving forces that influenced spatial change in peri-urban areas. African population growth is astonishing, though the concept of urbanization and way of life manifesting economic growth and development but initiates a number of socio-economic problems (Tegegne,

2002). In addition, though the economic effects of urban growth have positive effects for the majority of urban dwellers, serious negative effects would occur for a much of the peri urban poor farmers (Nebiyu, 2000).

In many ways, urban growth is a spontaneous phenomenon that leads to spontaneous growth displacing neighbouring rural farming communities Tegegne (2002), planned displacement has its own effect on the livelihood of the displaced farmers hence they are now focusing on adaptation strategies to sustain and enhance production. Wa town is one of the fast-growing urban centres in Ghana though the region records the least urban population. This ongoing urbanization and growth captures the views of peripheral farmers who forced to leave their land and property because they are outbided by other land users in the municipality; hence, the expansion of the town becoming irregular, fast and creation of displacement of farming communities.

### **2.2.7 Urban Growth and Urbanization Nexus**

From as low as about 9 percent in since 1921, the proportion of the total population urbanized almost triplicated to reach 23 percent in 1960, and more than doubled to reach 49 percent in 2007 Ghana Statistical Service (2007) with Current proportion of the population living in urban areas in Ghana fluctuating around 50%, 50.9%, 50.95% and 51% (GSS, 2012). As landscapes urbanize aided by increasing population, density, built environments and human activities, it associated risk tend to increase land use changes in most peri urban regions as land uses are influenced by interest and location (Nowak and Walton, 2015). A global remote monitoring study found that there are four main types of urban growth: low-growth cities with modest rates of infilling; high-growth cities with rapid, fragmented development; expansive-growth cities with extensive



dispersion at low population densities (North American); and ‘frantic-growth’ cities with very high land conversion rates and population densities (Schneider and Woodcock, 2008).

Each of these types had different spatial patterns, whether dispersed or constrained and scattered or contiguous development with frantic growth types manifesting more in the study area. A fifth type, negative growth more commonly referred to as shrinking cities where urbanization was without growth and in most developed regions Skyscrapers catered for such growth. Literature point out that urban growth is synonymous to sprawl. Increasing residential estates at the fringes developed by government and private sector for their workers or by property developers for sale is linked to the ongoing urbanization in some major cities in Ghana, (Ghana Statistical Service, 2010).

Urban population growth results in increased population densities within established urban areas and outward thrust of urban agglomerations Mandere et al., (2010) and evidenced in many cities in Ghana such as Accra, Kumasi, Koforidua, Tamale Wa (Dabie 2015). In the words of (Peprah, 2014), it was evident that urban sprawl has caught up with the Wa Municipality and noted that the sustainability of livelihoods that depend on agricultural lands has become threatened by urban sprawl. This has often led to its impact on the agricultural lands and motivates the farmers to adopt some coping strategies to sustain and enhanced crop production.

### **2.2.8 Drivers of Urban Growth**

Although urban population growth is a global phenomenon, reliable data show that the bulk of urban expansion and associated land-cover change is concentrated in few



regions. It is estimated globally that about 5.87 million km<sup>2</sup> of land have a positive probability (>0%) of being converted to urban areas by 2030, and 20% of this (1.2 million km<sup>2</sup>) have high probabilities (>75%) of urban growth (Seto et Al., 2012). Urbanization and development are some factors which governed urban expansion in most regions in the world though they are subjected to time and changes (Xiao et al., 2006). The growth of cities physically, through the frontiers of urban, peri-urban and the country side is distorting and merging to presenting opportunities for beneficial relationships which in simple terms, peri-urban change is a direct result of urban expansion and the peri urban area spreading outwards into the countryside or rural areas (Kaur, 1995).

Population and economic growth mostly result in demand for housing and commercial areas outside the central business district that may create subsequent sector and call for other supportive infrastructures which may affect the already land uses at the fringe. The location of housing is then determined by transport accessibility, employment and services and in part by the attractiveness of the environment and land values at the center and the fringes respectively. Transport and communications, re-urbanization are the other key factors that drives. Urban built structures and infrastructure are the components of the physical urban system itself and has affected agricultural land use due to policy constraints to growth of most developing urban areas (Loibl and Bell, 2011).



## 2.3 Urban Sprawl, Land Cover Changes and Agricultural Land Conversion

### 2.3.1 The Concept “Urban Sprawl”

Urbanization results in dramatic transformation of land use which motivated Mutuga (2009) to explain it as the expansion of urban areas which is unplanned and haphazard thus, a phenomenon referred to as urban sprawl. Urban sprawl characterizes most African cities, though the definition of sprawl is not straightforward (Barnes et al., 2000) it is alarming, since more land is taken up by urban areas through growth or expansion which may result in encroachment into agricultural land at the fringes. The concept was expounded as an unwarranted spatial growth of cities which indicates physical outward expansion characterized by low densities, separated land uses, noise free environment and affected agricultural land use and urban greenery greatly (Dabie, 2015). However, with some common manifestations, Hasse and Lathrop (2003) suggested that sprawl affects cities or towns in developed and developing nations that exhibit strong growth and expansion of their population.

The term urban sprawl is highly politicized, and almost always has negative connotations. It is criticized for causing environmental degradation and intensifying segregation and undermining the vitality of existing urban areas and attacked on aesthetic grounds. Due to the pejorative meaning of the term, few openly support urban sprawl as such. The term has become a rallying cry for managing urban growth hence the discussions on sprawl is much disturbing and uneasy. Johnson (2001) presented many definitions but there was no mutual agreement over the definition of sprawl which makes the concept much relative. Nanda (2005) indicated that, “any area which exceeds its administrative boundary and grows outward without any check assisted by population growth, is considered to be a sprawl”. Less vociferous descriptions include “the



scattering of urban settlement over the rural landscape” (Harvey and Clark 1971), “low-density urbanization” (Pendall 1999), and “discontinuous development” (Weitz and Moore, 1998). The area of urban sprawl is characterized by a situation where urban development adversely interferes with urban environment which is neither an acceptable urban situation nor suitable for an agricultural rural environment (Rahman, 2008).

Sudhira and Ramachandra (2005) challenged the conceptualization of urban sprawl as indicated by Galster et al. (2001) and argue that ascribing sprawl as a pattern of land use alone does not emphasize the underlying processes, causes and consequences, because some developing countries like Ghana, has population densities higher with significant urbanization rates with urban sprawl conceptualizing to be focusing on processes, causes and their consequences (Sudhira and Ramachandra, 2005). Further, an altered definition of urban sprawl included the pattern of outgrowth emergent during the process of urban spatial expansion over time. As most cities are improperly planned, urban sprawl adds to environmental degradation UN-HABITAT, (2010) and encourages new developments in many places that cause significant loss of prime farmland and the farmers coping strategies becomes beneficial to research about because of increasing food insecurity.

This confirms Atu et al. (2013) that urban sprawl involves the conversion of open space, wetland, semi-natural and natural vegetation and agricultural land into built up and Wolman et al. (2005) posited that urban centres grow and develop either as planned, semi-planned or unplanned hence urban sprawl occurs as land resources are consumed to accommodate new urbanization. New terminology for urban sprawl was introduced Wolman et al. (2005) as Extended Urban Area (EUA) thus the census-defined





urbanized area plus the new urbanized area and further indicated urban sprawl as one of the most challenging threats to agriculture in the world today as it fast track the extension of growth unto Peri urban agricultural lands and causes the movement of farmers to the hinterlands while left has to employ some coping strategies to survive the pressure emanating from sprawl. Rapid industrialization causes haphazard and unplanned growth of urban centers has become more complicated because it takes place within built up areas.

Tontoh (2011) indicated that where pressure continuous to mount on the growing population to diversify their livelihood opportunities non-formal small-scale industries begins to take shapes at the center and further expand to the peri urban regions which aids changing land uses that affect Peri urban crop farming. The situation forces the middle class as well as property developers to also move to outward lying suburbs (Vinay, 2000). Population growth, economic proximity to resources and basic amenities identified as the major causes of sprawl has necessitated land use conflict (Peprah, 2014), through constant encroachment on agricultural lands at the periphery, livelihoods that depend on agricultural lands becomes vulnerable by sprawl. As the built-up area reduces farmland, sand winners scoop the surface soil and farmers are pushed to use marginal lands which may increase their production cost and those who will stay on the shrink land employ coping strategies to improve crop production.

A study in Calabar, by Atu et al. (2013), indicated that between 2002 and 2012 there has been outgrowth of Greenfield residences on the urban periphery developed by the government, and the private sector for their workers or by property developers for rent or sale. Nwafor (2006) clearly explained that, the expansions into peripheral agricultural lands reduce the spatial extent of agricultural land and fragment them to



reduced farmer's yields. Increase in residential estates currently at the periphery by government and private sector for their workers or by property developers for sale is another dimensional factor that have increased land conversion and reduces yield. Land for sprawl is often taken from fertile agricultural lands, which are often located at the immediate surroundings of many cities; the extent of modern sprawl has consumed a large amount of most productive agricultural land (Hasse et al., 2003).

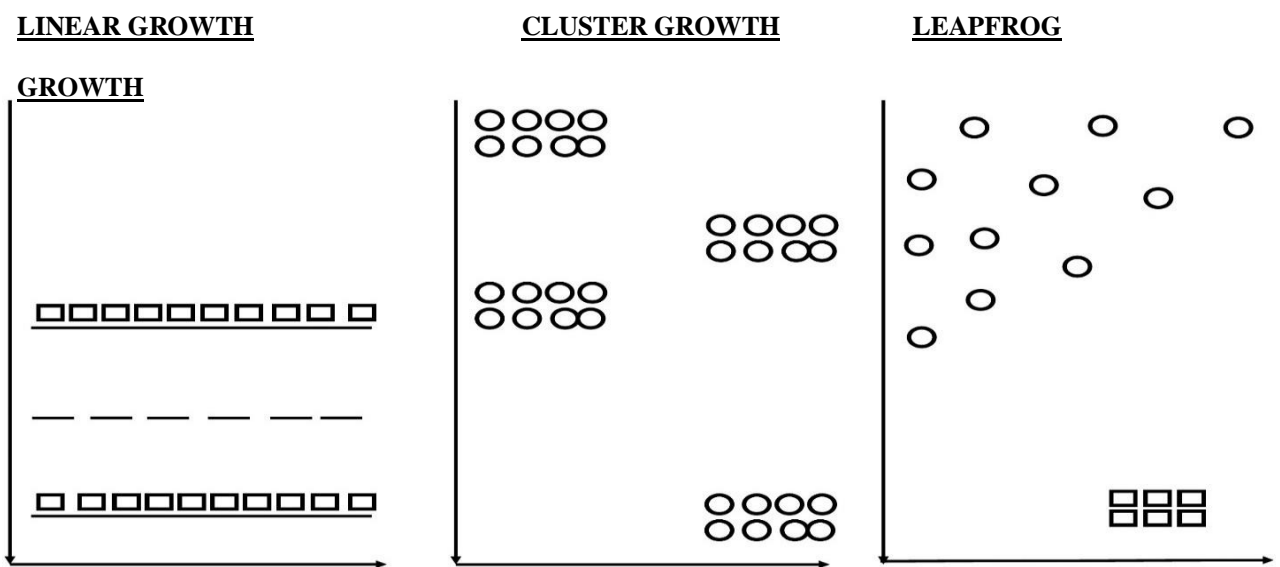
It is evident that urban sprawl has caught up with the Wa Municipality (Peprah 2014). The municipality's urban sprawl has increased by 34 percent between 1986 and 2011 resulting in 47 percent increase in bare land and 10 percent reduction in vegetation cover (Aduah and Aabeyir, 2012). This is due to the fact that the population of Wa has increased from 98,675 in 2000 to 127,284 in 2012 (Ghana Statistical Service, 2012; Wa Municipal Assembly, 2012). Urban sprawl, agriculture land conversion and agriculture productivity are strongly correlated (Dabie 2015), hence Peprah (2014) quoted that, "the sustainability of livelihoods that depend on agricultural lands has become threatened by urban sprawl" with the following reasons; as the built-up area increases, it reduces farmland, sand winners scoop the surface soil and farmers are pushed to use marginal lands which exacerbate the cost of farmers in production". This is partly due to increasing population, spreading commercial activities and their strategic location as indicated by Zana et al. (2013). Therefore, uncontrolled momentum of urban sprawl and land use change raises many issues (Brook and Davila 2000) which might have both positive and negative impacts in natural, social, and economic aspect of the environment.



### 2.3.2 Spatial Forms of Sprawl

Sprawl development is made up of three basic spatial forms; these are as follows: ribbon sprawl or linear growth, low-density continuous sprawl or cluster growth and Leapfrog development (Harvey and Clark, 1971). Ribbon sprawl or strip commercial development along highways is development that follows major transportation arteries outward from urban cores. Lands adjacent to corridors are developed, but those without direct access remain in rural uses/covers.

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**Figure 2.1: Diagrammatic Representation of the Forms of Sprawl**

**Source: Adopted from Tontoh (2011).**

Over time, these nearby “raw” lands may be converted to urban uses as land values increase and infrastructure is extended perpendicularly from the major roads and lines. Low-density continuous sprawl is the highly consumptive use of land for urban purposes along the margins of existing metropolitan areas.

This type of sprawl is supported by fragmentary extensions of basic urban infrastructure and social amenities such as water, sewer, power, and roads. Leapfrog development sprawl is a discontinuous pattern of urbanization, with patches of developed lands that are widely separated from each other and from the boundaries, albeit blurred in some cases, of recognized urbanized areas. This form of development incurs high expenditure to provide total urban services at the time of development (Harvey and Clark, 1971). However, the form may be, Sprawl has been criticized for eliminating agricultural lands, spoiling water quality and causing air pollution which affect agricultural productivity (Allen et al., 2003). As population increases, so does the need for new housing, schools, and transportation networks.

### **2.3.3 Distinction between Urban Growth (Land Use Expansion) and Sprawl**

Urban growth is often confused with urban sprawl. However, there is a distinction between urban growth and urban sprawl. Cities often experience growth either physically by infrastructure, by population growth, or by a combination of both. Urban sprawl is much more complicated because it may or may not qualify as urban growth.

How city grows can create the appearance of sprawl. Such urban growth may appear as a low-density leapfrog pattern, a linear or strip development pattern along highways, or a tightly condensed pattern of new development around pre-existing built-up landscapes (Nechyba et al., 2004). Urban sprawl occurs as land resources are consumed to accommodate new urbanization initiated by population through migration (Wolman et al., 2005). Urban centers grow and develop to the new areas either as planned, semi-planned or unplanned and exert pressure on land hence expansion of housing and other infrastructure (Pepreh, 2014).



Although, Sprawl has been well researched, Wolman et al. (2005) delimit areas affected by sprawl by measuring density, concentration, centrality, nuclearity and proximity, for instance Shalaby, (2012) combined remotely sensed satellite images and digital soil maps to assess consequences produced by urban encroachment on agricultural lands in Egypt whiles Hasse and Lathrop,(2003) adopted existing digital maps and studied urban sprawl against five land resource indicators: density of new urbanization, loss of prime farmland, loss of natural wetlands, loss of core forest habitat and increase in impervious surface. Taubenbock et al., (2009) also used remote sensing, landscape metrics and gradient analysis to trace trajectories of urban footprint of Cairo since 1972 to 2008.

Without urban growth, there would be no appearance of urban sprawl. Urban growth may have more of a planned appearance, while the pattern of sprawl often appears awkward, uncontrolled and haphazard. However, there is an ongoing conflict between urban growth and agricultural land protection, because urban growth is inevitably at the expense of clearing surrounding fertile farmlands, which were once fundamental for agricultural activities (Shiqiang et al., 2013). Cotula (2007) explained that many field studies from peri-urban areas have shown that customary land tenure is becoming increasingly individualized, informal land markets are growing, land values soaring and disputes increasing as a result of continuous growth and sprawl. Hence Aduah and Aabeyir, (2012) outline that, urban sprawl in Wa has increased by 34% between 1986 and 2011 resulting in 47% increase in bare land and 10% reduction in vegetation cover with increasing encroachment through urban growth of the region.



### 2.3.4 Peri Urban Land Cover

Human encouraged earth surface modification has the pace, magnitude and spatial reach of direct and indirect alterations of the Earth 's land surface in recent decades are exceptional as land use and land cover alteration are the most important effectors and outcomes of such anthropogenic causes (UN-Habitat, 2014). Urban landscapes are proportionally the fastest emerging land cover type resulting from the recent above 50 percent of the world 's population living in towns and cities for the first-time which influences peri urban land use pattern. Arable lands and green spaces constitute a major environmental resource of landscape worldwide, nonetheless Africa urban green spaces are depleting at an alarming rate which is now occupying small fraction of the landmass of several urban areas Adjei (2014) though urban greenery is crucially important because it is linked with the general health and comfort of urban and peri urban dwellers (Quagraine, 2011).

Such land cover changes directly and indirectly affect changing urban atmospheric environment (Nowak, 2002) urban expansion has increased the exploitation of natural resources and changing land use and land cover patterns on the globe especially for developing countries (Small 2004), whiles increasing other land uses, it has negatively affects agricultural land which are fundamental determinant of land uses, land cover changes which are mostly found at the fringes (Small, 2004). Whiles there are substantial amounts of data about the Earth's surface information which provides easy and effective monitoring and analysis of land use and land cover changes, Wang et al. (2012) explain that, rapid urban transformation represented by substantial variations in demographic composition and large-scale expansion of the urban landscape contributes to urban and peri urban land cover changes irrespective of technological progress.



Satellite imagery according to Liu et al., (2005) show that most urban areas has increased by almost 25%, Seto et al. (2010) has outline that urban land cover is expanding at a rate faster than the growth of urban population.

This resulted in massive loss of cultivable land at the fringes and the expansion of cultivated lands into other regions which exacerbate agricultural cost and limiting farm sizes which calls for active farming strategies (Yue et al., 2010). It is expected that land scarcity will trigger a more intensive use of agricultural land in developing regions (Ewert et al., 2006), but urban development increases off-farm employments, which will boost the opportunity costs of more intensive farming and for that matter reduced food crop production to uncover food insecurity in the region (Uchida et al., 2009). Urban growth and the concentration of people have significant environmental and socioeconomic impacts at local, regional, and global levels due to increasing land cover changes, However, unchecked population growth will exacerbate and accentuates social and economic problems, if not extremely difficult, it is impossible to solve any of the social, economic, political and cultural problems of population growth. Therefore, policymakers and the public should continue to raise concerns about the effects of urbanization and urban growth on the lands cover changes (Pozzi and Small, 2005).

### **2.3.5 Agricultural Land Conversion**

Growth in urban population goes with no equivalent growth in land supply because land is fix in supply and does not in any way upturn with increasing population growth (Olima and Washington, 2003). The pressure exerted by increasing population and rapid urban sprawl deprives other sectors such as agriculture (Olima and Washington, 2003). Agricultural lands are mostly affected by rapid urban growth and its functional



demands, such as Land uses for residential, industry and commercial tend to dominate agricultural lands in the bid for space in the urban setup (Lerise et al, 2004) but Naab et al, (2013) argue that a major problem of rapid urban growth is changing land use patterns which affect agricultural land use, land sizes and for that matter yield. In the last few decades of uncontrolled urbanization and sprawl, land use practices such as mining, logging, housing and recreation have become so intensive and predominant that their impacts can be witnessed Kharel (2010) and has led to deteriorating environmental quality, loss of prime agricultural lands.

Traditional agrarian communities and vast tracts of agricultural land are being metamorphosed by a changed economy enveloped by sprawling urban formations at the fringes or a growing city and has led to the several coping mechanisms taking by farmers in such areas (Seto and Kuafmann, 2003). Most urban areas landscape is likely to expand at a very rapid rate due to the rate of change to urbanization and urban growth which the lands of farmers are subjected to. Developing countries are experiencing an accelerated urbanization, which has impacted in different ways (López et al., 2003).

Cities worldwide holds more than 95% of the net increase in global population by 2050 UN (2005) with most of their economy shifting from mainly agricultural use to industrial land use (López et al., 2003). For example, in New Jersey between 1986 and 1995, about 53% and 60% of prime farmland was lost to urbanization and resistant surfaces increased by some 9.2% statewide (Hasse and Lathrop, 2003).

Egypt, a major agrarian country in Africa where the Nile Delta represents the prime agricultural land, about 77.3% of the highly capable farmland and 17.8% of low capable farmland were lost to urban sprawl between 1984 to 2006 (Shalaby, 2012). Addis Ababa, the capital of Ethiopia is also a victim of urban sprawling (Tegenge, 2000), and





the capital of Ghana, according to Nunan (2001), 2100 hectares of agricultural land was converted into urban uses on an annual basis in Accra alone between 1990 and 1993 and increasing at a decreasing rate currently. Ghana Statistical Service (2015) established that, agricultural productivity has changed of late to GDP, Luoto et al. (2003), following outward urban expansion of most cities and its consequences in Ghana, peri-urban land use pattern would change from the one dominated by agriculture to a more multiple landscape (Fekadu, 2015).

Perhaps additional worrisome happened when there is furtive city encroachment on fertile agricultural land and other socio-economic implication on peri-urban areas of most cities (Adeboyejo et al., 2007). Despite many cities rapidly growing into their fringe to engulfing former villages and farmlands triggering land restraint, numerous challenges can potentially repress peri urban food production potentials such as inadequate capital, technology, water, poor storage, marketing and poor infrastructural systems (Fekadu, 2015). Available evidence on sprawl demonstrates conclusively that urban sprawl has accompanied the growth of urban areas across the world including United States of America (USA) (Nechyba and Walsh, 2004).

According to Gordon-Larsen et al., (2006), the USA and Canada lose 4,800 sq km of prime cropland annually to roads, buildings, reservoirs and other non-agricultural uses. Lopez et al, (2001) has it that between 1977 and 1994, the urban area of Puerto Rico increased from 11.3 percent to 27.4 percent and this led to a huge loss of agricultural land. They therefore concluded that if the pattern of encroachment by urban growth into farmlands continues, Puerto Rico's potential for production in the future will be dimmed which is no different in some developing regions like Ghana.



To conclude, Agricultural land loss, as a type of land use/cover change (LUCC), is one of the most important factors that affect food security through food crop production and are predominant in regions with very high population and urban growth such as Ghana (Kraemer et al., 2015). Human activities, especially urbanization, have resulted in a significant loss of agricultural land during the past two decades around the world which has contributed to the shrinking nature of farming lands and their respective coping strategies farmers adopt is what this study seeks to unveil (Priyadi and Pauleit, 2015).

### **2.3.6 Drivers of Agricultural Land Conversion (ALC)**

The phenomenon of ALC in most countries is different in terms of intensity and trend of urbanization and urban growth. Lichtenberg and Ding (2008) outline that there are two major drivers that contributes to ALC; internal and external land degradation and development (industrialization). The internal driver of land degradation is related to the location and land potential including land location, land productivity, ownership pattern including land size and household size and income, with urbanization, socio-economic conditions and government policies later included. External driver is industrialization as Ho and Lin (2004) indicated that Industrial development is widely seen as an engine for economic growth which when expanded could engulf valuable farmlands.

A study by Firman (1999) indicated that regions surrounding Jakarta in Indonesia had a widespread ALC because of industrial estates development. In a similar study by Oyinloye and Adesina (2011), in analyzing the situation of Ibadan city, they observed that one population growth impact severely on the environment and persistently expand towns and cities whereas such expansion heavily affects valuable farmlands. Han & He (1999) studied the distribution pattern of farmland loss in numerous cities, and the



relationship between urbanization and farmland transformation, they found that there was a significant positive relationship between urban population growth (as the main measurement of urbanization) and farmland conversion. Ho and Lin (2004) studies in China showed that industrialization causes farmland conversion in cities, and this change is driven by economic demands, consumption patterns and lifestyles factors (Heilig, 2002). This has resulted in the acquisition of some of the most suitable agricultural lands for residential developments as confirmed by Atu et al. (2013) that in most part of the world, there is a consequent decline in farmed areas and an increasingly limited access to the natural resources due to urbanization affects poor people livelihoods.

Rapid population growth influences ALC as greater population leads the expansion of built areas to provide more housing and employment opportunities. Fazal (2001) describes how urbanization influences ALC and argued that the urbanization pattern and high population growth in developing and underdeveloped countries leads to pressure on land with urban growth encroaching fertile agricultural lands. Due to this, there was a large part of the land parcels flagged for industrial or residential development which was left vacant for a long time (Malaque and Yokohari, 2007). Ministry of Food and Agriculture (MoFA) (2011), Ghana 's agriculture is dominated by smallholder farmers, and estimated fluctuations in land holding capacities as about 31 per cent of the farm holdings in Ghana are less than 1 hectare, 55 per cent are less than 1.6 hectares while only 18 percent are more than 4.0 hectares per farmer.

The continuous dissipation of peri-urban agricultural lands in desperation for urban infrastructure will have dire consequences on peri urban agriculture and sustainable livelihoods of the per-urban poor. Efforts of governments to make cities self-sustaining



in terms of producing their own local food remain unnoticed and illusion if there is no productive land available, for instance Kuusaana and Eledi (2015) had it that land remains a major constraint to advancing peri-urban agriculture even when all the other factors including transportation, markets, extension services and capital are resolved.

Yet, peri urban agricultural land management requires considerable research attention (Kuusaana and Eledi, 2015) because the consumption of agricultural land in peri urban areas reduces the potential resilience of cities to become self-reliant, food secure and to address the inequality gap among the citizenry. However, the industrialization process should be regularly synchronized with urbanization and ribbon development of many urban areas including Wa where farmland conversion is common and affect peri urban farmer's productivity.

## **2.4 Urbanization and Urban Expansion Impact on Food Production and Farmers' Coping Strategies**

### **2.4.1 Effects of Urban Expansion on Food Crop Production**

Although, growing populations in developing urban areas need to be fed now and, in the future, the vastly non-agrarians population in most urban areas in Ghana poses challenges on food systems. Shields (2011) reported that urbanisation results in the concentration of population in a specific space and decreases the amount of agricultural land available for the cultivation of food and other agricultural related practices which generally affect food crop production and food system in most peri urban regions. Cassidy and Patterson (2008) explain food system as all the processes involved in putting food on the individual's table beginning with food cultivation, processing,



through distribution and acquisition until consumption. Unprecedented population growth in Ghana makes urban built up area becomes inevitably phenomenal which results in the loss of valuable urban and peri-urban agricultural lands which affects food systems (Kuusaana and Eladi, 2014).

Satterthwaite et al. (2010) indicated that as settlements grow to become cities, they tend to be located in areas with high soil fertility and fresh water resources availability, which could have been ideal for farming activities. In Wa, such settlements grow in size and tend to engross the adjacent agricultural area which lives farmers with limited opportunities to increase their output because they are pushed out and away from the available arable lands. Peri urban farmers become incapable to supply enough food to feed the growing urban and peri urban population hence expounding poverty in the area. Bricas et al. (2003) therefore believed that urban agriculture and peri urban agriculture has the potential to contribute significantly to feeding of the growing populations of towns and cities. It is tremendously crucial that peri-urban agricultural lands are protected from competing urban land uses but not well crafted in our land use plans, as such many areas of the world, it becomes the battle between urban land uses and agricultural land uses is permanently lost to the first (Kuusaana and Eladi, 2014).

The increasing land commodification in and around urban areas, there is the tendency for land to be left vacant in anticipation of monetary gains which limit peri urban agricultural primary potential of food production (Satterthwaite et al., 2010). But the absence of any land-use plan or strategic planning framework to direct and regulate land-use changes in rapidly growing cities of the less developed regions results in a more haphazard growth and expansion of urban areas limiting peri urban agricultural land sizes, outputs and benefits which influences peri urban farmers to employ some



coping mechanisms sustain and enhance production and to address food insecurity and food system problems (Satterthwaite et al., 2010).

#### **2.4.2 Shrinking Peri Urban Agriculture Land and Food Production**

While Land transformation is one ground of human induced environmental transformation and has accelerated and diversified with the inception of industrial revolution and globalization of the world economy through population expansion (Malik and Ali, 2015). Food insecurity remains crucial aside several policy interventions at the government level (Kuusaana and Eledi, 2015) and has raised concerns regarding food insecurity research currently in many developing regions of the world. Bender (1997) indicated that food scarcity and increasing losses of agricultural lands to urban infrastructural development has become an issue of global concern with continued increase in human population that brings about loss of arable lands to urbanization and further affect the production of sufficient food to feed the world's inhabitants (López et al., 2001).



Farmland loss in the peri urban areas of Ghana most developing countries receives a lot of attention because concerns about how to feed the urban population, the peri urban population as well as other areas is key to development. Food insecurity is the product of ineffective food systems (Kuusaana and Eledi, 2015). But the process of cultivation and the quality of available natural resources to go into food production decreasing brings about food insecurity, unemployment, rising food prices, growing dependence on food imports, increasing dominance of supermarkets and fast food chains (Thornton et al., 2008).

Yeboah and Shaw (2013) had it that population growth in Ghana is necessitating the creation of informal and formal settlement for the poor in the form of social amenities hence increasing demand for land calls for effective strategies to merge competing claims for the use of limited urban space, especially for purposes that do not command the highest and best use value and often subject peri-urban lands to immense pressure due to population growth. On the contrary, food security is affixed on food availability as may be produced directly by local farmers in accessible locations such as peri urban regions. Tacoli et al. (2013) had it that, one key factor responsible for recent food crises is decrement in agricultural productivity. Uncontrolled urbanisation has consumed hitherto agricultural lands and has dispossessed majority of farmers from the peri-urban interfaces of their productive agricultural, whiles this is pushing some determined farmers farther into the hinterlands and food system is greatly affected (Kuusaana and Eledi 2014).

Rapid urban growth, shrinking peri urban farmlands and growing urban poverty should raise concerns particularly about Ghana's urban food security, supply and distribution system (Dabie, 2015). The FAO (2008) points out that urban poor are disproportionately affected by rising food prices and the most basic livelihood venture they embark on has been affected by urbanization. Ghanaian population is increasing so is urbanization and it challenges, as of 2009, approximately 1.2 million people making up 5% of the entire Ghanaian population were said to be food insecure (World Food Program, 2009). Additional 2 million people are said to be vulnerable of becoming food unsecured. It was estimated however that more than 3 million people in Ghana representing over 12% of the entire population who do not have access to adequate, affordable, safe and nutritious food. Ministry of Food and Agriculture (2007)



believes that available agricultural land is declining due to population pressure mounted by urbanization and urban growth.

### **2.4.3 Urban and Peri Urban Linkages**

The urban expansion scheme is not a simple one-way process but generates responses and changes in the surrounding peri-urban and rural areas and reshaping of such spatial relationships. These responses are important feedback loops, which over time can lead major peri-urban changes which causes dynamic change to evolve towards the inter-urban or ‘regional agglomeration’ effect. Hall and Pain (2006) indicated that free-standing city in rural surroundings is replaced by a wider regional urban system of interconnected and polycentric settlement forms which further boost the input output relationship because urban markets and peri-urban ‘shadows’ expanding. Housing location choices influences economic-financial terms, in labor markets, shopping markets and the concentration of retail shops expanding at the fringes, such manifestations recognize spatial functions which need not always be examined as alternative and mutually competing uses of scarce land, but instead a merging of land use functions at certain location which unveil economic synergies, save space, and be environmentally benign (Rodenburg et al., 2003).

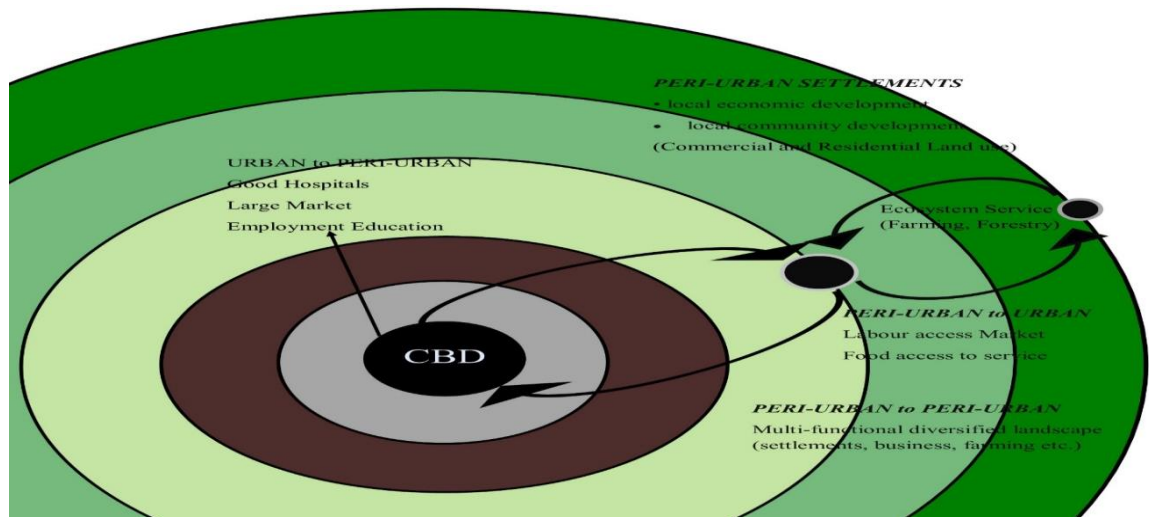
Though urban expansion is alarming by subjecting peri urban farmers out of production but there is a greater backlock of input output relationships which naturally improve livelihood opportunities and create the dependancy syndrow for growth and development of urban and peri urban economy. Whiles the peri urban regions are known as fertile farming grounds they provide the CBD(Central Business District) with food, labour and accesses their market and services, the CBD create the room for the peri urban dwellers to have quality education, health services, large market for their





produce and gives them employment opportunities. Figure 2.4 which shows urban and peri urban linkages indicates the following relationships, Urban to peri-urban links: urban demands and pressures on suburbs and peri-urban surroundings; space for housing, business, infrastructure while peri-urban requires urban markets, services and innovations.

Peri-urban to rural: the relationship of people to landscape, in functional economic terms such as food, water, minerals, or tourism. There are also services which are more socio-cultural (aesthetics, amenity, recreation). In the other direction are relationships of employment, investment, and access to services Ravetz et al. (2013). There are also relationships within peri-urban communities: the potential for economic and social development within settlements and across the peri-urban zone and managing such relationships should be at the core of policy agenda for ‘integrated development for territorial cohesion in the urban and peri urban regions (Ravetz, 2011).



**Figure 2.2: Agricultural Land Conversion**

Source: Adapted from Ravetz et al. (2013)

#### **2.4.5 Land Tenure Arrangement in Peri Urban Areas of Ghana.**

There is a rural-urban divide in land management in Ghana and traditional authorities are in control and management of about 80% of the country's land mass, especially in rural Ghana. Bugri (2013) noted that "many Ghanaians, particularly in rural areas, the most important and relevant institution in terms of land relations is the traditional authority itself, in the form of the chief, traditional councils, land allocation committees, and the like" and the remaining 20% of the country's land, which is mostly urban land has state's control and land management activity is widely impacted hence peri-urban lands becoming convoluted with both traditional authorities and state land managers often in conflict. From the above synthesis, it is clear that the lands in the peri-urban areas need to be properly managed to ensure sustainable land management so that effective use could be obtain. This brings to fore the need for new roles for traditional authorities in land management quite distinct from what they are used to in rural lands. It is only through informed policy processes and legislative review through research such as sustainable land management to be attained in peri-urban areas.



The competition between demand and supply of land for different activities also plays a critical role in land use morphology of most urban and peri-urban areas hence customary land tenure is becoming increasingly individualized, informal land markets are growing and land values keep increasing. This process of change in land relations in peri-urban areas is further accelerated by urban elites (public officials, businesspersons, politicians, etc.) willingness to buy land mainly for speculative purposes, which affect peri urban agriculture greatly. The peri-urban interface is where suburban growth is taking place and where urban and rural uses of land are mixed, forming a transition zone between city and countryside.

Land management in peri urban regions covers all activities concerned with the management of land as a resource both from an environmental and from an economic perspective which include farming, mineral extraction, property and estate management, and the physical planning of towns and the countryside (Williamson et al., 2010) which when not taken into account land tenure issues will unravel.

Food discussion in were typically confined to agriculture and food systems have always been seen as prototypical to rural areas (Smit et al., 2001; Morgan, 2009; Morgan and Sonnino, 2010). Food system has several components which must work together in order to yield fruitful results with production as key and for that matter any pressure on arable land needs to be address by city and traditional authorities. Since more than one-third of the food produced globally gets wasted (FAO, 2011), while food insecurity persists in other areas especially developing regions, peri urban agriculture is one of the strategy to be strengthened to improved food crop production. Nevertheless, such livelihood opportunity has been affected seriously with persistence urbanization and constant urban expansion mounting pressure on tenure arrangement, which has affected farming especially in Ghana, hence peri urban land tenure management should be strengthened.

#### **2.4.4 Peri Urban Agriculture, Crop Farming and Employment**

Globally, urban agriculture, as a form of economic activity, is practiced by people of various income brackets and is particularly an essential survival strategy for urban poor in developing countries (Jacobi et al., 2000). In 1960, 61.1 % of the Ghanaian population was engaged in agriculture (Ghana Statistical Service, 2005). This reduced to 51 % by the year 2000. Ghana Living Standards Survey, (2008) revealed that 56 %



of the working population were employed in agriculture (GSS, 2008). Agriculture contributes about half of formal and informal employment and export earnings as well as 23.1 percent of GDP in 2012 (Mongabay, 2013; Government of Ghana, 2013) though current statistics indicates the service sector is leading in terms of GDP contribution. Ghana as basically agrarian country in the cannot overlooked agriculture, because, agriculture contributes to household income, food security and export earnings annually with peri-urban agriculture generating formal and informal employment for farmers themselves as well as food processors and distributors as a way of diversifying their livelihoods.

The intensive peri-urban horticultural and livestock rearing are extremely fast-growing sectors that employ many workers and produce high value-added products that yield reasonable incomes and returns (World Bank, 2007) but arable lands in the Peri-urban areas has been affected by the outcomes of urban growth and how peri urban farmers are coping with their limited lands. Peri-Urban agriculture has the potential to serve as a form of employment for the poor and provide a major source of food supply for the majority of the poor. Eventually, if the urban poor are able to improve their self-containment on their food needs, it frees income to engage in other possible economic activities or to meet other essential household needs including health and education but Thornton et al. (2012) believe that urban and peri-urban agriculture is the lifeline of subsistence for urban and peri-urban dwellers.

The agricultural sector is dominated by smallholder farmers who are indigenous subsistence peasants (Peprah, 2014) but most middle-income earners and even rich people acquire peri urban land and engage in agriculture for commercial and subsistence purposes in developing countries such as Ghana. Many farmers, especially



women are likely to use income earned from farming on food provision for the family (McGee and Robinson 1995), but peri-urban agriculture is seemingly recognized in land use plans and further subject the phenomenon to urban pressures due inevitable population growth, urban expansion.

Urbanization which is dislocating peri urban farmers to farther hinterlands where they become prone to agricultural challenges hence are unable to meet the food needs of the urban population but rather for themselves and family to a larger extent. Cotula et al. (2004) also outline that increasing urbanization is fostering demand for food products in urban centers, which in turn boosts processes of agricultural intensification and commercialization in peri-urban agricultural produce areas. Farmers living closer to the city centers enjoy input and out market advantages as compared to their counterparts in the hinterlands (Kuusaana and Eledi, 2015) as such, changes in peri urban land uses makes the poor farmers adopt some coping mechanisms to enhance and sustain production of food crops in other to cater for their family.



#### **2.4.7 Peri urban Livelihood Strategies**

Various livelihood assortments are viewed as a critical component of household thrifths in developing countries where most of the handy work are importantly “hand to mouth” (Cinner and Bodin, 2010:67). This is a typical characteristic of peri-urban households since they are influenced by both rural and urban economies with greater emphasis on survival. Narrain and Nischal (2007) explained that peri-urban interface could be heterogeneous platform of natural ecosystems, productive or agro-ecosystems, and urban ecosystems affected by material flows demanded by both urban and rural systems. The interactions between rural and urban dwellers exposed them to a wide

range of livelihood options and choices including farm and non-farm-based activities that are undertaken in order to achieve their livelihood goals and optimum use resources available in their zone.

The effects of urban expansion have a profound impact on improving or worsening the livelihood conditions of peri-urban dwellers in Ghana (Adomako, 2015). Available occupational sectors of Peri-urban dwellers include, salaried work, informal economic activities such as trading, construction with the dominating one to be agriculture, which has been affected by land use changes. Conversely, urbanization can be expected to bring about changes in the livelihood strategies of households in villages close to the urban areas couple with effective harnessing of natural resources in the area (Brook and Dávila, 2000). While 'livelihood activities are grouped into cash based and non-cash-based activities with the Non-cash-based activities include household food production, fuel, medicinal herb collection or access to building or artisanal materials depended on free access to communal natural resources. Depending on the time limit of a particular activity, Brook and Dávila (2000) classified livelihood strategies into coping and adaptive strategies whereas the Coping strategies have been defined as a short-term response to a specific shock so that survival may persist, the adaptive strategies are long-term change in behavior patterns as a result of a shock or stress.

On agricultural livelihood, urban expansion has a significant impact on farming systems in the surrounding peri-urban areas, where agriculture is often primary occupation (Tacoli, 2004). The processes of intensification (more output per unit area through capital investment or increases in inputs) or additional land under cultivation (Scoones, 1999) makes many people in peri-urban areas gain more of their livelihood from agriculture including livestock rearing, aquaculture, forestry, crop farming among



others. Urban intrusion into the fringe is eating into agricultural land leading to the reduction in the quantity and quality of land for farming which render some farmers out of production (Thuo, 2010).

Though agriculture still remains one of the predominant economic sectors in Peri-urban regions in most developing areas of the world (Mandere et al., 2010), its economic value is significantly declining as a result of declining number of households that engage in agriculture as full time economic activity with constant livelihoods changes influenced by urbanization and urban growth. The increasing pressures from urban expansion compel most people to adopt non-farm income generating activities as a coping strategy to improve their livelihood outcomes. Hence poor people who were hitherto relying on the natural resource base for survival, have no other alternative than to engage and rely on new income generating activities (Adu-Ampong et al., 2008), while others employ a very good strategy to improve their agriculture practices.

## **2.5 Theoretical and Conceptual Framework**

### **2.5.1 Theories of Urban Expansion**

Urban expansion could be generative or parasitic. Paul et al. (2000) stressed that most developed countries urban growth is generative (stimulates economic growth and create surplus) in the broader urban area, whereas in developing countries urban growth was parasitic in their development (surplus extracted from surrounding regions) but it is now becoming largely generative. The interdependency between the peri urban and the urban areas in terms of food crop and other agricultural related output such as charcoal, baskets, mat, firewood, leaves as animal feed and services such as banking, market, electricity, good schools and others respectively. With regard to generative process of urban expansion, explanations in the developed countries worldwide are provided by



the central place theory, urban base theory but in the context of parasitic process an explanation to urban growth is offered by the dependency theory, Sector model, and Concentric theory. Though they have adequate bearing to the study, growth machine theory was basically underlined.

The dependency theory maintains that as cities grow parasitically by exploiting and holding back their surroundings means that economic growth follows the principle of cumulative causation, an establishment in the city economic development promotes further local spread effect on development (Paul et al., 2000). However, the cordial linkage between the centre and the fringe in Wa poses serious land use challenges at the fringes which affect farming or agricultural productivity. However, the Growth Machine Theory is the major underlining theory seeking to explain the study which was first articulated by (Molotch, 1976). The theory suggests that *“urban growth is driven by a coalition of interest groups who all benefit from continuous growth and expansion”*.

Urban sociology had been dominated by the idea that cities were basically containers for human action, in which actors competed among themselves for the most strategic parcels of land, and the real estate market reflected the state of that competition. The theory pointing out that, land parcels were not empty fields awaiting human action, but were associated with specific interests such as commercial, sentimental, and psychological which affect it uses and achieve specific goals to address the increasing population problems which triggers land use changes through commodification. This was situated within a broader theory of commodification of place, where its key principle is that coalitions of actors and organizations, all sharing an interest in local growth and its effects on land values (Rodgers, 2009). In particular, cities are shaped





by the real estate market, the interests of people whose properties gain value when cities grow for example land. These actors make up what Molotch termed "the local growth machine."

Therefore, in an urbanizing Wa, interest, strategic location, and land values motivates people to move for land in some location which affect agricultural productivity by changing the land use pattern which was supposed to be there for farming and hence the coping mechanisms farmers adopt becomes the core section of this study. To conclude on the theories, many developed countries protect their farmland and open space through the adopted various measures, including farmland protection (Shortle et al., 2015), smart conservation green infrastructure and market oriented policies (Brueckner, 2000) but in most developing countries on the contrary, not only are such strategies unimplemented, but the problem of urbanization more pressing thus, a place where the increase in global urban population is concentrated because of uncontrolled human population ( UN 2012) whereby urban growth and peri urban land encroachment is very common.



### **2.5.2 Conceptual Framework**

Figure 2.3 illustrates interrelated elements that determine urban development and its effect on peripheral farming communities. Different deriving forces such as immigration, natural or demographic increased, institutional failures, and some parasitic theories are considered for the cause of expansion of the urban area under study which has engulf many peri-urban areas in the municipality. With the overall force being population growth (DFID 2000), pressure is driven by change in land use in peri urban interface with several losses of agricultural lands due to increasing agricultural land

conversion and land commodification and other uses of land in the study area. Urbanization, urban growth and sprawl are the driving forces that bring problem to farming communities away from the central business districts (CBD) which could be economical, sociocultural and ecological.

Such manifestations affect food system and food security and to cope up with these, crop farmers are to pursue strategies and government can take varies policy response to mitigate the problem in line this frame work whiles the institutional capacities are to be strengthened. However, urban sprawl that turn heat on agricultural land use by shrinking it and reducing the fertility of the available arable land renders crop farmers to face some negative manifestations which affect crop productivity.



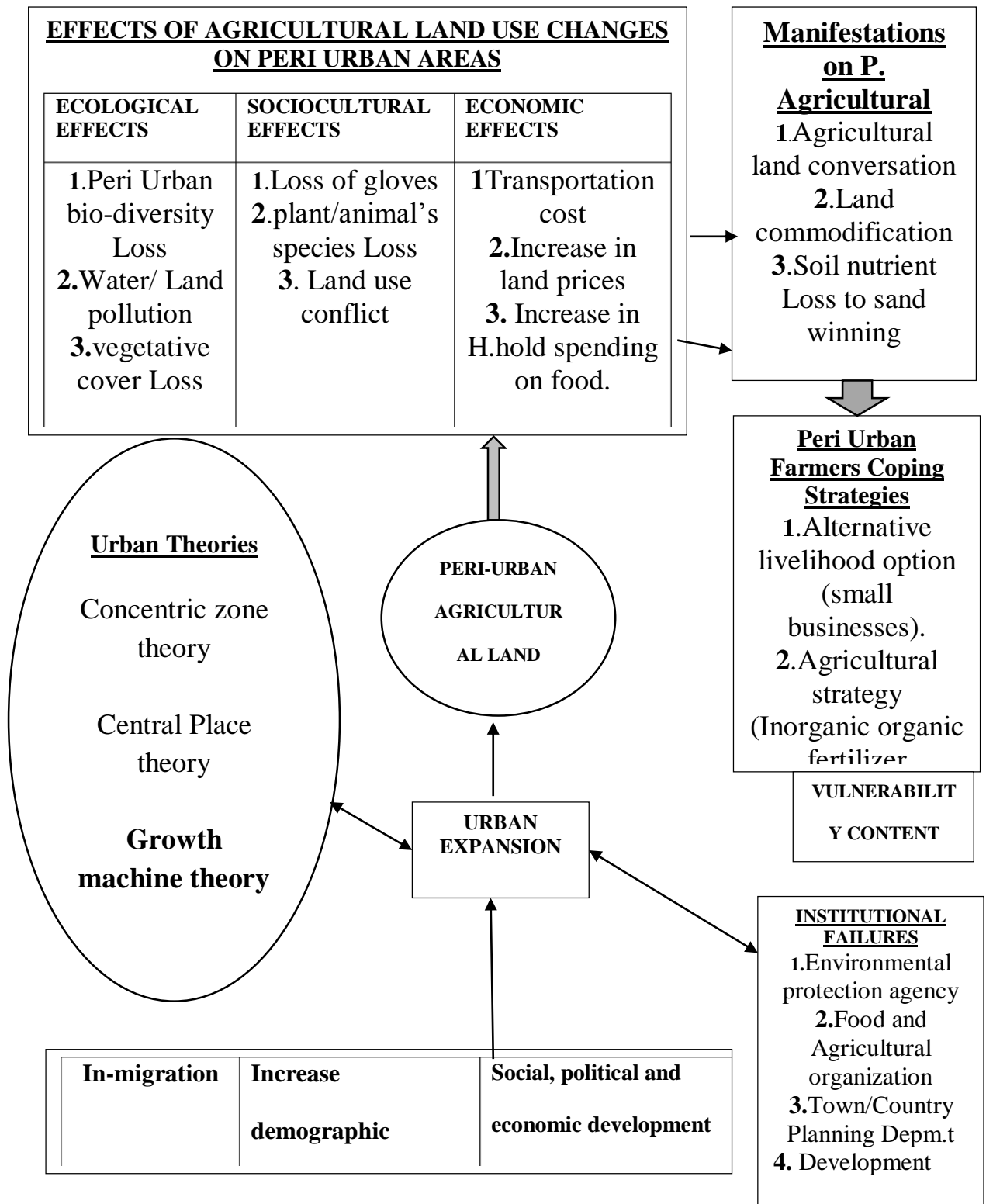


Figure 2.3: Conceptual framework

Adopted from Dabie, (2015)

This therefore makes crop farmers to adopt some coping mechanisms to aid crop farming productivity thus when the strategy is agriculturally related. Non-agricultural related strategy may shift crop farmers away from production by engaging themselves in different non-farm ventures such as small businesses, weaving, woodcarving, and charcoal burning.

## **2.6 conclusion**

This chapter contains the review of literature on urbanization, urban expansion, peri urbanization, peri urban agriculture, and agricultural land conversion. In particular, it looked at urban expansion in theory where the various definitions of peri urban were looked at. Under these chapter, a review of key concept and theories was provided in the framework for the study. Consequently, major notion on peri urbanization, peri urban agriculture, relationships between urbanization, urban expansion, peri urban agriculture and development and the coping strategies to mitigate the challenges on peri urban agriculture by urban expansion were addressed.



## CHAPTER THREE

### STUDY AREA AND METHODOLOGY

#### 3.1 Introduction

This chapter describes the nature and the features of the study area. This includes the pictorial representation of the area in the form of a map. The methodology provides a detailed explanation about the process and stages employed in this research. These details the design of the research, method used in study site selection, data requirements, data collection methods, sampling techniques and tools chosen for obtaining the information in the communities selected and presentation of the data analytical tools. In addition, the chapter indicates specific stages for the research process as well as the detailed phases for the administration of questionnaires and interviews conducted during the groundwork.

#### 3.2 Description of the Study Area

Wa lies in the savannah high plains with gently undulating and an average height between 160 m and 300m above sea level. Low lying areas are found in the following localities; Charia, Zingu, Kperisi to the north and Piisi, Dapouha, Boli, Sing, Biihe and Busa to the south. Valleys in the low-lying areas collect and retain water over long periods during the rainy season. The streams are seasonal and thus dry up during the long dry season thereby reducing available water for farming and other uses. The Wa municipality shares administrative boundaries with the Nadowli District to the north, Wa East District to the east and south and the Wa West District to the west and south. It lies within latitudes 1°40'N to 2°45'N and longitudes 9°32' to 10°20'W as shown in (Figure 3.1).



Wa is the capital of the municipality which also serves as the regional capital of the Upper West Region. It has a landmass area of approximately 234.74 square (kilo) meters, which is about 6.4% of the region. According to PHC (GSS, 2012), Wa Township has a total population of 135,638 of which 2,996 are males and 54218 are females. Due to the intensity and the nature of urbanization occurring in Wa as a result of increasing population growth and urban expansion, urbanization in Wa is ostensibly evident with high growth rate in urban population which has led to rapid expansion of the township area leading to the springing up of some peri urban communities in Wa such as; Bamahu, Tampalipaani, Kpongu, Guli, Nakori, Waali-Sombo, Kumbiaha, Piisi, Kperisi, Konjieha, Kanpaha, Danko, Sing, and Busa (Wa Municipal Assembly 2012).

### **3.3. Location of the Study Communities, Population and Occupation**

The study was conducted in five Peri- urban communities; Bamahu, Kperisi, Danko, Nakore and Kpongu located around Wa Township which was purposively selected while Kperisi is located in the north eastern side. The populations of these communities depend on the Wa Municipal Assembly for the provision of essential goods and services for agriculture while most of their primary activities end up in the Wa market. The rest of the communities are located at south west and eastern corners of Wa where economic and social activities extend and trigger population movement there for other livelihoods. These communities, therefore, exhibit traces of farm land extinction and productivity loss which farmers adopt some coping strategies within farming and other livelihoods to aid their survival. The population of these communities, according to the 2010 Population and Housing census are; Bamahu, 1148, Kpongu, 2311, Guli, 643, Danko, 2178 and Nakore, 1633 (GSS,2012). The main



occupation of these study communities is farming whereas others engage in household or home base small scale businesses, such as petty trading and quarrying.

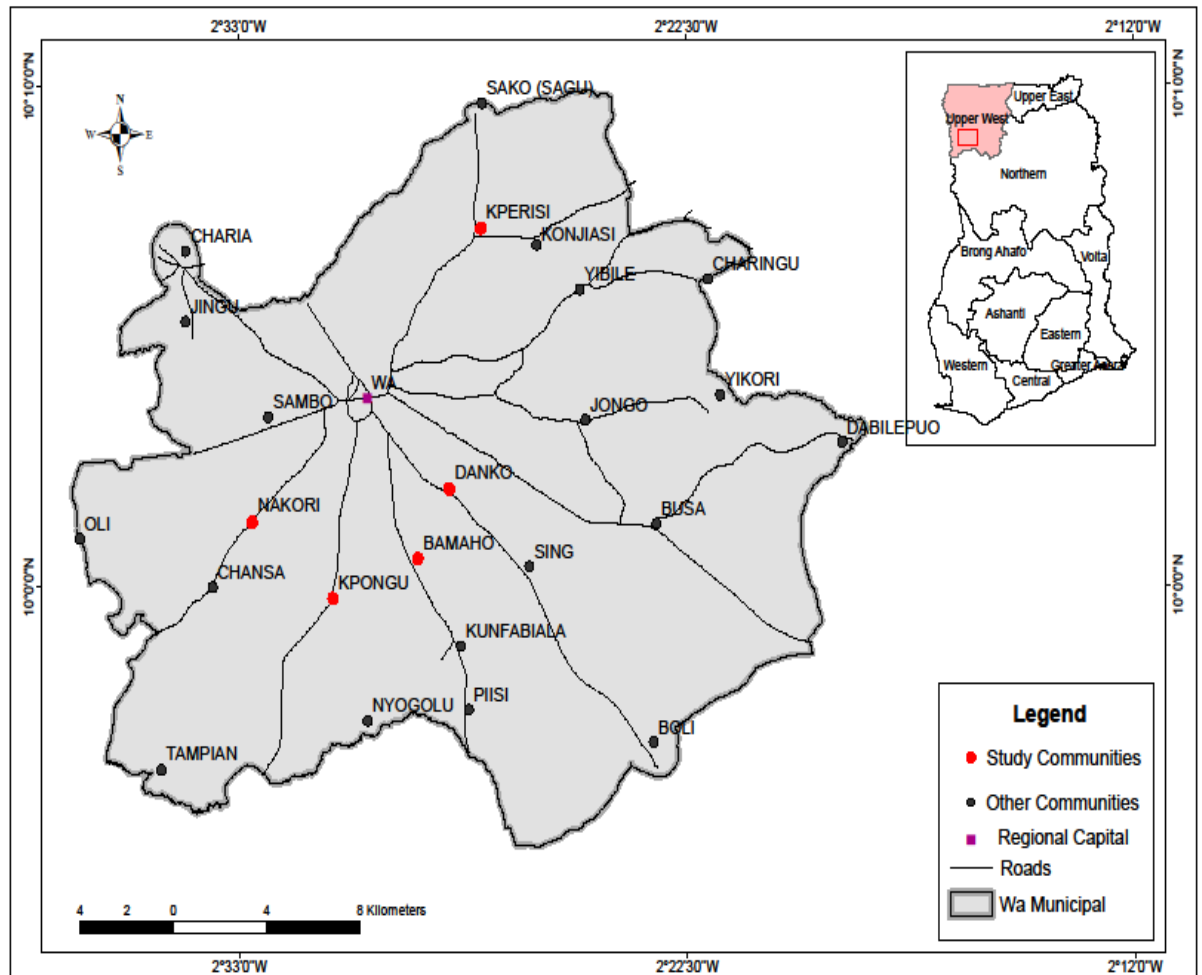


Figure 3.1: Map of the study area

### 3.4 Research Design

The study is a multi-site type, which dwells on mix method design; it was adopted because it is more complex and addresses the shortfalls of each, where qualitative ideas or quantitative ideas were appropriately used to make the study much comprehensive.

Quantitative research design of this study uses factual quantities of data such as

numbers that is to test or study the authenticity of theories for solving problems and finding relationships between facts, ruling the facts of concept, and questioning the attribute (Naoum, 2007). Paired Sample t-text, exploratory factor analysis was used to test and determine the relations among some variables such as farm size lost or land loss and output loss which unveiled the linear relationships between factors influencing urban expansion and it challenges to crop farming. Before and after analysis with spatial images was used to track the changes and impact of urban expansion in Wa.

Descriptive survey technique was employed with the purpose of generalizing from a sample to a population so that inferences could be made about the characteristics, attitude and behaviour of the population. Marczyk et al. (2005) indicated that descriptive research is the process of defining, classifying or categorizing phenomena of interest. This study concentrated on the period of before planting, during and after harvesting which unveiled the changes that has affected the phenomenon under consideration. Questionnaire survey and interviews, focus group discussions, and observation were used as methods of data collection. Qualitative research design was merged in this study for the purpose of narrating or adding on to the deductions and answers received from the field. It was basically explorative qualitative studies based on in-depth interviews to add on to the literature that was reviewed to support the outcomes on the field theoretically. Institutional inputs were analysed in themes which aid the comparative analysis of the result between the study communities.

### **3.5 Types and Sources of Data**

Primary and secondary data were the main types of data used in this research. The basis for this combination was to allow the study have adequate discussion of the





phenomenon under consideration. This approach further allowed the study to scrutinize documents and other relevant materials to give a very clear understanding to the effects of urban growth, and the coping strategies peri urban farmers adopt to sustain and enhance food crop production in the Wa Municipality. Combination of both primary and secondary data sources ensured the interplay of ideas from theory as established in literature and results from the analysis of empirical data obtained from the field (Creswell, 2003).

### **3.5.1 Primary Data**

Primary data was obtained from farmers in the peri-urban communities selected as a result increasing urban expansion in Wa. These respondents included only household members that were engage in crop farming activities in the peri urban communities at the fringes of the Wa Township. Primary data was principally about the extent of urban growth in Wa, Peri urban Land cover changes, land and output loss and the coping strategies farmers adopt to sustain their production and other livelihood options.

### **3.5.2 Secondary Data**

Secondary data was gathered from the Town and country planning, Wa municipal Assembly, and environmental protection Agency, Ministry of Food and Agriculture which included urbanization trend, population growth pattern, urban expansion and peri urban land use changes which has affected agriculture (crop farming), available measures and policies on land use and their ideas about the major causes and effects of land use changes in the peri urban farmers through urban sprawl in Wa. Thematic maps were also gotten from the United States Geological Survey department to extract the



shape file polygons of Wa municipality which was overlaid to get the extent of expansion and also land cover changes.

### **3.6 Target Population, Institutions in Charge for Land Use and Sample Size Determination**

The total population of the five communities selected for the study was 9,817. Out of this number, Bamahu had 2542. Kperisi 1362, Kpongu 3455, Nakori 1633, Danko 825. The number of households in the selected communities was as follows in a respective way; 422, 179, 444, 164, 152 giving the total number of households to be 1,366 (GSS, 2010). However, per the nature of the study and the target group (household head who are farmers), the total number of households for the five selected communities was used. The researcher in an attempt to obtain opinions from institutional perspectives interviewed various institutions that are directly involved in the management of lands and land related activities. This was to aid in eliciting of expert views on land issues especially regarding urbanization, urban growth and land use changes in the five study communities. Stakeholders, such as the District Assembly members, Agriculture Extension Officers and Traditional and Opinion Leaders, Town and Country Planning Director, Lands Commission Officer among others were interviewed to find out what they are doing in providing livelihood security to the food crop farmers against inevitable ongoing urban growth.

Thus, the sampling unit was 9817 and a total household of 1,366, hence the actual sample size selected from the units was obtained through the formula (Naoum, 2007 as cited in Adnan and Al. Swaity (2015):



$$SS = \frac{Z^2 \times P \times (1-P)}{C^2}$$

SS – sample size;

Z - Z-Value (eg.1.96 for 95% confidence interval)

P - Percentage of picking a choice expressed as decimal (0.50 uses for sample size needed)

C - Maximum error of estimate (0.05)

$$SS = \frac{1.96^2 \times 0.50 \times (1-0.50)}{0.05^2} = 384.1$$

Therefore, the correction for the finite population for the study is described as

$$SS_{\text{new}} = \frac{SS}{1 + \frac{SS-1}{POP}} \rightarrow \frac{384.1}{1 + \frac{384.1-1}{9817}} = 370$$



Where POP - Total population of the five-selected peri urban communities around Wa thus 9817. Therefore, a sample size of 370 was used who were crop farmers and was purposefully selected for the study. A proportional stratification was applied taking into consideration the total number of households in which a respondent was selected. The total number of households available in the Peri-urban communities selected was related taking into consideration the sample size determined and was spread proportionally to the communities based on the number of households. A proportionate sample size was obtained for every community as shown in Table 3.1.

**Table 3.1: Proportionate sample size**

| <b>Area/Community</b> | <b>Number of households<br/>(2011)</b> | <b>Proportionate household<br/>Sample size</b> |
|-----------------------|--|--|
| <b>Bamahu</b>         | 422                                    | 115  |
| <b>Kpongu</b>         | 444                                    | 121  |
| <b>Kperisi</b>        | 179                                    | 49   |
| <b>Nakori</b>         | 164                                    | 44   |
| <b>Danko</b>          | 152                                    | 41   |
| <b>TOTAL</b>          | 1361                                   | 370  |

**Source: Field Survey, 2017**

Three and seventy respondents were selected from the five communities using simple random sampling. Additionally, 8 officials were purposively selected across the institutional structures in Wa to contribute to the study and to help unveil the significant changes in Wa, how they have extended their operations from Wa Township to some peri urban areas which were previously undue for some of their infrastructure. These stakeholders were two officials each from Environmental Protection Agency (EPA), officials from Wa Municipal Assembly, officials from the Town and Country Planning Department, and officials from the Community Development Department. These officials were purposively selected because they are key stakeholders in urban



management and planning for the emerging fringes and therefore have adequate information that could be of relevant to the study.

### **3.7 Sampling Techniques**

In this study, purposive sampling and simple random sampling techniques were adopted. These are combination of probability and non-probability sampling techniques. Simple random sampling techniques was probability methods whilst the purposive sampling technique was a Non-probability method of sampling and were used where suitably in the process of the research. This confirms the aim for drawing sample to make a generalization about the findings that was obtained from the unit of analysis with such sample representing the whole. Sampling emerges as an obvious choice for the researcher because it was unfeasible to study the entire population.

#### **3.7.1 Purposive Sampling**

In selecting the five communities from the 14 peri urban communities in the Wa Municipality where changes in peri urban spaces are as a result of urban expansion, Purposive sampling technique was used to ensure that communities with similar characteristics in terms of their location, existence of growth poles, and their distance from the centre of the municipality justified this research conducted in these areas of Wa. As a result, five areas were purposively selected thUs; Danko, Kpongu, Bamahu, Nakori, and Kperisi.

Purposive sampling technique was also employed to select relevant stakeholders involved in urban growth management and development. These stakeholders were two officials each from the; Environmental Protection Agency (EPA), Wa Municipal Assembly, Town and Country Planning Departments, Community Development



Department and the Ministry of Food and Agriculture (MoFA). These officials were purposively selected because they are key stakeholders in urban management and planning for the emerging fringes and therefore have adequate information that could be of relevant to the study.

### **3.7.2 Simple Random Sampling**

List of all farmers in the study communities was gotten from the district MoFA office in the municipality. Whereas crop farming was basically the dominant economic activity, household heads who were farmers was duly selected and situations where a household was without a farmer, the researcher skipped to the other household where there was a farmer. Since peri-urban farmers are spread within the population in the various households, the study also focused on farmer from a household with a minimum experience of 5 years so that adequate information about the changes in farm sizes, productivity or output, and changing land use as a result of urban expansion in Wa could be explained. The choice of this technique was to ensure openness to the target group and also engaged the experienced people who are into farming in each of the selected communities to provide adequate information for the study.

### **3.8 Data Collection Instruments/Methods**

To achieve the set goals, the study adopted multiple data collection methods including interview (structured key informant), participant observation, questionnaires survey and a comprehensive review of official and other documents to generate empirical data for the study. These methods will have yielded detailed primary and secondary data which helped to achieve the purpose and objectives of the study.



### **3.8.1 Questionnaires**

Questionnaires were used for soliciting primary data from the respondents from the five-selected peri urban communities. The respondents were household members who are engaged in crop farming and not less than five years old. The questionnaires included both close and open-ended questions. The questionnaires were used to gather data on the impact of land use changes on peri urban crop farming and farmer's coping strategies to enhance and sustain production to address some challenges they face in the area such as food insecurity, low income and others.

### **3.8.2 Interviews (Semi Structured and Key Informant Interviews)**

The interview method; both the structured and key informant, was used to generate primary data from the officials of key institutions. The key informant interviews were done by using an interview guide that gave the researcher the chance to probe and get more information from the institutions, which aided convincing understanding of the study by indicating the trend of land use, and the pattern of urban expansion in the municipality. Institutions like Town and Country Planning Department, Community Development Department, Lands Commission, Municipal Assembly and Ministry of Food and Agriculture were contacted. Key informant interview were necessary since the study needed vital information on coping strategies farmers adopted in the face of urban expansion in Wa.

### **3.8.3 Observation**

The observation method was adopted on the field to gather primary data about land use changes through urban expansion, available peri urban spaces, physical structures evolution and the hiving out of farmers from the fringes, shrinking of farm sizes and how the farmers are coping with the situation especially those who remain in the fringes



of Wa. This helped the researcher to inculcate ground checks on the maps indicating land cover dynamics both positively and negatively into the research process so that the conclusions and recommendations could be a true reflection of what is on the ground. Through this, pictures were taken from the field to support the explanations and deductions that emanated from the data analysis.

### **3.8.4 Focus Group Discussion**

Five separate focus group discussions were held; with one in each community selected, constituting women and men. Membership was drawn across board to deliberate on the challenges of peri urban agriculture, such as increasing land use changes, coping strategies they adopt, the best farming practices and other alternative livelihood opportunities to aid their survival apart from the threatened agriculture. This approach is considered appropriate when the object of the research is to explore reactions of a group or community in response to some commonly experienced aspects of their environment (Tsiboe, 2004, cited in Owusu et al., 2014). This added on to the information obtained from the field because not all of the farmers had the chance to be part of the study but their contributions were key. The women were made to be many because when it comes to agriculture women hardly talk though they always help their husbands who happen to be household heads and also women are those who walk and carry their farm produce to the city centre (Wa).

### **3.9 Ethical Considerations**

Ethical concerns, according to Apusiga (2012), do not only border on confidentiality and anonymity but also researcher's location and bias. Seeking and ensuring the consent and protection of information provided by the respondents are some of the ethics in research. The study took into account its rationale, goals, objectives and the purpose,





which were truly explained to the respondents before reliable information was sought. The researcher assured the respondents that the information provided by them will be treated as separate from them and that the outcome of the study shall not in any way or at any time be connected or linked to them as a source of information leading to the findings and the outcome of the work.

### **3.10 Pre-testing of the Instruments**

This is the process by which a sample of questionnaires is administered on trial basis before the actual work is carried out. This gave the researcher the opportunity to access the effectiveness, accuracy as well as actual time it takes to administer the questionnaires. This was done before the actual data collection. It took place in Sombo which was not part of the study communities. The choice was because Sombo appears to be one of the worse as a result of urban expansion emanating from rapid urbanization in Wa and the institution (U.D.S) that is located hence agricultural lands has been threatened in diverse ways due to land use changes. The purpose of the pre- testing was to test the itemized questions on the instruments for irregularities, confusion, and effectiveness and ensured the validity and reliability of the instruments. The pre-testing also gave the researcher the opportunity to have the insight into the issues that were discussed. Hence, inaccuracies in the pre-testing stage were corrected before the actual data was collected.

### **3.10 Delimitation of the study**

For the purpose of time and resource used, the work was limited to only five peri urban areas in Wa. In the quest to examine the coping strategies peri urban crop farmers adopt, taking into account population growth, urbanization and urban expansion in Wa, the research was faced with series of constraints. First, financial and logistical problems:



considering the geographical size of Wa and the locations of some selected peri urban zones it was very difficult getting all the necessary financial and logistical resources to travel to various communities and institutions for data. Another problem was also time constraints. A research of such type requires a longer period but the institution had barely six months to complete such a comprehensive study. However, the challenges were addressed. Notwithstanding, such challenges was dealt with in the area of soliciting for funds from siblings, contacting relevant key informants who helped in the collection of accurate data. Though time was limited because of the seasonal nature of farming in Wa, the research was therefore organized with an activity schedule which guided the process.

### **3.11 Data Processing, Analysis and Presentation**

Data collected were analysed using statistical tools and procedures. The data was entered into Statistical Package for Social Scientist (SPSS) which helped in finding the percentages of the various variables listed in the questionnaire, paired Sample t-text for farm size loss and output loss between two time periods and exploratory factor analysis for dominant farming practices of the respondents, factors that influences agriculture land conversion and the dominant coping strategies that farmers adopt in the face of such inevitable urban growth in the study area. Some analysed data were exported to excel for further chat and tables which aided the pictorial understanding as well as guiding for a meaningful deduction from the data analysed. The same was used to summarize the information collected which helped to ascertain the exact findings from the study area.



Landsat images were acquired from the United States Geological Survey Department. These images were of the thematic mapper and Operational Land Imager (OLI) for the years 2000 and 2016 respectively. Bands 4, 3 and 2 of the TM image and bands 5, 4, and 3 of the OLI image were stacked to form a multi-spectral image for the respective years using Erdas Imagine 2010. These images were sub-setted using a shape file of the Wa Municipality as the area of interest (AOI). Supervised classification was performed using the maximum likelihood classification algorithm with Erdas Imagine 2010. Four-land cover classes were derived from the classification, thus Built Up, water Bodies, Closed savannah and Shrubs, grassland and farmlands. The classified images were then imported to ArcMap 10.4 where a composite map was produced showing the land use/land cover of the Municipality for the years 2000 and 2016.

The largest continuous zone of built up areas from the center of Wa town from 2000 and 2016 were digitized to form two polygons representing the township extent of growth between 2000 and 2016. These layers were overlaid and a thematic image was produced in ArcGIS 10.4 to represent the township extent of growth of Wa in the years 2000 and 2016.

Both closed-ended and open-ended responses were documented and then assigned codes for further analysis. There was an overview of the open-ended responses to ensure that all similar ideas were put together to aid a good meaning to the tables and chats in the form of narration. Where necessary, for example, maps, pictures taken from the field were provided to give visual impression on the peri urban land use changes and the shrinking nature of arable lands at the fringes of Wa and some coping strategies. The output of paired sample t-test analysis contains the following; Paired Sample Statistics; which provides descriptive information about two variables including the



mean, sample size, standard deviation and the standard error of the mean. The Paired Sample Correlations; provides the correlation between the two variables. Paired Sample Test; these compare the means of the two variables and a significant t-test that indicates a difference between the two variables. It also contains the upper and the lower bounds at a 95% confidence interval around the difference between the mean.

Factor analysis operates on the notion that measurable and observable variables can be reduced to fewer latent variables that share a common variance and are unobservable, which is known as reducing dimensionality (Bartholomew et al., 2011). Exploratory Factor Analysis (EFA) was used because a number of factors influencing variables and to analyzed which variables 'go together' (De Coster, 1998). The focus was on some key factors rather than having to consider too many variables that may be trivial. To evaluate the adequacy of the survey data, the Kaiser-Meyer-Olkin (KMO) test (Kaiser, 1960) and Bartlett's test of sphericity were conducted to test the strength of the relationships among the variables (Bartlett, 1954). That is, the test of sphericity, sampling adequacy and multivariate normality. The KMO value represents the ratio of the squared correlation between the variables to the squared partial correlation between the variables, which varies from 0 to 1. Cronbach's Alpha measures the internal consistency with a coefficient ranges from 0 to 1. The higher the score, the more reliable the internal consistency.

As a general guide, rotated factors that have two or fewer variables should be interpreted with caution. A factor with two variables is only considered reliable when the variables are highly correlated with each another ( $r > .70$ ) but fairly uncorrelated with other variables. The recommended sample size is at least 300 participants, and the



variables that are subjected to factor analysis each should have at least five to ten observations (Comrey and Lee, 1992).

### **3.12 Conclusion**

This chapter looked at the research methodology that was employed in the study. In these regards, it deals specifically with areas such as: the research design where mix method approach was used for the study. The sampling techniques were also both probability and non-probability methods. This chapter looked at methods of data collection, sources and instruments and data analysis. It provides justification of the selection and a brief description of the study area.



## CHAPTER FOUR

### RESULTS AND DISCUSSION

#### 4.1 Introduction

This chapter presents the findings and discussions of results of the data obtained from the field. The chapter is divided into relevant themes or sections based on the objectives of the study. The purpose of the study demanded that data was to be generated both from crop farmers and institutional structures, specifically those tangled in urban growth, agricultural land use and food crop production. The purpose of this chapter is to use data from the selected study communities to investigate whether the conceptual and theoretical framework issues discussed in Chapter Two, concerning the assessment of urbanization and urban expansion impact on agricultural land use and how farmers are coping, agrees with the findings.

#### 4.2 Socio-Demographic Characteristics of Respondents

Farming starts at an early age for many people living in the periphery or rural areas or at the fringes of Wa (Peprah, 2014) but has been hit by changing attitudes due to urban expansion, which has affected the population bracket engaged in farming on both subsistence and commercial basis. The socio demographic characteristics discussed issues of respondents' age, sex, marital status, educational background among others. Table 4.1 reveal that the most dominant age was 46-59 years and 36-45 years representing 36.8% and 33.8% respectively. This means that a chunk of the population is basically into the dominant economic activity which is crop farming. This was because majority of the respondents were within the economically active population. This has a profound implication for development and of quality of life of the people as



confirmed by Tiani Salifu (2013) that the youth working class of most populations are likely to be hardest hit by the effects of land use changes initiated by urban expansion.

About 22% of the respondents represented the ages above 60 years and 7.6% as ages between 18-35 years. De Zeeuw et al., (2011) revealed that Peri-urban agriculture make key economic and social contribution in peri urban households through poverty reduction and social inclusion of marginalized groups (the aged without a pension, unemployed youth, people with disabilities, those afflicted by disease, refugees etc).

About 78% of the respondents were males and 22.2 % were made up of females as shown in Table 4.1. Majority of the households were controlled by men because of the patrilineal system of inheritance practiced in the study areas and was in accordance with tradition. While farmers introduce their children to crop farming at an early stage agriculture was still challenged with urban expansion. Many children do not attend formal schools. Educational attainment turns out to be low as 34.9% of the respondents had basic education, 43.8 % had no education, only 2.4 % had reached tertiary level, SHS Level had 7.3 %, and GCE O'A' Level 11.6% as in Table 4.1. Whiles grater majority of the respondent have some educational background, nearly half of the respondents have education between basic and tertiary. Slightly above 40% are illiterates which is in accordance with the illiteracy rate of the region. Formal education is very minimal in the study area with almost 45% of the population attaining up to basic level with those without education being in the majority. However, increasing farmer's patronage in informal educational ideas couple with their minimal formal educational background has had influences on their responses to urban growth impacts on agriculture. A farmer at Kpongo indicated that:



“he learnt how to apply fertilizer and animal manure back at school when they use to have school gardens/farms which they mostly visited every Fridays”.

**Table 4.1: Demographic Characteristics of Respondents**

| Variables          | Farmer Household head respondents |           |             |
|--------------------|-----------------------------------|-----------|-------------|
|                    | Age                               | Frequency | Percent (%) |
| 18-35 years        | 28                                | 7.6       |             |
| 36-45years         | 125                               | 33.8      |             |
| 46-59 years        | 136                               | 36.8      |             |
| 60 years and above | 81                                | 21.9      |             |
| Sex                |                                   |           |             |
| Male               | 288                               | 77.8      |             |
| Female             | 82                                | 22.2      |             |
| Level of Education |                                   |           |             |
| Basic              | 162                               | 34.9      |             |
| S.H.S              | 27                                | 7.3       |             |
| GCE O'/A' Level    | 43                                | 11.6      |             |
| Tertiary Level     | 9                                 | 2.4       |             |
| None               | 129                               | 43.8      |             |



**Source; Field Survey, 2017.**

The women leader at Kperisi outline that “she did not go to school but she was taught by one reliable extension officer from Wa Ministry of Food and Agriculture (MoFA)



office". This however explains how formal and informal education benefits farmers responses to urban growth on some coping strategies adopted to enhance and sustain agriculture.

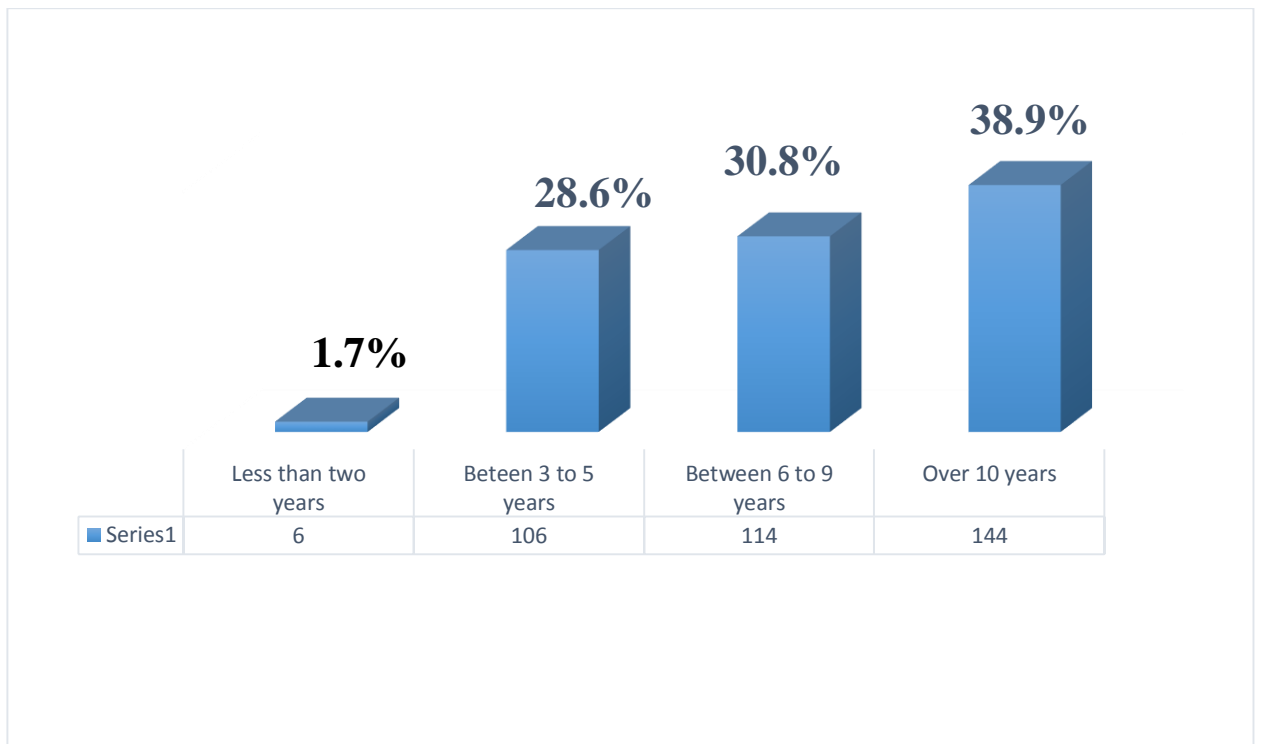
#### **4.2 Farming Experience**

The survey discovered that 38.9% of the respondents have stayed in the study area for more than 10 years and are believed to have much information to help the analysis of land use changes in the study area. The rest of the respondents (30.8%) have lived in peri urban Wa between 6 to 9 years, 28.6% have stayed in Wa for 3 to 5 years and, at least each farmer interviewed had stayed in the study area for 2 years and above. The duration of stay in the study area was much necessary because the respondents provided much needed information to help in the analysis of the state of land use, land use change direction and the dominant coping strategies farmers are adopting to sustain and enhance peri urban crop farming in Wa, and for that matter given credible results for the study.



Even though those who have stayed in the study area less than 5 years were interviewed, the aim was to get the present information about land use/cover change in the study area. When inquired about the respondents 'number of years they have farmed in Wa, 38.9% said they have farmed more than 10 years, 30.8% responded to have farmed between 6 and 9 years, 28.6% have been farming for between 3 and 5 years and those who have spent least 2 years in farming were only 1.6% as presented by Figure 4.1.

**Figure 4.1: Duration of stay in this town as a Farmer**

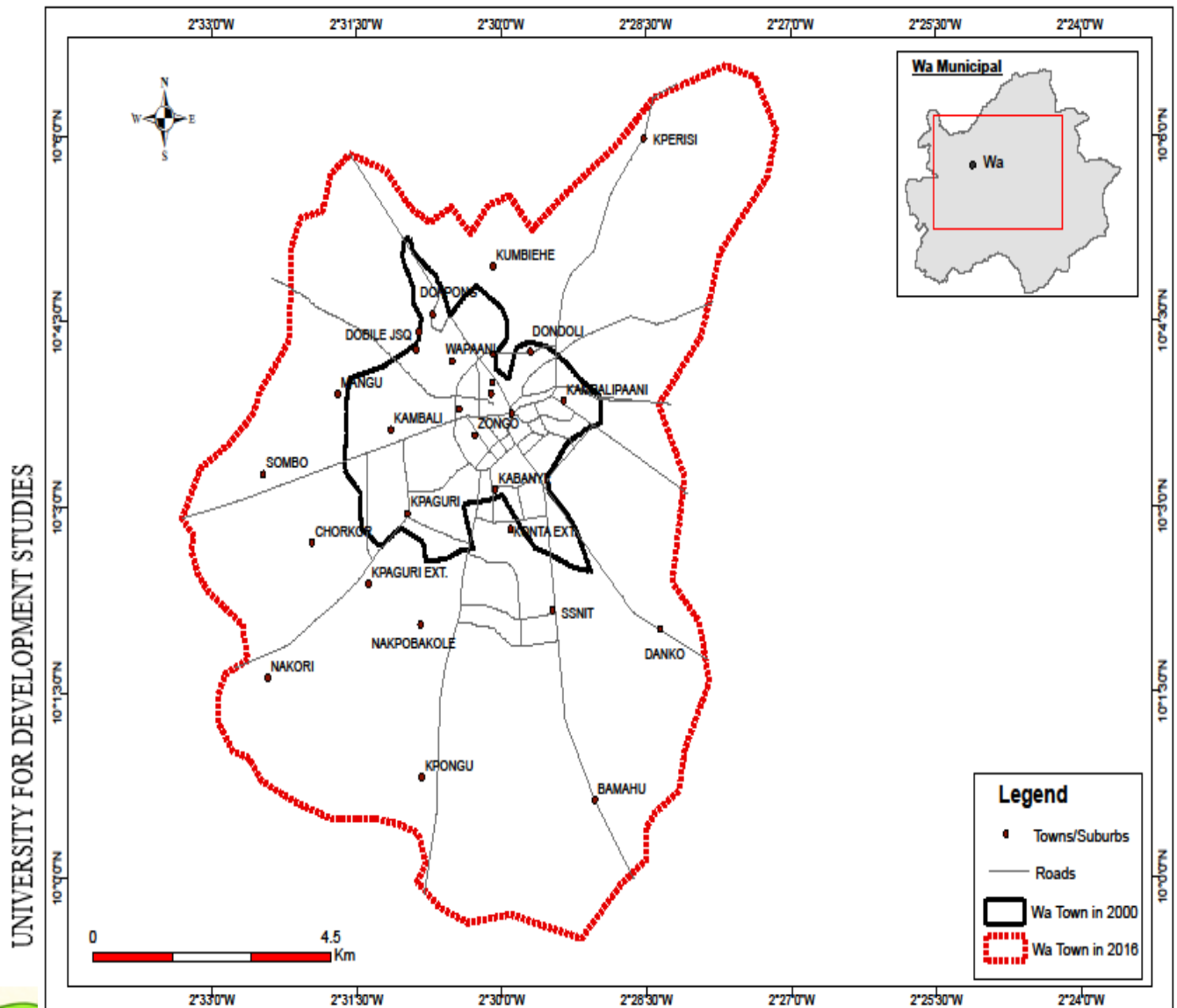


**Source: Field Survey, 2017.**

### 4.3 The Nature of Urban Expansion in Wa

#### 4.3.1 Extent of growth of Wa

This section answers research question and objective one, which seeks to examine the nature of urban expansion in Wa. The study showed that the urban expansion in Wa has been quite slow until the early 2000 following key developmental activities such as the redevelopment of the township and the upgrading of the city core. The urban area of Wa has outstrip its boundaries to engulf most peri urban areas including the study communities. This is in line with Tegegne (2002) who established that urban growth is a spontaneous phenomenon that leads to unplanned growth displacing neighbouring rural farming communities. Cohen (2005) also supports this assertion when he observed



Studies (UDS) of Sombo.

Figure 4.1: Extent of Expansion of Wa from 2000 to 2016

Source: Author's construct, 2017.

Wa and its environs attracted the emergence of housing rental market as well as commercial facilities springing up to cash-in on potential consumers (student populations). However, the relocation of the campus in 2006 to Bamahu has slowed down growth in the formal area. Developments along the Wa-Kumasi Road in the south of the city have been phenomenal in the past decade following the relocation of the Wa Campus of UDS to Bamahu in 2006 (Amoah, 2012). This has brought a lot of developers and speculators into the area for hostels and rental accommodation facilities for students whereas campus churches in their quest of having their own church building have contributed to the pressure on the arable land of farmers. Many private residences and businesses have also sprung up in the area due to improved commutation to the city centre.

It was observed that expansion on this route is extending all the way to the neighbouring villages of Bamahu, such as Kunfabiala, Kongpaala and Piisi. In an interview with some key informants, they attributed the growth of Bamahu to UDS, a situation that a key informant claimed is having effects on agriculture. One farmer within and around campus revealed that;

*farming on campus will never ceased because the most arable lands have been taken away with scattered buildings of the University giving us the chance to still farm on the little arable land.*

*One man said that;*

*“returns in farming has reduce currently and I prefer farming within Bamahu to wasting money and other resources for a reduced output”.*



Though, Development along the Wa- Kpongua road saw the establishment of Wa Polytechnic and the Wa Technical Institute much of the growth was realised in the western and the southern parts in the last decade beginning in the early 2000s.

#### **4.3.2 Changes in Land Use/Land Cover in Wa from 2000 to 2016**

A greater number of respondents (98%) established that they have experienced inevitable change in the land cover for the past decade as shown in Figure 4.3. Population growth has been found not to be the cause of environmental change in the study of Boserup (1981) but has contributed to land cover changes, as human beings need to respond to the natural demands of population growth such as food crop production, housing, and extraction of natural resources to generate income. Other studies have positively linked population growth to the destruction of the environment such as deforestation, sand winning among others as in the study of Olima and Washington (2003) that pressure exerted by increasing population and rapid urban growth deprive other sectors such as agriculture.



While growth poles tend to influence urban growth as well as distant or some peri-urban receiving regions, Naab et al. (2013) argues that a major problem of rapid urban growth is changing land use patterns that affect agricultural land use, which influences farm size loss and yield loss of farmers. A Key informant in Bamahu disclosed that:

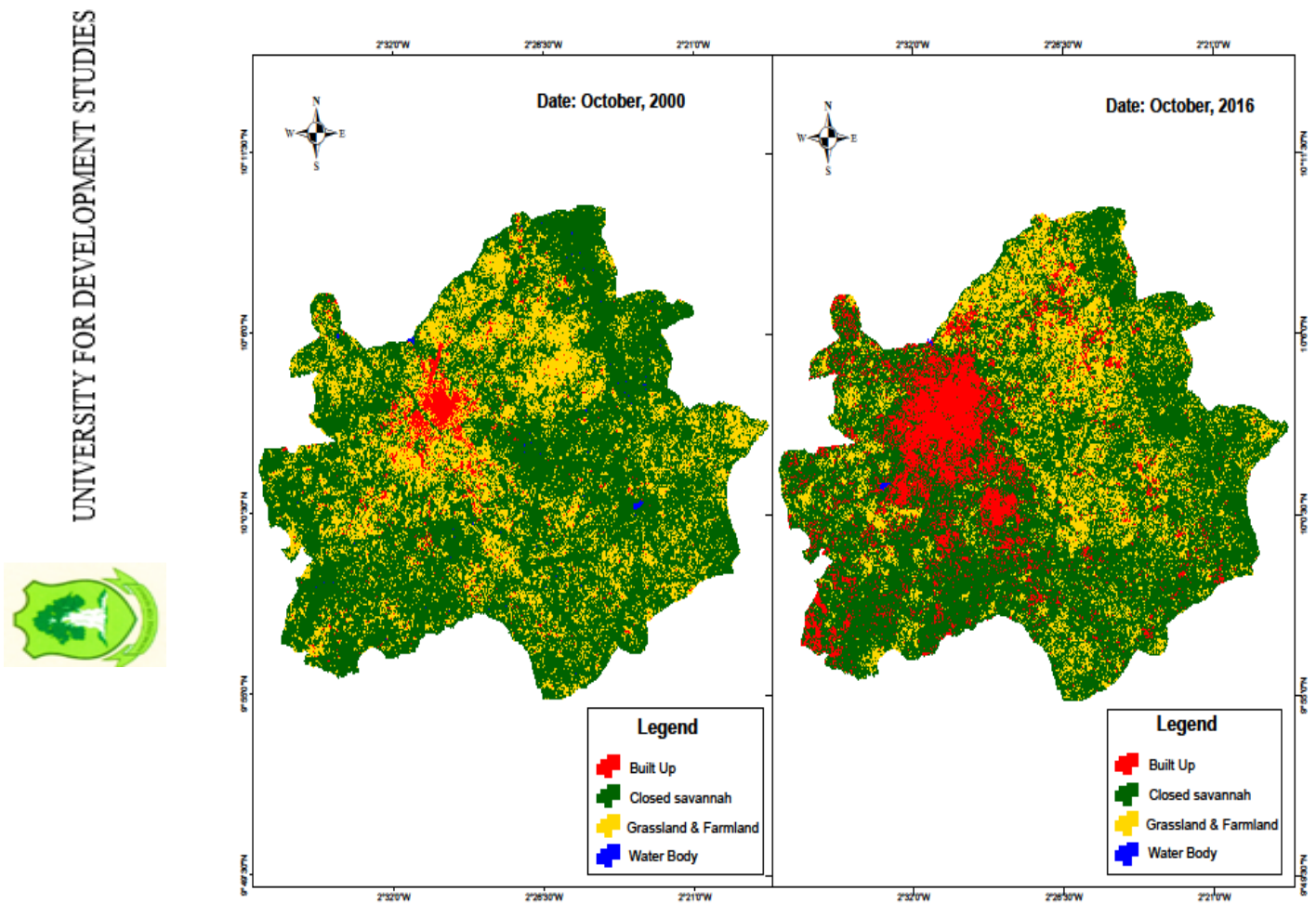
*“there was a green separation between Wa Township and Bamahu community. what do you see now? Buildings and a big school which occupy hundreds of land acres which was formally farm lands and green”.*

He attributed it to UDS as a growth pole and human population increase as the cause of land cover changes of in the study areas. This was supported by 64% of the respondents to the causes of change of their land cover and their loss of arable lands which has pushed most farmers far from the community. Change in land cover and increasing sand winning due to the construction of residential facilities in the areas was a reason, representing 36 %. Shalaby (2012), Tegenge (2000), and Nunan (2001) studies attributed land lost to urbanization and its demands at the Nile Delta, Addis Ababa. According to Lambin et al. (2001), the pace, magnitude and spatial reach of direct and indirect alterations of the Earth land surface by humans in recent decades, are unprecedented. Also, in comparing this study with that of Atu et al. (2013), some similarities were identified.

Results from the 2000 to 2015 analysis Table 4.1 indicated that the study area has suffered a substantial quantity of change with reducing steadily over the years though some percentage of farmland still exist because the areas are predominantly agricultural zones mainly attributed to more engagement in subsistence and commercial farming. It was revealed that between 2000 and 2015, Grassland and farmlands had a total of 3835.1 hectares of land cover compared to other features such as build up which has increased significantly from 1989.6 hectares in 2000 to 7954.5 hectares with a difference of 5964.84 hectares hence confirming Adjei, (2014) study that urban Africa green spaces are depleting at an alarming rate which is now occupying a small fraction of the landmass of several urban areas as shown in Figure 4.2.



Closed savannah, normally regarded as forest, has decreased from 39,725.0 hectares to 37,659.2 hectares representing 5.14 decrease in terms of its land cover. Hence, 2,065.8 representing a decrease in size 2.77 was converted into built up. The remaining was changed into mainly bare land, which is currently playgrounds and funeral grounds in some of the communities. Built up increased greatly by 5,964.84 hectares and the percentage change of increase is 8.00. Cultivated land lost significantly about 3,835.1 hectare of land cover between 2000 and 2015.



**Figure 4.3 Map showing the extent of land cover changes and types in Wa**

Factors the study identified as the cause of these changes, largely included reduction in rainfall patterns, deforestation, increase in build ups through urban expansion, sand

winning among others. Based on Landsat satellite imagery from 2000 to 2015, the build ups has expanded 10.25 % annually over the period as shown in (Table 4.2).

**Table 4.2: Land Use/ Land Cover for Wa between 2000 and 2016**

| Land Use/<br>Cover                      | 2000<br>(Ha) | 2005(H) | 2010(H) | 2015<br>(Ha) | Amt<br>Change<br>(Ha) | Rate of<br>Change | Remark    |
|---|--------------|---------|---------|--------------|-----------------------|-------------------|-----------|
| <b>Water Body</b>                       | 86.5         | 34.7    | 29.9    | 22.6         | -63.9                 | -0.09             | Decreased |
| <b>Closed savannah</b>                  | 39725.0      | 981.1   | 1084.7  | 37659.2      | -2065.8               | -2.77             | Decreased |
| <b>Built Up</b>                         | 1989.6       | 2768    | 3195.16 | 7954.5       | 5964.84               | 8.00              | Increased |
| <b>Shrub, grassland &amp; farmlands</b> | 16338.1      | 1098.9  | 2736.2  | 12503.0      | -3835.1               | -5.14             | Decreased |
| <b>Total</b>                            | 58139.2      |         |         | 58139.3      |                       |                   |           |

**Source: Field Survey, 2017.**

Results of this objective confirms Seto and Kaufmann's (2003) study that vast tracts of agricultural lands in traditional agrarian communities are being metamorphosed by a changed economy enveloped by urban growth and urban formations at the fringes.





Agricultural production changes to landscape fragmentation and green space deterioration with agricultural lands conversion to urban development has contributed negatively to agricultural development (Luoto et al., 2003). However, land uses for residential, industry and commercial tend to dominate agricultural lands in the bid for space in most urban setup (Lerise et al., 2004). This was supported by Naab et al. (2013) who argued that the major problem of rapid urban growth is changing land use patterns which affect agricultural land use thus land loss and output loss. These inevitable situations in most urban area render pressure on the dominant economic activity that is agriculture and rendering farmers to adopt other alternatives in place of farming such as engaging in small businesses, woodcarving, charcoal burning and others. Conclusively, Eledi and Kuusaana, (2014) revealed that indeed large tracts of hitherto agricultural lands are indiscriminately being converted to urban infrastructure, especially housing. Many of the respondents (74%) ascribed the cause of urban growth in Wa to high price of land.



#### **4.4 Effects of Urban Growth on Peri Urban Agriculture**

##### **4.4.1 Land Acquisition Verses Food Crop Production in Wa**

This section answers research question and objective two that seeks to access the effects of urban expansion on peri urban agriculture in Wa. The study showed that there is a rural-urban divide in land management in Wa and traditional authorities are in control and management of about 80% of the municipality's land mass, especially in rural areas. Bugri (2013) noted that in Ghanaians, particularly in rural areas, the most important and relevant institution in terms of land relations is the traditional authority itself, in the form of the chief, traditional councils, land allocation committees. Usufruct rights (tenants and borrowers) are often evicted to make land available for sale to

outsiders for urban development (Rakodi 1999). They are Allodial title (land vested in stools or skins), Freehold, Sharecropping (Abunu (a half share) and Abusa (a third share) outright purchase (selling) which is currently on going, as a gifts, through inheritance and lease.

The commonest land tenure system which determines land for agriculture in the study areas was through inheritance which had 43%. There were purely indigenes in the study area who are farmers and have spent over 10 years in the study area who indicated that farmlands used to be acquired free of charge but the situation is different today. 7%, 23% representing Lease and outright purchase respectively. However, agricultural land through lease or rent from the land owners has been expensive due to the urban expansion and its effects. This has influenced land market allocations to land resources, politically powerful, resource-rich are the uppermost and best users privately.

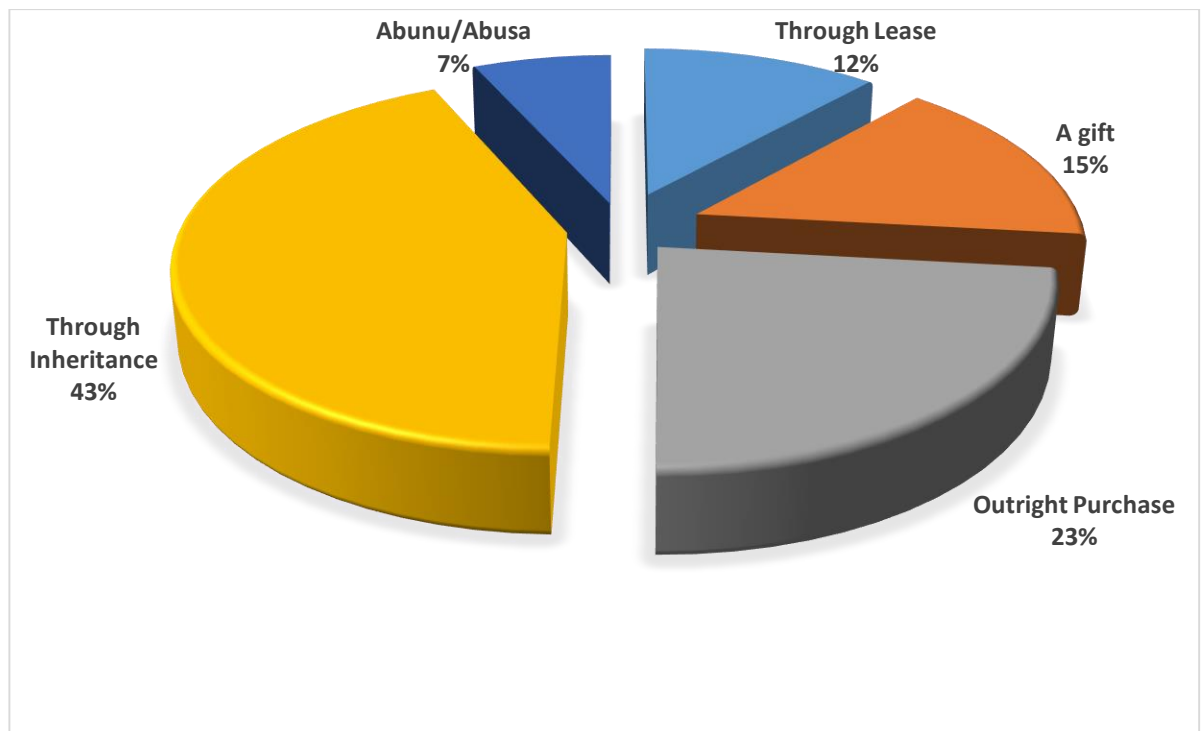
The survey also identified farmers who are engaged in Abunu/Abusa (work and share) farming. They formed 12% of the respondents. With this practice, the farmer does not pay for the land, instead he/she cultivates his/her preferred crop(s) and the produce is shared between the farmer and the land owner. It sometimes hinges on the preliminary arrangement the parties make. It could be either  $\frac{1}{2}$  Abunu (equal sharing) or  $\frac{2}{3}$  Abusa (dividing the proceeds into 3 equal parts) with the farmer taken two See Sarpong, 2006). It was revealed that farmers who engage in this system were secured in a way. Some respondents explained that the land owner has a share in the produce and may not allow infiltration or encroachment of the farmland until the end of the season and where tree crops were grown the situation works more to the advantage of the farmers.



In an expert interview with the municipal MoFA field officer disclosed that:

*“the forest reserve at Konta near Danko that is, one of the study communities has been there untouched though there have been various approaches by government and other rich people in Wa, the reality is that let a very vibrant family member approach it there we will see high rise buildings”.*

Key informant interview revealed that, *large piece of land at kperisi has been there for long and well protected, even though urban expansion has reached our lands, but because the land owner has purchased the land outright and has also registered, the land has been there untouched”.* There is also a similar case in Bamahu where the owner had to erect something on it to secure a large tract of land. This was in line with Zana *et al.* (2013) study conducted in Tamale on the effect of urbanization on livelihood options available.



**Figure 4.4: Land Acquisition for in Peri-Urban Wa**

**Source: Field Survey, 2017.**

#### **4.4.2 Factor Analysis for Reduction in Agricultural lands**

Crop land reduction and yield reduction in the area is seen as a twin concept though there is an increment in the use of fertilizer in contemporary farming but crop land reduction positively relates to yield lost in the study area. Unreliable rainfall, high land values, tenure arrangement, agricultural land conversion, sand winning, and expensive land prices were scaled in the factor analysis which was agree (3), strongly agree (4), disagree (2), strongly disagree (1). Data suitability test was carried out with Cronbach's Alpha (Internal reliability) of 0.7402, Kaiser-Meyer-Olkin Measure of Sampling Adequacy of 0.5721, Bartlett's Test of Sphericity of 749.346 and a determinant of 6.245E-04 which all set the ground for the analysis of how prevalent of the factors in table 4.3 on to the reduction of agricultural lands in the study communities.

##### **4.4.2.1 Attribute Transformation Matrix of the factors contributing crop land reduction**

Table 4.3 shows eigenvalues and the amount of variance explained by each successive factor.



**Table 4.3: Extraction of Principal Component and cumulative variance of the factors**

| Total variance exp | I.E.V        | % of Variance | Cumul of ative % | Tot al | % of Varia nce | Cumul ative % | Total | % of Varia nce | Cumul ative % |
|--------------------|--------------|---------------|------------------|--------|----------------|---------------|-------|----------------|---------------|
| 1                  | <b>1.669</b> | 23.839        | 23.839           | 1.6    | 23.8           | 23.8          | 1.63  | 23.29          | <b>23.29</b>  |
| 2                  | <b>1.206</b> | 17.226        | 41.065           | 1.2    | 17.2           | 41.0          | 1.19  | 17.03          | <b>40.33</b>  |
| 3                  | <b>1.130</b> | 16.148        | 57.213           | 1.1    | 16.1           | 57.2          | 1.18  | 16.88          | <b>57.21</b>  |
| 4                  | .911         | 13.802        | 71.015           |        |                |               |       |                |               |
| 5                  | .740         | 11.424        | 82.439           |        |                |               |       |                |               |
| 6                  | .500         | 10.943        | 93.382           |        |                |               |       |                |               |
| 7                  | .463         | 6.618         | 100.00           |        |                |               |       |                |               |

**Source: Field Survey, 2017**

The Initial Eigenvalues are for a principal components analysis, in which the communalities are one. The final communalities are estimated by iteration for the principal axis factor analysis, as mentioned earlier. As shown in the table, they are less than one, and the amount of variance accounted for is reduced, as can be seen in the second column of the section headed Extraction Sums of Squared Loadings. The rest of the factor analysis is based on three factors, because three factors have eigenvalues greater than one.

A **scree plot** displays the eigenvalues associated with a component or factor in descending order versus the number of the component or factor. **Scree plots** in principal components analysis and factor analysis to visually assess the factors explain most of the variability in the data of factors contributing to cropland reduction. At the point that



the plot begins to level off, the additional factors explain less variance than a single variable.

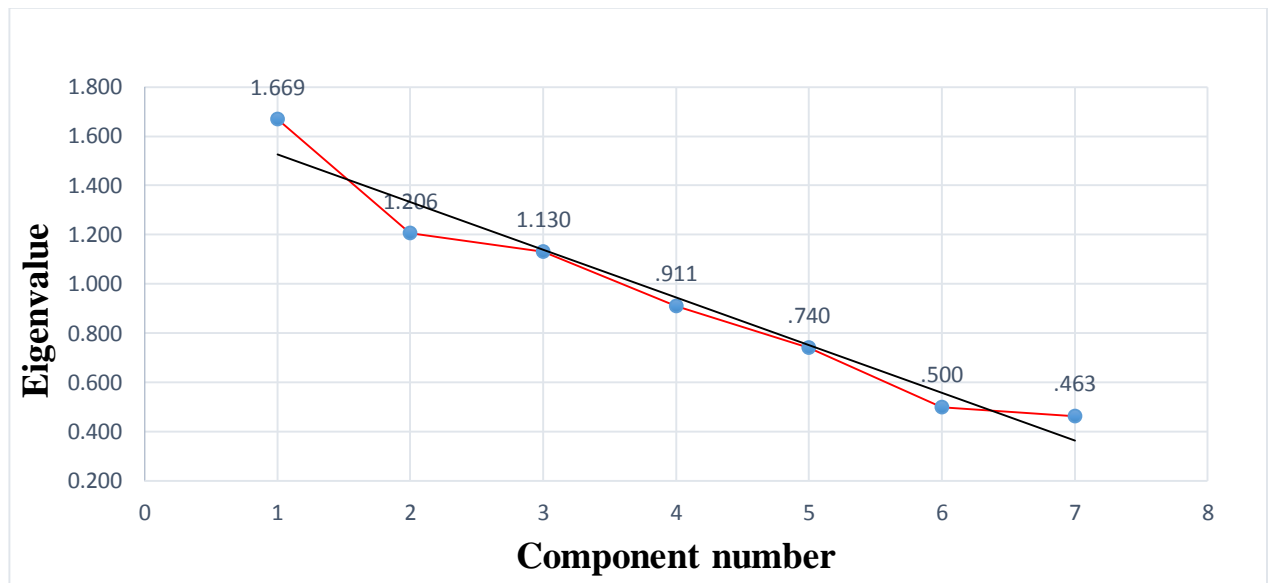


Figure 4.5: Scree Plot Representing eigenvalue's and its components

Source: Field Survey, 2017

#### 4.4.2.2 Principal Component Analysis for Factors Contributing to Crop Land Reduction

Table 4.3 indicate the principal factors in accordance with component 1, 2 and 3 to unveil the major ones that best influence crop land reduction in the study area. The first group in the first component was agricultural land conversion which recorded 0.807. This imply that ongoing encroachment to agricultural lands in the study communities are for residential and commercial land uses and has a bearing in the reduction of soil fertility as so many constructional activities render the key green space for farming under immense pressure. Pribadi and Pauleit (2015) confirmed that human activities, especially urbanization, have resulted in a significant loss of agricultural lands during

the past two decades around the world which has contributed to the shrinking nature of farming lands.

The second component in Table 4.4 indicates sand winning and land tenure arrangement as the principal factors that also influences crop land reduction in the study area which recorded 0.770 and 0.546 respectively. Sand winning has been increasing in most growing cities in Ghana because of increasing constructional activities. As a process of land degradation, sand winning destroys the soil profile, damages soil surface structure and changes scenery of the land (Mehta et al., 2007) hence it's in line with recent upsurge in demand for savannah sand and gravel in Wa as indicated by Pephrah (2013). This has diminished all agricultural activities in the area because the culvert created by such activity redirect rain water onto farmlands which often disturb farmers and aids soil infertility.



**Plates 4.1 Degrading site in Danko by Sand winning.**

**Source: Field Survey, 2017**







**Plates 4.2 : Degrading site in Bamahu by Sand winning**

**Source: Field Survey, 2017**

This practice was influenced by the land ownership issues in the study area as it was another principal factor. One farmer said that:

*“I bought land outright from the land owners and indicated that their reason was that before Bamahu Township grows to reach that area they will sell the land to total gas station which is a negotiated contract”.*

It was deduced that, land in such areas was far to be used for agriculture as property owner's cash more on the sale of land than to use it for agricultural activities. One farmer said that:

*“landlords are “wicked” because the practice of selling land to sand winners does not allow them to practice shifting cultivation as continuous use already reduced land reduces yield hence they either stop production into other livelihood or stay and apply fertilizer”.*

The last component indicated natural phenomenon (unreliable rainfall) as contributors of farmland reduction was attitudinal change that had 0.577.





**Table 4.4: Component score matrix of the factors that contribute to crop-land reduction**

| Factors of crop-land reduction | Components Groups |             |             |
|--------------------------------|-------------------|-------------|-------------|
|                                | 1                 | 2           | 3           |
| Loss of soil fertility         | .468              | -.081       | -.101       |
| Agricultural land conversion   | <b>.807</b>       | .429        | .301        |
| High land values               | -.499             | .070        | -.025       |
| Sand winning                   | .012              | <b>.770</b> | -.216       |
| Tenure arrangement             | -.516             | <b>.546</b> | .330        |
| Unreliable rain fall           | -.066             | .038        | .449        |
| Attitudinal change             | .119              | -.370       | <b>.577</b> |

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**Source: Field Survey, 2017**

#### 4.4.3 Paired Sample T-Text for Farm Size Loss

The paired sample analysis unearths the number of participants, mean and standard deviation for each condition by reading across each of the two condition rows. While the mean 15 years ago is 11.28 indicating a significant higher farm sizes of farmers in the study communities, mean of the farm size now is 3.3 indicating a significant reduction of farm sizes in the study communities. The deviation about the mean 15 years ago was 7.536 and now is 2.399 with Standard Error variability between sample

means was 0.392 and 0.124 respectively. And a correlation of 0.532 indicating a strong relationship between farm sizes 15 years ago and farm size now.

**Table 4.5: Extraction of Principal Component of Paired Sample T test on Farm size loss**

| Paired Samples Statistics      | Mean  | N   | Std. D | Std. E.M | Correlation | Sig. |
|--------------------------------|-------|-----|--------|----------|-------------|------|
| Pair 1                         |       |     |        |          |             |      |
| Size of farm land 15 years ago | 11.28 | 370 | 7.536  | 0.392    | 0.532       | 0    |
| Size of Farm land now          | 3.3   | 370 | 2.395  | 0.124    |             |      |

Source: Field Survey, 2017

Table 4.5 outline the weight of farm size 15 years ago is 11.28 while farm size now is 3.3. This means that farm size 15 years ago is relatively bigger than farm size now. However, to confirm the outcome of this research, the t-test output in Table 4.5 had a significant difference of 0 hence a change in farm sizes 15 years ago and farm sizes now. The Paired sample differences and significant change in Farm Size at 95% confidence interval around the difference between the two means was 7.988, with a Standard Deviation of 0.342. Deduction from the test are that, majority of the respondents were found to have lost at least a parcel of land to urban expansion. From the survey, none of the respondents have lost their entire farmland in all the communities visited but observations were that in the next 5 to 10 years, apart from



those farmers who acquired their lands through gift, outright purchase or inheritance, most of the farmers interviewed will lose their entire farmlands to uncontrolled urban expansion. This was confirmed by the land use/land cover change data from Landsat (Enhanced Thematic Mapper) images (2000 and 2015) in Figure 4.2 which indicated a 27.7 % decrease of closed savanna in the study area, 80% increase in build-up, and 51.4 % reduction in shrubs and farmlands in the area. Otoo et al. (2006) observed that demand for and access to land for residential purposes are the major drivers for the spatial growth of a city coupled with increase in residential and office accommodation and the growth of infrastructure development. A respondent in Bamahu said that:

*“all my farm lands are situated in the now UDS campus at Bamahu here. Though we all agreed that it was bringing development for our region, some people like me are now suffering because I am landless”.*

This is supported by Hasse and Lathrop (2003) that between 1986 and 1995 in New Jersey, about 53% and 60% of prime farmland was lost to urbanization and resistant surfaces increased by some 9.2% statewide. Observation was that respondents located in those communities with tertiary education as growth poles were angry with the staff in the schools (UDS, Wa Poly, Wa Nursing Training College). This is what one had to say:

*“they think they are knowledgeable, working and farming on our land, government will pay them and make us jobless, foodless”.*

#### **4.4.4 Trend of Farmland Loss in the Selected Peri Urban Communities from 2000 to 2015**

It was revealed in Table 4.6 that land loss was at its peak between 2000 and 2005 in Danko though the development of some growth poles begun in the early 2000s. It was



basically because of its nearness to Wa but land loss in this area has increase in a decreasing rate since 2010.

**Table 4.6 Trend of Farmland Loss in Acres in The Selected Study Communities**

| Study communities | YEARS |      |      |      | Average loss<br>(Hecteres) |
|-------------------|-------|------|------|------|----------------------------|
|                   | 2000  | 2005 | 2010 | 2015 |                            |
| Kperisi           | 11    | 18   | 40   | 90   | 10.6                       |
| Danko             | 31    | 50   | 58   | 78   | 14.46                      |
| Nakori            | 17    | 21   | 58   | 183  | 13.26                      |
| Kpongu            | 14    | 29   | 63   | 111  | 18.6                       |
| Bamahu            | 16    | 35   | 185  | 274  | 34                         |
| Total             |       |      |      |      | 90.92                      |

**Source: Field Survey, 2017.**

Whereas all the other four communities lost their farm lands in an increasing rate they now on their peak especially those with growth poles. Bamahu recorded the highest in terms annual average land loss (34 hectares) and the least was Kperisi which recorded 10.6 hectares and observation was that, this area is now receiving massive development



due to the establishment of the Wa Nursing Training College. Hence the total annual average loss was 90,92 hectares.

#### 4.4.5 Trend of Output loss in the selected peri urban study communities from 2000 to 2015

It was revealed in table 4.7 that output loss was at its peak between 2000 and 2005 in Danko because farm sizes have reduced though the development of some growth poles begun in the early 2000s, it was basically because residential land overtook agricultural land uses in Danko and reduced output since 2010 when output loss lost its peak. Whereas, all the other four (4) lost their farm output in an increasing rate now on their peak especially those with growth poles. Bamahu recorded the highest in terms annual average output loss in tons (879.74) and the least was Kperisi, which recorded 158.64 tons, and observation was that, this area is now receiving massive development due to the establishment of the Wa Nursing Training College. Hence, the total annual average loss of farm output was 2,457.23 tons.



**Table 4.7 Trend of Output Loss in Acres in The Selected Study Communities**

| Study communities | YEARS |      |      |      | Average loss (Tons) |
|-------------------|-------|------|------|------|---------------------|
|                   | 2000  | 2005 | 2010 | 2015 |                     |
| Kperisi           | 20    | 146  | 743  | 1468 | 158.64              |
| Danko             | 63    | 1043 | 792  | 863  | 184.1               |
| Nakori            | 58    | 1106 | 3074 | 3892 | 542                 |
| Kpongu            | 46    | 963  | 2721 | 4264 | 532.93              |
| Bamahu            | 52    | 996  | 4349 | 7799 | 879.74              |
| Total             |       |      |      |      | 2,457.23            |

Source: Field Survey, 2017

#### 4.4.6 Paired Sample T-Text for Output Loss between 2000 and 2015

The paired sample analysis unearths the number of participants, mean and standard deviation for each condition by reading across each of the two condition rows. Whiles the mean 15 years ago is 17.42 indicating a significant higher output loss of farmers in the study communities, mean of the output lost now is 4.2 indicating a significant reduction of farm output loss in the study communities. The deviation about the mean 15 years ago was 30.525 and now is 12.22 with Standard Error variability between sample means of 1.587 and 0.635 respectively and a correlation of 0.599 indicating a strong relationship between farm output 15 years ago and farm size now.

**Table 4.7: Paired sample statistics and correlation for Yield lost**

| Paired Samples Statistics | Mean  | N   | Std. Deviation | Std. Error | Correlation | Sig. |
|---------------------------|-------|-----|----------------|------------|-------------|------|
| Output 15 years ago       | 17.42 | 370 | 30.525         | 1.587      | 0.599       | 0    |
| Output now                | 4.2   | 370 | 12.22          | 0.635      |             |      |

Source: Field Survey, 2017

Table 4.7 outline the weight of farm output 15 years ago was 17.42 whiles farm output now is 4.2. This means that farm output 15 years ago is relatively bigger than farm output now. However, to confirm the outcome of this research, the t-text output in Table 4.7 is 0 hence indicating a difference between farm output 15 years ego and farm output now. The Paired sample differences of the mean and significant change (0) in farm



output at 95% confidence interval around the difference between the two means was 13.225, with a Standard Deviation of 27.987. After the extent of loss of farmland has been established, the survey further investigated into the extent of loss they have experienced in terms of output. Majority (96%) of the respondents indicated that they have experienced a huge reduction in their output. Out of these 96% affected respondents, 55.8% have lost between 1 and 8 tonns of output annually/seasonally. This threaten food security in the study communities and the region at large hence a high possibility that the figure could increase considering the irregular nature of urban expansion in Wa.

Conclusively, this situation in Wa is not quite different from what was reported by Atu et al. (2013) in Nigeria, where between 2002 and 2012, over 5,200.09 hectares of the former agricultural land was converted to low density residential, commercial and industrial uses and resulted in a total loss of about 600 tons of food crop which has affected the area greatly. Also, in Egypt, a major agrarian country in Africa where the Nile Delta represents the prime agricultural land, about 77.3% of the highly capable farmland and 17.8% of low capable farmland were lost to urban sprawl (between 1984 and 2006) which significantly contributed to food crop reduction in the area (Shalaby, 2012).

#### **4.5 Coping Strategies to Address the Effect of Urban Expansion on Peri Urban Agriculture**

##### **4.5.1 Reasons for peri-urban Food Decline Wa**

Respondents revealed that sand winning is a major reason for the decline in food production, which accounted for 37% of the responses as shown in Figure 4.6. The Town and Country Planning Department head disclosed that:



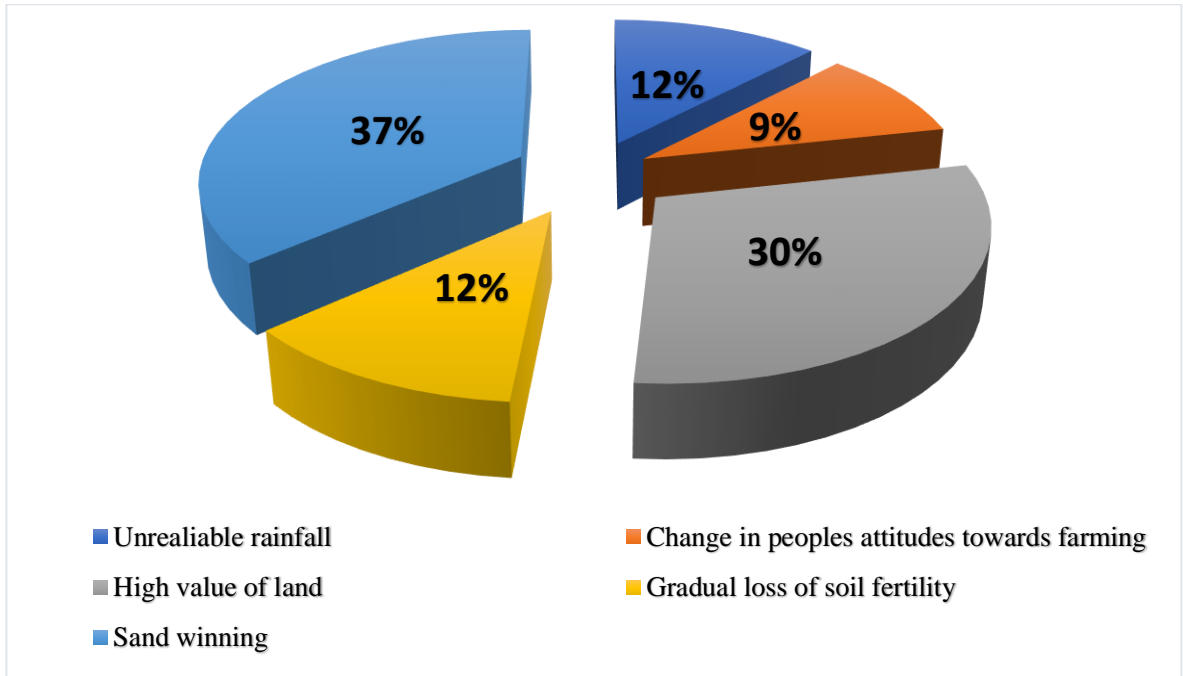
*“the municipality has almost lost most reserved areas to indiscriminate felling of trees, sand winning practices and charcoal burning. He discussed that there has been greater influence on the vegetation through the construction of residential facilities as addressing population growth. He indicated that little they could do about the situation because the land belongs to either individuals, families or skins and they choose to do whatever they want any time they deem it fit hence landlords in the study area selling lands to private users who pay higher land prices”.*

This has, however, reduced agricultural productivity because most land owners in the area issue land for commercial users such as gas/fuel station construction, and sand winning site among which attract higher returns. An Interview with the Agricultural Extension Officer at the MOFA office Wa who was a native and has worked for about 20 years, hinted that:

*“the increase in build ups has deprived most farmers of their farmlands. She indicated that, areas like UDS Bamahu campus was once a state farm, the area between Konta and Bamahu was a serious farming belt which produced enough food for the municipality, Wa Polytechnic area was also a huge farming strap of Wa where a lot of good yam where coming from”.*







**Figure 4.6: Perceived reasons for decline in Food crop production in Wa**

Source: Field Survey, 2017

One disturbing thing was the acquisition of large tracts of land by private estate-developers, companies, individuals and government institutions (education) future use. Though the development of these lands has not been started, which could have been used for farming, yet they are being guarded by concrete wall with a security personnel at the gate.





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**Plates 4.3: Secured arable land for other land uses at Kperisi (Wa Magazine extension)**

**Source: Field Survey, 2017.**

This was indicated in plates 4.3 just opposite of Wa slaughter house just around the Wa magazine extension at Nakori. Perhaps, this is due to fear of future land litigation that may emanate between landlords and the temporal occupants (farmers) who may claim ownership because they have been there for a long time. Land litigation and

confrontations of farmers in Wa has increase people's attitudinal changes in farming. Moreover, gradual decline of soil fertility due to deforestation, continuous cropping and sand winning were mentioned by the respondents as reasons for the decline in farmer's production. Apart from the large mechanized farmers, other farmers, mostly peasant farmers, do not have access to capital, fertilizers, agro-chemicals among others to improve the fertility of the soil, hence low crop yield.

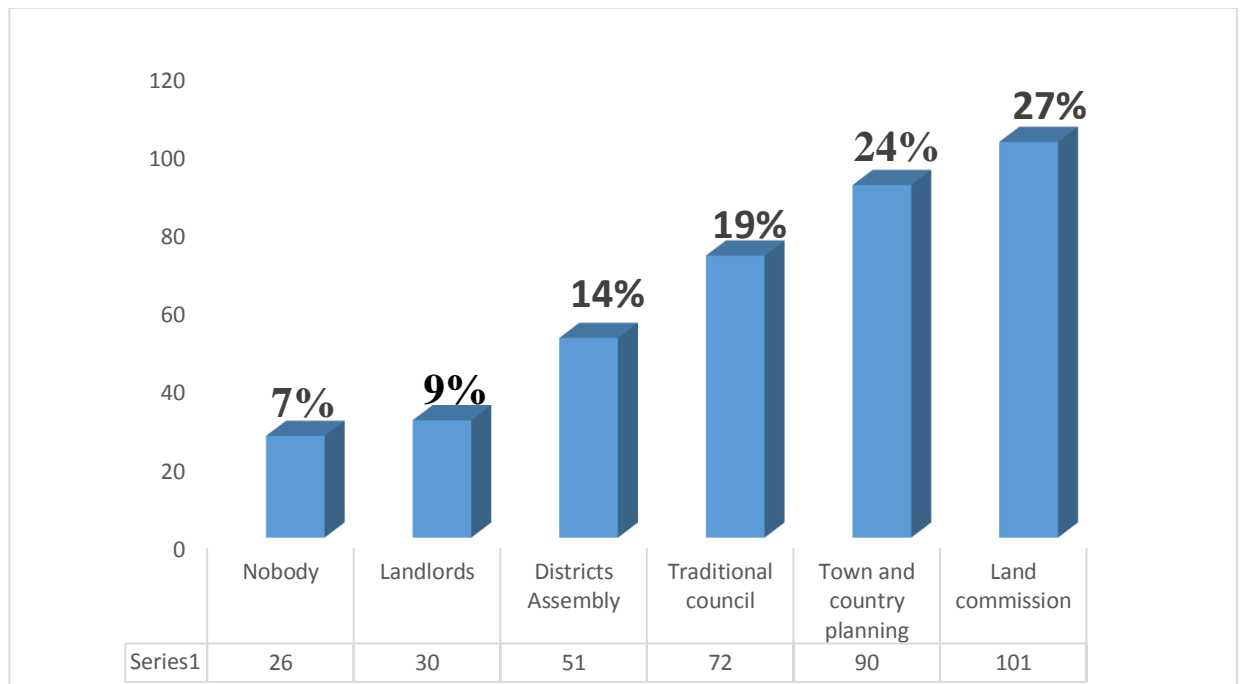
#### **4.5.2. Stakeholders role in Providing Security to Farmers' Livelihood**

Taking into account the nature of urban expansion in Wa, the research further inquired from the respondent who are providing them with livelihood assets security against urban growth in the study communities. In other words, who protects the livelihood asset and activities of farmers in case of land litigation or confrontations? Stakeholders identified in the study areas include the Wa District Assembly, Landlords, Lands Commission, Traditional council, and Town and Country Planning Department. It came out, as indicated in the graph in Figure 4.7 that Lands Commission and the Town and Country Planning Department had 27.2% and 24.32% respectively, though most of the people indicated that bribery and corruption are part of their operations and that they always take decisions in favor of government operations.

However, 19.5% of the respondents indicated that the Traditional Council protect them in cases of any problem concerning their livelihood occupation more especially farming. They outlined the importance of the council as sometimes becoming the arbitrator or negotiator of most land litigation issues. Landlords did very small in protecting their livelihood occupation because of their profit maximizing character on their land and represented 8% of the respondents indicated that they have nobody to provide security for their farming should there be any problem about land issues. These,



according to the survey, are those who acquired their land through gift or outright purchase.



**Figure 4.6 Stakeholders role in Providing Security to farmers' livelihood assets.**

**Source: Field Survey, 2017**



When inquired from the Planning Officer of the municipality, he said that:

*“the Assembly is there as a ceremonial head as far as land ownership and acquisition in the municipality are concerned. He explained that they are powerless in land matters since the lands in Wa are solely in the hands of the Traditional Council/Rulers and the Family Heads. The help offer is to advise them to seek legal advice in case of land litigation between parties”.*

What the Assembly and the respective departments does is the zoning of the area into suburbs and streets, which has nothing to do with land ownership and livelihood security. He further said, even those areas earmarked for agricultural and green spaces

have been violated or defiled by their rulers. The Traditional Council and the Landlords in Wa, according to the respondents, give the highest (30%) livelihood security to the assets of farmers as shown in (Figure 4.6). This security provided by the Traditional Council or the Landlords was not secured, reliable and sustainable to the individual farmers. The motive is that, such documents issued by the Traditional Council or Landlords to the respective tenants are not hundred percent bound by Statutory Law, unless the land is monotonously registered by the leaseholders at the Lands Commission.

#### **4.5.3 Agricultural Coping Strategies for Farmers**

Agricultural coping strategies was examined with factor analysis to determine the most dominant coping strategies farmers adopt in the selected study communities. The strategies were, livestock rearing, intensive application of organic fertilizer, crop rotation, tree cropping, agro forestry, inorganic strategies, (chemical fertilizer application). Data suitability test was carried out with Cronbach's Alpha (Internal reliability) of 0.7402, Kaiser-Meyer-Olkin Measure of Sampling Adequacy 0.564, Bartlett's Test of Sphericity of 626.356 and a Determinant of 7.081E-04 which all set the ground for the analysis of how prevalent of the factors in (Table 4.8) on to the reduction of agricultural lands in the study communities.

Table 4.8 shows eigenvalues and the amount of variance explained by each successive factor. The Initial Eigenvalues are for a principal components analysis, in which the communalities are one.





**Table 4.8. Extraction of Principal Component**

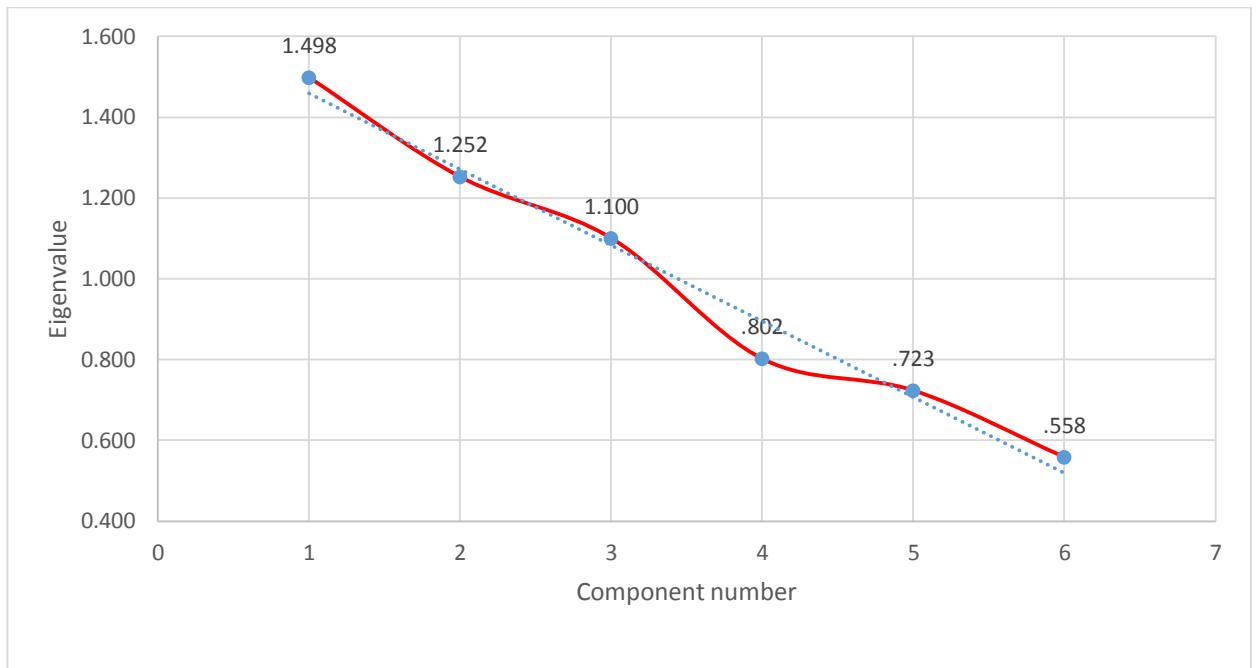
| Total variance explained | Initial Eigenvalues | % of Variance | Cumulative % | Total | % of Variance | Cumulative % | Total | % of Variance | Cumulative % |
|--------------------------|---------------------|---------------|--------------|-------|---------------|--------------|-------|---------------|--------------|
| 1                        | 1.498               | 24.96         | 24.96        | 1.49  | 24.96         | 24.96        | 1.41  | 23.62         | 23.62        |
| 2                        | 1.252               | 20.86         | 45.82        | 1.25  | 20.86         | 45.82        | 1.25  | 20.89         | 44.52        |
| 3                        | 1.100               | 19.46         | 65.28        | 1.16  | 19.46         | 65.28        | 1.24  | 20.76         | 65.28        |
| 4                        | .802                | 13.35         | 78.64        |       |               |              |       |               |              |
| 5                        | .723                | 12.05         | 90.69        |       |               |              |       |               |              |
| 6                        | .558                | 9.30          | 100.0        |       |               |              |       |               |              |

Source: Field Survey, 2017

The final communalities are estimated by iteration for the principal axis factor analysis, as mentioned earlier. As shown in the table, they are less than one, and the amount of variance accounted for is reduced, as can be seen in the second column of the section headed Extraction Sums of Squared Loadings.

A **scree plot** displays the eigenvalues associated with a component or factor in descending order versus the number of the component or factor. Scree **plots** in principal components analysis and factor analysis to visually assess the factors explaining the most dominant agricultural coping strategies. At the point that the plot begins to level off, the additional factors explain less variance than a single variable.





**Figure 4.7: Scree Plot Representing eigenvalue's and its components in groups**

Source: Field Survey, 2017

Table 4.9 indicate the principal factors in accordance with component 1, 2 and 3 to unveil the major groups of coping mechanism farmers adopt in agriculture. The first group component, *same old crop on small piece of land and organic fertilizer application*, recorded 0.710 and 0.684. It was revealed by the survey that most farmers have no option to address the urban expansion phenomenon, hence they resorted to the continuous use of land over a long period. A farmer at Danko indicated that: *“because of constants pressure exerted onto them, they are now concentrating the small piece of land at their disposal with some crops with short gestation period that might occupy the land temporary before other users comes to buy those lands outright”*.



Also, the intensive use of organic fertilizer by farmers had a recognition and was basically adopted to help improve arable land in the area. The leader of Yam Growers Association at Kpongu had this to say:

*“farmers organize with the municipality to dispose human waste on lands and after 6 months, ploughing and planting of crops, whereas others uses compost as a means of boosting the fertility of the land for farming”.*

This was in line with Abd-Allah et al., (2001), Aly (2002) and Ehalotis et al. (2005) that application of organic fertilizer increased agricultural output and the natural taste of food crops.

Crop rotation and tree cropping was the second group of farming coping strategies with constant urban expansion in the study area with 0.691 and 0.649. Crop rotation was widely practiced by the people as majority of the farmers, for instance at Nakori on farmer said that:

*“I have been educated by the district MoFA officers on the principles of crop rotation and that has become a very good strategy for using a piece of land for a longer period of time”.* Others constituting 7% had it that tree cropping was one good way to secure land by protecting it.

Inorganic fertilizer was the third group unveiled by the analysis. The use of fertilizers is essential in improved crop production. It was however revealed by the study that inorganic coping strategies (inorganic fertilizer) are mineral or chemical fertilizers with grater output (Omidire et al., 2015).





**Table 4.9: Agricultural coping strategies in groups of components**

| Agricultural coping strategies              |                   |       |       |
|---|-------------------|-------|-------|
| Organic strategies                          | Components Groups |       |       |
|   | 1                 | 2     | 3     |
| Same old crop on small piece of land        | .710              | .057  | .177  |
| Intensive application of organic fertilizer | .684              | -.051 | .181  |
| Crop rotation                               | .018              | .691  | .055  |
| Tree cropping                               | -.099             | .649  | -.085 |
| Agro forestry                               | -.040             | -.091 | .406  |
| Inorganic strategies                        |                   |       |       |
| Fertilizer application                      | .177              | .057  | .810  |

Source: Field Survey, 2017.

The nutrients in mineral fertilizers are relatively high, and the release of these nutrients is quick because there is no need for decomposition. This recorded .810 at the 3<sup>rd</sup> component in the last farming coping strategy in the study area. A farmer at Danko confirmed that: *“some farmers for more profit will apply chemical fertilizer to increase their output but for me I do not because fertilizer yam is not good for Fufu”*.

#### 4.6 Other Livelihoods Coping Strategies

Other livelihoods coping strategies were examined with factor analysis to determine the most dominant coping strategies farmers adopt in the selected study communities. The strategies were, becoming a cleaner, becoming a security, weaving of smock, sand winning, and hunting, wood carving. Data suitability test was carried out with Cronbach's Alpha (Internal reliability) of 0.682, Kaiser-Meyer-Olkin Measure of



Sampling Adequacy 0.505, Bartlett's Test of Sphericity of 527.346 and a Determinant of 7.06E-04. Table 4.9 shows eigenvalues and the amount of variance explained by each successive factor. The Initial Eigenvalues are for a principal components analysis, in which the communalities are one is red.

**Table 4.9 Extraction of Principal Component**

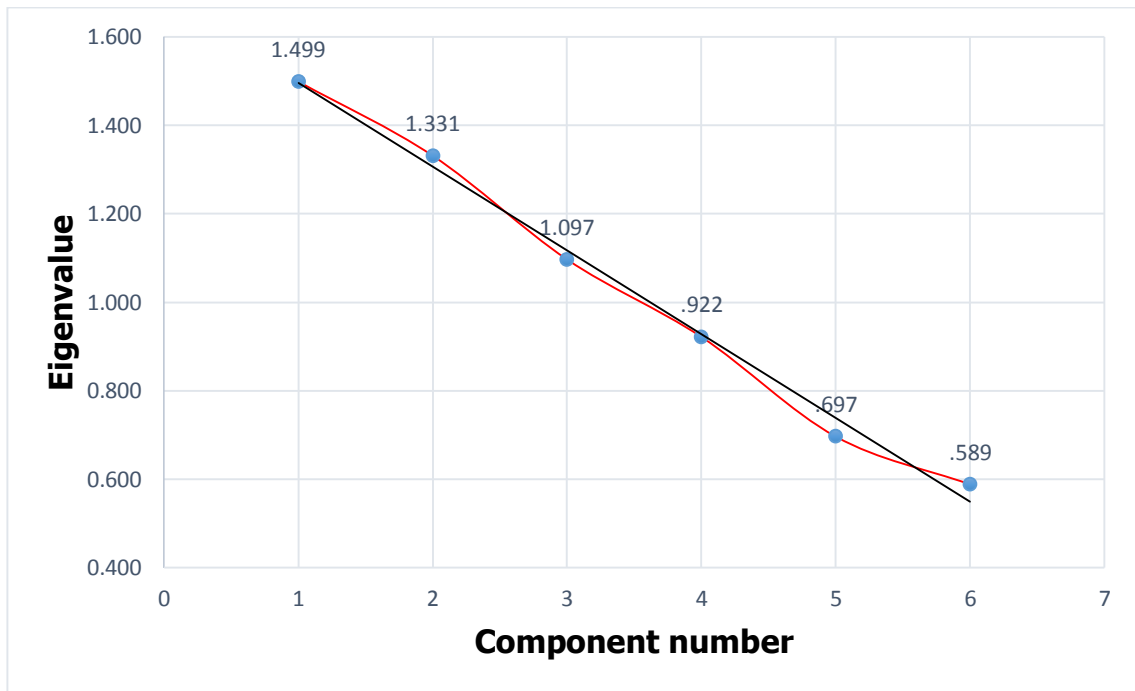
| Total variance explained | Initial Eigenvalues | % of Variance | Cumulative % | Total | % of Variance | Cumulative % | Total | % of Variance | Cumulative % |
|--------------------------|---------------------|---------------|--------------|-------|---------------|--------------|-------|---------------|--------------|
| 1                        | 1.499               | 24.98         | 24.98        | 1.4   | 24.98         | 24.98        | 1.4   | 23.65         | 23.65        |
|                          |                     |               |              | 9     |               |              | 1     |               |              |
| 2                        | 1.331               | 22.18         | 47.17        | 1.3   | 22.18         | 47.17        | 1.2   | 21.56         | 45.22        |
|                          |                     |               |              | 3     |               |              | 9     |               |              |
| 3                        | 1.097               | 17.01         | 64.18        | 1.0   | 17.01         | 64.18        | 1.1   | 18.96         | 64.18        |
|                          |                     |               |              | 2     |               |              | 3     |               |              |
| 4                        | .922                | 15.36         | 79.55        |       |               |              |       |               |              |
| 5                        | .697                | 10.62         | 90.18        |       |               |              |       |               |              |
| 6                        | .589                | 9.81          | 100.00       |       |               |              |       |               |              |

Source: Field Survey, 2017

A **scree plot** displays the eigenvalues associated with a component or factor in descending order versus the number of the component or factor. Scree **plots** in principal



components analysis and factor analysis to visually assess the factors explaining the most dominant other livelihoods coping strategies. At the point that the plot begins to level off, the additional factors explain less variance than a single variable.



**Figure 4.6 Scree Plot Representing eigenvalue's and its components**

Source: Field Survey, 2017



Table 4.10 indicate the principal factors in accordance with component 1, 2 and 3 to unveil the major coping strategies by farmers under other livelihood coping strategies. This were in the form of component in groups where component one hard becoming a cleaner or security in some institutions around which recorded .556 and .539 in component one. This was because the university has occupied their vast arable land with minimal pay offs hence as part of the social responsibility, some work and still farm within the corridors of UDS. A greater proportion of the people prefer to be in the profession of cleaner or security with the university.

**Table 4.10: Other Livelihood coping strategies as some Off-farm opportunities**

| Other livelihood coping strategies | Components Groups |       |       |
|------------------------------------|-------------------|-------|-------|
|                                    | 1                 | 2     | 3     |
| Becoming a cleaner                 | .556              | -.101 | -.010 |
| Becoming a security                | .519              | -.343 | -.349 |
| Weaving of smock                   | .019              | .685  | -.292 |
| Sand winning                       | .037              | -.112 | .817  |
| Hunting                            | .132              | .339  | .141  |
| Woodcarving                        | .039              | .262  | .370  |

**Source: Field Survey, 2017**

Other communities of study had it that most institutional structures available contracted them for such jobs in the area but one-man stress that:

*“it was a better venture to be a cleaner or security because urban growth has reduced their arable lands and even kick people out of production though greater number of them are still into subsistence farming but for me I love this work with my ‘small small’ agriculture on my mother’s land”.*

Component two unveiled weaving of smoke as being one of the most important livelihood option for the people in the study area with reference to urban expansion and the reduction of arable land in the study area. Weaving of smoke had 0.685 in component two which illustrate its dominate as livelihood option for agriculture. Though the smoke industry is faced with several challenges in Wa, some weavers



indicated that the business is very good compared to farming. One farmer in Kpong said that:

*“as the population of Wa increases demand for smocks has increased over the years hence it is more beneficial to be in the industry with no dependence on the weather and landlords wish to determine output”.*



**Plate 4.4. Smock weaving as an alternative livelihood option economic activity in Wa**

Source: Field Survey, 2017

Though the practice of sand winning has been addressed but most of the responsible men who are farmers indicated that they also engage in this during the off season because construction of hostels, and fuel stations among others have increased to address urban expansion in the study area which further make the practice beneficial. This was reflected in component 3 recording 0.808. The people outline some reasons such as poor weather condition for farming, exorbitant land pricing, the loss of “work and share” in the system as contributing to their option for this livelihood in the study communities. This however, affect agriculture at the long run and food security in particular but they stress that, it was an option they have taken to survive with their families though some little agricultural activities are attached to it but far away from where the practice was done.

#### **4.7 Conclusion**

This chapter examines the demographic and socio-economic characteristics of respondents, nature of urban expansion, extent of urban expansion, trend of land and output loss to build up expansion. The study revealed that, huge tracts of agricultural land have been affected and farmers are coping within agriculture as well as other livelihoods coping strategies.





## CHAPTER FIVE

### SUMMARY, CONCLUSION AND RECOMMENDATIONS

#### 5.1 Introduction

This chapter summarizes the entire work into themes of findings, conclusions and recommendations. This chapter firms the linkages between findings of the study and that of other studies. This chapter also concludes on all the aspects of the study and the policy recommendation made by the researcher. Though the recommendations are not binding on the mandated institutional structures, they may yield fruitful results if implemented by the authorities and other relevant stakeholders interested in the management of peri urban lands in Wa and the promotion of some important coping strategies for farmers in the face of rapid urban expansion.

#### 5.2 Summary of Major Findings

From objective one, the study revealed that urban expansion has led to a displacement of crop farmers as a result of the growing urban demand for peri-urban natural resources such as land. This research indicates that there has been reduction in the number of people employed in agricultural sector to other livelihood option in the study area, and this pressurized peri urban crop farming. Arable land uses are getting narrower because of urban demand for peri-urban land for residential purposes. Hence the change detection results confirmed that there is a positive relationship between urban land cover changes and urban growth. The study revealed that urban expansion is inevitable in Wa, the capital which has absorbed many areas that were seen as an outskirts. Urban expansion in Wa has been rapid since 2000 following population growth and key developmental projects such as the redevelopment of the township and the upgrading of the city core. The urban area of Wa has outstripped its boundaries since then.



Results from the 2000 to 2015 analysis indicates that the catchment area has suffered a substantial quantity of changes in terms of land cover. Though some percentage of farmlands exist because the areas are predominantly agricultural zone, Commercial and residential users of Peri Urban lands are reducing where it steadily over the years. It was revealed that between 2000 and 2015, grassland and farmlands lost a total of 3835.1-hectare (51.4%) to other features such as build up which has increased significantly from 1989.6 hectares in 2000 to 7954.5 hectares (80% increment) with a difference of 5964.84 hectares hence confirming Adjei (2014) study that urban Africa green spaces are depleting at an alarming rate which is now occupying a small fraction of the landmass of several urban areas.

A significant t-text (0) indicates that there is a difference between the two variables of yield 15 years ago and yield now confirmed that, there has been a huge reduction of yields of farmers with a mean difference of 13.40 thus 17.42 and 4.2 respectively. Also, A significant t-text (0) indicates that there is a difference between the two variables of farm size 15 years ago and farm seize now with a mean difference of 7.98, thus 11.28 and 3.3 respectively which confirms that there has been a huge reduction of farm land of farmers to other land uses in the study area such us commercial and residential land uses as confirm by the change detection statistics. It was revealed that the trend of output loss and farm size loss to urban expansion has increased. The analysis in objective two indicates that 90.92 hectares in average loss of land and 2,457.23 tons.

Though tree crops recorded a lower percentage (7%), because of poor ready market for their produce than elsewhere in Ghana. However, a mango farmer said that he exports his produce to the south for better money but again stress that the best way for a poor





farmer to protect his/her land is to grow tree crops. This therefore attested to the fact that more farmers are now into the planting of tree crops instead of food crops.

The study revealed that both organic and inorganic farming practices was being undertaken by crop farmers with some as an imbedded coping strategy. The study confirmed that organic standards were basically used by respondents to allow the use of natural substances to aid crop production. They therefore proposed that the practices under such system encourage fitness within the agro-ecosystem, including soil organisms, plants, livestock among others, this therefore confirm Canadian Organic Standards (2006) that it protect the environment, minimize soil degradation and erosion, decrease pollution, and optimize biological degradation.

Crop rotation, horticultural farming and agroforestry practice as very common under organic farming practices in the study area as revealed. This practice was aimed to naturally enrich the soil nutrient and aid crop farming. The study revealed that other farmers who want to get abnormal profits demarcate their farm land into four and apply fertilizer on three and the remaining one is for family consumption. Hence it therefore confirms why commercial farming was prominent but subsistence farming also had an appreciable percentage thus 52.4% and 48.6% respectively. Majority of the respondents 68 % specified that they use both in their farms. Respondents revealed that, Nutrients in mineral fertilizers are comparatively high, its decomposition was quick because there is no need for decomposition, such inorganic fertilizer was revealed to cause destruction of soil texture and structure, which often leads to soil erosion and acidity resulting in leaching. All these give rise to reduced crop yields as soil degradation and nutrients imbalance increases in the study area (Ojeniyi, 2000).



Agricultural land conversion was revealed by factor analysis as a major cause that contribute to reduction of arable lands in Peri urban Wa. Observation by the researcher revealed that ongoing encroachment on to agricultural lands in the study area was for residential and commercial uses has affected soil fertility and shrinking arable space. As many constructional activities is ongoing the key green space for farming under immense pressure. This is in line with what Lichtenberg and Ding (2008) that there are two major drivers that contribute to ALC; internal and external Land degradation and development (industrialization). Hence, Firman (1999) indicated that regions surrounding Jakarta in Indonesia had a widespread ALC because of industrial estates development. Luoto et al. (2003) linked agricultural production changes to landscape fragmentation and green space deterioration with agricultural lands conversion to urban development.

The second component indicates sand winning and land tenure arrangement as the principal factors that also influences crop land reduction in the study area which recorded 0.770 and 0.546 respectively. Sand winning has been increasing in most growing cities in Ghana because of increasing constructional activities. As a process of land degradation, sand winning destroys the soil profile, damages soil surface structure and changes scenery of the land (Mehta et al.2007), hence it is in line with recent upsurge in demand for savannah sand and gravel in Wa as indicated by (Peprah 2013). This has diminished all agricultural activities in the area because the culvert created by such activity redirect rain water onto farmlands which often disturb farmers and aids soil infertility. It was deduced that land in such areas was far to be used for agriculture as landlord's cash more on the sale of land than to use it for agricultural activities. Peri Urban farmers however outlined that their landlords are "wicked" because the practice of selling land to sand winners does not allow them to practice shifting cultivation as



continuous use of their already reduced land reduced yield. Hence, they either stop crop production and move into other livelihoods or stay and apply fertilizer.

As a coping strategy with urban expansion effect in peri urban Wa, the survey identified farmers who were engaged in Abunu/Abusa (work and share) farming as most secured. This was because landowners had a share in the produce and may not allow infiltration or encroachment of farmlands until the end of the season and where tree crops were grown the situation works more to the advantage of the farmers.

The study revealed that, respondents resorted to migration and diversification of resources in order to cope with urban expansion effects. It was discovered that most households in the study areas rarely depend on other livelihood activity for survival. However, majority of the households combine both farm and non-farm strategies in order to cope with the effects of urban Expansion. This confirmed why farmers were in different occupations as a survival strategy to cushion the shock of urban expansion effects on peri urban agriculture. Farmers take advantage to farm on open spaces yet to be developed and mostly reserved for future land uses such as; building sites, along riverbanks, drains and water catchment areas. It was revealed that most farmers have no option to address the negative effect of urban expansion phenomenon hence they resorted to the continuous use of land over long period. Farmers outlined that because constant pressure is exerted on them, they now concentrate on some crops with short gestation periods that might occupy the land temporary before other invertors come to buy those lands outright.

Also, the intensive use of organic fertilizer by farmers had a recognition and was basically adopted to help improve arable land in the area whiles crop rotation was



widely practiced by majority of the farmers, as they revealed that they have been educated by the district MoFA officers on the principles of crop rotation and that has become a very good strategy for using a piece of land for a longer period of time. Others (constituting 7%) had it that tree cropping is one good way to secure land by protecting it while agroforestry integrates crops and livestock with trees and shrubs as a means of enhancing both forest and crop production. Hence it was revealed that agroforestry was widely practiced to protect the shea trees and also to reduce charcoal burning.

There are other coping strategies which were best adopted by farmers under coping strategies with respect to other livelihoods. These were in the form of component in groups where component one had become a cleaner or security in some institutions around. This was what one small business owner in Bamahu had to say:

*“most of the people in Wa if not educated or self-employed they are cleaners and security men and women at some institutions in Wa”.*

Weaving of smoke has been one of the most important livelihood option for the people in the study areas instead of farming with reference to urban out growth and the reduction of arable land. Weaving of smoke had 0.685 in component two which illustrates its dominance as a livelihood options to agriculture since the chain of production is much long and creates numerous employment opportunities. Though the smoke industry is faced with several challenges in Wa, some weavers indicated that the business is very good compared to farming.

Though the practice of sand winning has been addressed, most of the responsible men who are farmers indicated that they also engage in this during the off season because construction of hostels, and fuel stations, among others have increased to address urban



growth in the study area. This was reflected in component 3 recording 0.817. The people outlined some reasons such as poor weather conditions for farming, exorbitant land pricing, the loss of “work and share” in the system has contributing to their option for this livelihood. This however, affect agriculture in the long run and food security in particular but they stress that, it was an option they have taken to survive with their families though some little agricultural activities are attached to it but far away from where the practice.

### **5.3 Conclusions**

The assessment of urban expansion effects on peri urban crop farming in Wa and the coping strategies farmers adopt to enhance and sustain production is essential. However, the horizontal and radial expansion of urban Wa on per urban livelihood has come with both constraints and opportunities to people living in peripheral communities or the fringes of Wa. The study discovered that urban expansion was inevitable and has engulfed most peri urban arable lands which poses serious threat to peri-urban dwellers who depend on natural resources for survival especially land for crop farming. People have been deprived of their farmlands as a result of rapid agricultural lands conversion to urban land uses and the number of people engaged in agricultural activities have been reduced drastically with respect to their yield and farm size. This was summarized by the empirical evidence of land cover change of Wa between 2000 and 2015 through Landsat images with ArcMap 10.4.

Peri urban areas, by virtue of their proximity and connectivity to the city, now have greater infrastructure infiltration, demand for goods and services and opportunity to acquire skills and knowledge which has indeed affected crop farming in the areas. Drawing on the results from the survey, conclusions were that interventions from local



and traditional institutions are towards the general population of the study areas and not specifically towards those whose livelihood have been negatively affected. These interventions are not aimed at providing alternative means of livelihood to absorb the affected indigenes. Based on the survey results and the interviews conducted, it can be said that, local government institutions are more responsive to local needs than traditional institutions.

Again, most of the expansion in human settlements has been experienced mostly within the peri-urban environments and has involved a rapid loss of hitherto arable lands such as natural vegetation and current arable spaces. Fascinatingly, as vegetative cover declined, urban physical infrastructure stretched immensely within the period and after urban expansion. However, reduction in farmlands as a result of increase in build ups has subsequently threatened food security in the study area which are proven in literature. Uncoordinated and unregulated sand winning activity has dissatisfied the efforts of many farmers to expand their production capacities and has affected local staples like maize, rice, yam and vegetables.



The study unveiled some important coping strategies farmers adopt to help in coping with the phenomenon of urban expansion. It was categorized into farm and non-farm coping strategies adopted widely to help improve the livelihoods of peri urban dwellers. The farm coping mechanisms included; same old crop on small piece of land, intensive application of organic fertilizer, crop rotation, tree cropping, agro forestry which was seen as a means of protecting farm land. Naturally improving production with crop types and natural fertilizer application were predominantly used by farmers in the study area as a means of responding to urban expansion in Wa. Non-farm coping mechanisms included; becoming a cleaner, becoming a security, weaving of smock, sand winning,

hunting, and woodcarving. Though all were aimed at improving livelihoods out of agriculture, some were exacerbating the challenges in peri urban farming such as sand winning and hunting.

#### **5.4 Recommendations**

Base on the findings of this study, the researcher wishes to make the following recommendations which in the view of the researcher will, to a larger extent, help in the management of urban expansion and lands use changes in the study area and their impacts on peri-urban livelihoods and especially the coping strategies farmers adopt in such areas.

Regarding the rapid rate at which Wa is expanding, coupled with urban land transformations there is the need for adequate planning strategies to be formulated in order to properly monitor and control the uncoordinated and unregulated land occupation such as the extension of built up area onto arable lands. Peri-urban land fragmentation may be offset by urban led demands for preservation uses that permit various degrees of use in the area. Hence the recommendation is that collaborative management approaches that involve community members, the private sector, researchers, and other stakeholders (landlords, chiefs and elders, and governmental institutions) in land decision-making processes will effectively help in land management in Wa.

There should be effective control of haphazard development in urban and peri urban environments, it is recommended that cognisant efforts should be made at the national, regional, and municipal levels to develop comprehensive land-use plans to guide urban and peri-urban land management. As part of a housing policy, they should have



encouraged high rise buildings for housing and office accommodation must be encouraged rather than horizontal expansion of offices and residential accommodation, which could encourage further expansion.

Ghana and for that matter Wa municipal must update recommended urban development policy that focus on maintaining rational balance between urban infrastructure development, ecological sustainability, and agricultural production. The social livelihood practices (excessive sand winning, land litigation) and its economic implications (reduction in crops yield and food supply, reduction in farmers' income and food insecurity) all come as a result of urban expansion. Hence peri urban crop farming should be watched with the lens of urgency and priority. Sustainable peripheral/fringe agriculture (crop farming) should be encouraged as a means of improving food security that is meeting the food needs of many of those at the peripheries, urban poor and the rich that depend on the farm produce at the market.

More importantly, it is recommended that government in collaboration with the stakeholders in Wa should as a matter of urgency acquire some parcels of land that would be designated purposely for farming activities in the Municipality, because farming is the backbone of majority of the inhabitants in municipal Wa, especially those at the fringes who are affected by urban expansion. This is a necessity, because if Ghana wants to maintain agriculture to become the largest employer again for its populace. The researcher also recommended that, livelihood security of farmers should be greatly given to farmers in diverse ways to enhance their survival.





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**APPENDICE**

**QUESTIONNAIRE**

**URBAN EXPANSION AND ITS EFFECTS ON PERI URBAN AGRICULTURE IN  
WA MUNICIPALITY OF GHANA**

**APPENDIX 1**

Structured Interview and Questionnaire Schedule for Sampled Household Heads.

Community/Town.....

This Research Instrument is designed to seek relevant primary data for the conduct of an academic study on the topic urbanization and urban growth in Ghana, Peri-urban farmers coping strategies in wa. The research is conducted in partial fulfilment of obtaining an MPhil Degree in Development Studies from University for development Studies, Wa Campus. Your support and co-operation is very much expected and please be assured that your responses will be treated with utmost confidentiality.

Please provide the right answers by either ticking or writing in the spaces provided.

**Section (1) BACKGROUND INFORMATION OF RESPONDENT**



AGE

| Code | Response           |       |
|------|--------------------|-------|
| 1    | 18 - 35 years      | [   ] |
| 2    | 36 - 45 years      | [   ] |
| 3    | 46 – 59 years      | [   ] |
| 4    | 60 years and above | [   ] |

SEX

| Code | Response |       |
|------|----------|-------|
| 1    | Male     | [   ] |
| 2    | Female   | [   ] |

MARITAL STATUS

| Code | Response |       |
|------|----------|-------|
| 1    | Single   | [   ] |
| 2    | Married  | [   ] |
| 3    | Divorce  | [   ] |



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|   |               |     |
|---|---------------|-----|
| 4 | Widow/Widower | [ ] |
|---|---------------|-----|

---

|   |             |     |
|---|-------------|-----|
| 5 | Co-Habiting | [ ] |
|---|-------------|-----|

---

#### LEVELS OF EDUCATION

---

| Code | Response |  |
|------|----------|--|
|------|----------|--|

---

|   |       |     |
|---|-------|-----|
| 1 | Basic | [ ] |
|---|-------|-----|

---

|   |       |     |
|---|-------|-----|
| 2 | S.H.S | [ ] |
|---|-------|-----|

---

|   |  |     |
|---|--|-----|
| 3 | GCE O <sup>2</sup> /A <sup>2</sup> Level | [ ] |
|---|--|-----|

---

|   |   |     |
|---|---|-----|
| 4 | Tertiary level (College, Polytechnic, University) | [ ] |
|---|---|-----|

---

|   |      |  |
|---|------|--|
| 5 | None |  |
|---|------|--|

---



#### OBJECTIVE TWO

#### TO ANALYZE THE NATURE OF PERI URBAN AGRICULTURE IN WA

What type of crops do you cultivate?

---

| Code | Response |  |
|------|----------|--|
|------|----------|--|

---

|   |   |     |
|---|---|-----|
| 1 | Vegetables (Tomato, Pepper, Garden eggs, Onion) | [ ] |
|---|---|-----|

---





|      |                         |  |  |  |  |
|------|-------------------------|--|--|--|--|
| VII  | Bee keeping             |  |  |  |  |
| VIII | Agro forestry           |  |  |  |  |
| IX   | Horticulture            |  |  |  |  |
| X    | Shifting<br>cultivation |  |  |  |  |



Do you rear the following animals?

| Code | Responses                       |        |
|------|---------------------------------|--------|
| 1    | Goat                            | [    ] |
| 2    | Sheep                           | [    ] |
| 3    | Pig                             | [    ] |
| 4    | Cattle                          | [    ] |
| 5    | Fowl (Guinea, Cock/Hen, Turkey) | [    ] |

Is crop farming your main activity

| Code | Response |        |
|------|----------|--------|
| 1    | Yes      | [    ] |
| 2    | No       | [    ] |

What is your reason in engaging in crop farming?

| Code | Response                           |
|------|------------------------------------|
| 1    | For home [ ]<br>consumption        |
| 2    | To sell at the local [ ]<br>market |
| 3    | For export [ ]                     |
| 4    | To feed an industry [ ]            |
| 5    | Others specify<br>.....            |

What is the scale of your product?

| Code | Response        |
|------|-----------------|
| 1    | Subsistence [ ] |
| 2    | Commercial [ ]  |



Reduction in crop lands is attributed to the following.

|      | Factors                            | Disagree (1) | Strongly disagree (2) | Agree (3) | Strongly Agree (4) |
|------|------------------------------------|--------------|-----------------------|-----------|--------------------|
| I    | Unreliable rainfall                |              |                       |           |                    |
| II   | Altitudinal change                 |              |                       |           |                    |
| III  | High land Values                   |              |                       |           |                    |
| IV   | Tenure arrangement<br>(Litigation) |              |                       |           |                    |
| V    | Agricultural land<br>conversion    |              |                       |           |                    |
| VI   | Loss of Soil fertility             |              |                       |           |                    |
| VII  | Sand winning                       |              |                       |           |                    |
| VIII | Loss of Agricultural<br>lands      |              |                       |           |                    |



Which crop has been greatly affected by urban growth

| Code | Response            |
|------|---------------------|
| 1    | Vegetable [     ]   |
| 2    | Root tubers [     ] |
| 3    | Tree crops [     ]  |
| 4    | Cereals [     ]     |
| 5    | None [     ]        |

Give reason to your answer

**OBJECTIVE THREE**

**TO EXAMINE THE EFFECT OF URBAN GROWTH ON PERI URBAN**

**CROP FARMING**

How did you acquire your farm land?

| Code | Response                    |
|------|-----------------------------|
| 1    | Through lease [     ]       |
| 2    | A gift [     ]              |
| 3    | Outright purchase [     ]   |
| 4    | Through inheritance [     ] |



---

5 Abura/Abusa [ ]

---

Does urban growth affect you as a farmer?

---

Code Response

---

1 Yes [ ]

---

2 No [ ]

---

If yes what have you seen

---

Code Response

---

1 Farm land are now build up [ ]

---

2 Crop farmers are shifting to tree crop [ ]

---

3 Farmers diverting to non-farm activities [ ]

---

4 Few people are into farming [ ]

---

5 Difficulty in land [ ]

---

6 Decrease in farm size [ ]

---

Have you experience decreased in your produce over the years

---

Code Response

---

1 Yes [ ]

---

2 No [ ]

---

17 b. If yes, about what percentage



How many acres of land do you cultivate?

What yield do you get from your cultivable land?

Does urban growth affect you as a farmer

| Code | Response                                |
|------|---|
| 1    | Decrease in farm size [      ]          |
| 2    | Difficulty in land acquisition [      ] |
| 3    | Others Specify<br>.....                 |

Apart from farming what use do they put land to?

| Code | Response             |
|------|----------------------|
| 1    | Residential [      ] |
| 2    | Commercial [      ]  |
| 3    | Civic [      ]       |



Do you envisage in the next 10 years the greater part or the entire farm land could be wiped by buildup?

|          |                |         |          |          |                   |
|----------|----------------|---------|----------|----------|-------------------|
| Code     | 1              | 2       | 3        | 4        | 5                 |
| Response | Strongly agree | Agree   | Not sure | Disagree | Strongly disagree |
| Tick     | [     ]        | [     ] | [     ]  | [     ]  | [     ]           |

Could the current trend of urban growth in Wa affect crop production in Peri-Urban areas.

|          |                |         |          |          |                   |
|----------|----------------|---------|----------|----------|-------------------|
| Code     | 1              | 2       | 3        | 4        | 5                 |
| Response | Strongly agree | Agree   | Not sure | Disagree | Strongly disagree |
| Tick     | [     ]        | [     ] | [     ]  | [     ]  | [     ]           |

Does land loss to urban growth affect output of farmers code

|          |                |         |          |          |                   |
|----------|----------------|---------|----------|----------|-------------------|
| Code     | 1              | 2       | 3        | 4        | 5                 |
| Response | Strongly agree | Agree   | Not sure | Disagree | Strongly disagree |
| Tick     | [     ]        | [     ] | [     ]  | [     ]  | [     ]           |





What do you think could be done to protect food crop farmers with inevitable urban growth phenomenon?

.....

.....OBJECTIVE FOUR

As settlement gradually extend into your farm land, what coping mechanism do you adopt most

| Code | Response            |         |
|------|---------------------|---------|
| 1    | Agriculture related | [     ] |
| 2    | Other livelihood    | [     ] |
| 3    | Migration           | [     ] |

Farmers adopt the following coping mechanisms under agriculture, other livelihood and migration. Tick under each taking into account Disagree (1), Strongly disagree (2), Agree (3), Strongly agree (4)



|            | Component and sub strategy           | Disagree | Strongly disagree | Agree | Strongly agree |
|------------|--------------------------------------|----------|-------------------|-------|----------------|
| <i>I</i>   | Same old crop on small piece of land |          |                   |       |                |
| <i>II</i>  | Intensive fertilizer application     |          |                   |       |                |
| <i>III</i> | Crop rotation                        |          |                   |       |                |



|            |                                       |  |  |  |  |
|------------|---------------------------------------|--|--|--|--|
| <i>IV</i>  | Tree cropping                         |  |  |  |  |
| <i>V</i>   | Organic farming                       |  |  |  |  |
| <i>VI</i>  | Rearing of animal in farm             |  |  |  |  |
|            | Other livelihood                      |  |  |  |  |
| <i>I</i>   | Becoming a cleaner                    |  |  |  |  |
| <i>II</i>  | Opening of small stores               |  |  |  |  |
| <i>III</i> | Weaving of smock                      |  |  |  |  |
| <i>IV</i>  | Sand winning                          |  |  |  |  |
| <i>V</i>   | Hunting                               |  |  |  |  |
| <i>VI</i>  | Wood carving                          |  |  |  |  |
|            | Migration                             |  |  |  |  |
| <i>I</i>   | To the CBD for service work           |  |  |  |  |
| <i>II</i>  | Outside the region                    |  |  |  |  |
| <i>III</i> | To the hinterland for longer farms    |  |  |  |  |
|            |                                       |  |  |  |  |
| <i>IV</i>  | Migration to other nearby arable land |  |  |  |  |
| <i>V</i>   | Outside Ghana                         |  |  |  |  |

In terms of sustaining and enhancing crop farming in Peri Urban Wa, which of these method will you employ

| Code | Response    | [ | ] |
|------|-------------|---|---|
| 1    | Traditional | [ | ] |
| 2    | Scientific  | [ | ] |
| 3    | Both        | [ | ] |
| 4    | Natural     | [ | ] |

How prudent is your choice?



INTERVIEW GUIDES ON

URBAN GROWTH, AGRICULTURAL LAND USES AND FOOD CROP

PRODUCTION IN PERI-URBAN WA

URBAN EXPANSION AND ITS EFFECTS ON PERI URBAN AGRICULTURE IN  
WA MUNICIPALITY OF GHANA

APPENDIX 2

Structured Interview and Questionnaire Schedule for Sampled Household Heads.

Community/Town.....

This Research Instrument is designed to seek relevant primary data for the conduct of an academic study on the topic urbanization and urban growth in Ghana, Peri-urban farmers coping strategies in wa. The research is conducted in partial fulfilment of obtaining an MPhil Degree in Development Studies from University for development Studies, Wa Campus. Your support and co-operation is very much expected and please be assured that your responses will be treated with utmost confidentiality.



QUESTIONNAIRES FOR LANDS COMMISSION, TOWN & COUNTRY

PLANNING AND MUNICIPAL WORKS

For how long have you been in this town as an officer? .....

What do you understand by the term land use changes?.....

In your opinion what do you think are the causes of land use changes in the Wa municipality?.....

How aware are you about the land use changes in peri urban areas of Wa especially;

What is your institution doing to the regulation of land use changes in the above mentioned

communities?.....

.....

To what extent does your institution contribute to land use changes.....

What significant changes have the institution notice in the land cover for the past 10 years?.....

.....

What is the total farmland sizes of the selected communities in the past 10 years?

.....

What is the current cultivable farm sizes of the selected communities? .....



## URBAN EXPANSION AND ITS EFFECTS ON PERI URBAN AGRICULTURE IN WA MUNICIPALITY OF GHANA

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QUESTIONNAIRES FOR AGRICULTURAL INSTITUTION (MOFA)

What is the highest land use practice in the Municipality?

What is the highest livelihood activity in the municipality?

What types of crops do they grow predominantly?

Which crops have significantly reduced in quantity?

What farming practices do the selected communities engages themselves in?

What is the total produce of these crops: mango, beans, yam, corn, millet, Cashew, potato?

Does food lost enough to cause food insecurity in the Municipality?

What coping strategies do you suggest for farmers to adopt?

What scientific and traditional mechanisms do farmers adopt to enhance and sustain production?

Do they in any way combine both?

How prudent it is?



URBAN EXPANSION AND ITS EFFECTS ON PERI URBAN AGRICULTURE IN  
WA MUNICIPALITY OF GHANA

APPENDIX 3

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FOCUS GROUP DISCUSSION GUIDE FOR FARMERS' ASSOCIATIONS

Have you experience any change in the land cover or the vegetation?

If yes, what may be the cause?

What significant changes have you notice in the land cover or the vegetation for the past 10 years?

Have the members been experienced any significant increase or decrease in annual produce over the past ten years?

If yes, about what percentage is the increased or decreased per year over the past 10 years?



Have you envisaged any expansion of the settlement towards your farm? or

Has the farm been encroached upon by build ups for the past 10 years?

If yes, what/who is causing the encroachment to the farm(s)? Is it individuals, companies, government, etc?

What is the highest land use practice in this town? (Example, farming, rent/leasing for building, quarrying, sand winning etc).

Is farming your livelihood activity?

